MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Sponsored by CMR Educational Society
(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)
Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.
Contact Number: 040-23792146/64634237, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in

BACHELOR OF TECHNOLOGY

AERONAUTICAL ENGINEERING

ACADEMIC REGULATIONS

(Batches admitted from the academic year 2018 - 2019)

Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- ➢ "Autonomous Institution /College" means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.

- ➢ "Academic Autonomy" means freedom to the College in all aspects of conducting its academic programs, granted by the University for promoting excellence.

- ➢ "Commission" means University Grants Commission.

- ➢ "AICTE" means All India Council for Technical Education.

- ➢ "University" the Jawaharlal Nehru Technological University, Hyderabad.

- ➢ "College" means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.

- ➢ "Program" means:
    - ▪ Bachelor of Technology (B.Tech) degree program
    - ▪ UG Degree Program: B.Tech

- ➢ "Branch" means specialization in a program like B.Tech degree program in Electronics & Communication Engineering, B.Tech degree program in Computer Science and Engineering etc.

- ➢ "Course" or "Subject" means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.

- ➢ T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality of education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The cooperation of all the stakeholders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

"A thought beyond the horizons of success committed for educational excellence"

PRINCIPAL

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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VISION

❖ To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modern society.

MISSION

❖ To become a model institution in the fields of Engineering, Technology and Management.

❖ To impart holistic education to the students to render them as industry ready engineers.

❖ To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

QUALITY POLICY

❖ To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.

❖ To provide state of art infrastructure and expertise to impart quality education.

❖ To groom the students to become intellectually creative and professionally competitive.

❖ To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never - ending ladder of **SUCCESS** year after year.

For more information: www.mrcet.ac.in

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
AERONAUTICAL ENGINEERING
COURSE STRUCTURE

I Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0001	English	2			2	30	70
2	R18A0021	Mathematics – I	3	1		4	30	70
3	R18A0013	Engineering Chemistry	3			3	30	70
4	R18A0261	Basic Electrical and Electronics Engineering	3			3	30	70
5	R18A0501	Programming for Problem Solving	3			3	30	70
6	R18A0082	Engineering/IT Workshop	-		4	2	30	70
7	R18A0581	Programming for Problem Solving Lab	-		3	1.5	30	70
8	R18A0289	Basic Electrical and Electronics Engineering Lab	-		3	1.5	30	70
9*	R18A0003	Human Values & Societal Perspectives	2		-	0	100	-
		TOTAL	**16**	**1**	**10**	**20**	**340**	**560**

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

I Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0002	Professional English	2			2	30	70
2	R18A0022	Mathematics – II	3	1		4	30	70
3	R18A0012	Engineering Physics	3			3	30	70
4	R18A0502	Object Oriented Programming	3			3	30	70
5	R18A0301	Engineering Graphics	1		4	3	30	70
6	R18A0083	Engineering Physics/Chemistry Lab	-		4	2	30	70
7	R18A0582	Object Oriented Programming Lab	-		3	1.5	30	70
8	R18A0081	English Language Communication Skills Lab	-		3	1.5	30	70
		TOTAL	**12**	**1**	**14**	**20**	**240**	**560**

B. Tech (ANE) – III Semester (II Year – I Semester)

(5 Professional core courses+1 Eng Science course+1 mandatory course+2 Labs)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0361	Mechanics of Fluids	3	0	0	**3**	**30**	**70**
2	R18A0302	Engineering Mechanics	3	0	0	**3**	**30**	**70**
3	R18A0303	Thermodynamics	2	1	0	**3**	**30**	**70**
4	R18A2101	Introduction to Aeronautical Engineering	3	0	0	**3**	**30**	**70**
5	R18A2102	Aircraft Production Technology	3	0	0	**3**	**30**	**70**
6	R18A2103	Aerospace materials and composites	3	0	0	**3**	**30**	**70**
7	R18A2181	Aircraft Production Technology Lab	0	0	3	**1.5**	**30**	**70**
8	R18A2182	Aircraft Engineering Drawing Lab	0	0	3	**1.5**	**30**	**70**
9	R18A0014	*Environmental Sciences	2	0		**-**	**100**	**-**
		TOTAL	**21**	**1**	**6**	**21**	**340**	**560**

Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

B. Tech (ANE) – IV Semester (II Year – II Semester)

(4 Professional core courses+ 1 Basic Science Course+1 Open Elective+ 1 Mandatory Course+2 Labs)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A2104	Aerodynamics	2	1	0	**3**	**30**	**70**
2	R18A0362	Mechanics of Solids	2	1	0	**3**	**30**	**70**
3	R18A2105	Air Breathing Propulsion	3	0	0	**3**	**30**	**70**
4	R18A2106	Aircraft Performance	3	0	0	**3**	**30**	**70**
5	R18A0024	Probability and Statistics	3	0	0	**3**	**30**	**70**
6	OE - I	**OPEN ELECTIVE - I**	3	0	0	**3**	**30**	**70**
7	R18A0391	Mechanics of Solids and Mechanics of Fluids Lab	0	0	3	**1.5**	**30**	**70**
8	R18A0392	CAD Lab	0	0	3	**1.5**	**30**	**70**
9	R18A0004 R18A0005	* Foreign Language: French **or** * Foreign Language German	2	-	-	**0**	**100**	**-**
		TOTAL	**18**	**2**	**6**	**21**	**340**	**560**

Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE - I

1. **R18A0451** Digital Electronics

2. **R18A0251** Elements of Electrical Engineering

3. **R18A0551** Database Systems

4. **R18A0351** Elements of Mechanical Engineering

5. **R18A0352** Green Energy Systems

6. **R18A0051** Intellectual Property Rights

B. Tech (ANE) – V Semester (III Year – I Semester)
(3 Professional core courses+1 H & S course+1 Professional Elective course+1 Open Elective+2 Labs)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS INT	MAX. MARKS EXT
1	R18A2107	Aircraft Vehicle Structures	2	1	0	3	30	70
2	R18A2108	Aircraft Stability and Control	3	0	0	3	30	70
3	R18A0061	Managerial Economics and Financial Accountancy	3	0	0	3	30	70
4	R18A2109	High Speed Aerodynamics	2	1	0	3	30	70
5	R18A2131 R18A2132 R18A2133	PROFESSIONAL ELECTIVE – I 1. Introduction to Space Technology 2. Air Transportation systems 3. Wind Tunnel Techniques	3	0	0	3	30	70
6	OE - II	OPEN ELECTIVE - II	3	0	0	3	30	70
7	R18A2183	Aerodynamics and Propulsion Lab	0	0	3	1.5	30	70
8	R18A2184	Aircraft Structures Lab	0	0	3	1.5	30	70
9	R18A0007	*Constitution of India	0	0	0	0	100	-
		TOTAL	18	2	6	21	340	560

Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE - II

1.	**R18A0452**	Industrial Electronics	4.	**R18A1251**	Software Project Management
2.	**R18A0453**	Communication Networks	5.	**R18A1252**	Introduction to Analytics
3.	**R18A0552**	Introduction to Data Structures	6.	**R18A0353**	Engineering Optimization

B. Tech (ANE) – VI Semester (III Year – II Semester)
(3 Professional Core courses+ 1 Professional Elective course+ 1 Open Elective course+2 Labs)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS INT	MAX. MARKS EXT
1	R18A2110	Finite Element Analysis	2	1	0	3	30	70
2	R18A2111	Aerospace Propulsion Systems	3	0	0	3	30	70
3	R18A2112	Automatic Control Theory of Aircraft	2	1	0	3	30	70
4	R18A0363 R18A2134 R18A2135	PROFESSIONAL ELECTIVE – II 1. Mechanisms and Machine Design 2. Flight Scheduling Operations 3. Airframe Structural Design	3	0	0	3	30	70
5	OE - III	OPEN ELECTIVE - III	3	0	0	3	30	70
6	R18A2185	Computational Structures Lab	0	0	3	1.5	30	70
7	R18A2186	Programming Language for Mathematical Models Lab	0	0	3	1.5	30	70
8	R18A2189	Mini Project	0	0	6	3	30	70
9	R18A0006	*Technical communication and soft skills	0	0	0	0	100	-
		TOTAL	16	2	12	21	340	560

Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE - III

1.	**R18A0454**	Robotics Engineering	4.	**R18A0554**	Game Programming
2.	**R18A0455**	Bio Medical Engineering	5.	**R18A0354**	Nano Technology
3.	**R18A0553**	Python Programming	6.	**R18A0052**	Enterprise Resource Planning

B. Tech (ANE) – VII Semester (IV Year – I Semester)
(4 Professional core courses+ 1 Professional Elective courses+ 2 Labs)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A2113	Computational Aerodynamics	2	1	0	3	**30**	**70**
2	R18A0364	Mechanical Vibrations	2	1	0	3	**30**	**70**
3	R18A2114	Flight Vehicle Design	3	0	0	3	**30**	**70**
4	R18A2115	Avionics	3	0	0	3	**30**	**70**
5	R18A0328 R18A2136 R18A0320	**PROFESSIONAL ELECTIVE – III** 1. CAD/CAM 2. Aircraft systems 3. Heat Transfer	3	0	0	3	**30**	**70**
6	R18A2187	Computational Aerodynamics Lab	0	0	3	1.5	**30**	**70**
7	R18A2188	Flight Vehicle Design and Instruments Lab	0	0	3	1.5	**30**	**70**
8	R18A2190	**Project - I**	-	-	6	3	**30**	**70**
		TOTAL	**13**	**2**	**12**	**21**	**240**	**560**

B. Tech (ANE) – VIII Semester (IV Year – II Semester)
(1 Professional Core Course + 2 Professional Elective Courses + Major Project)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A2116	Aircraft Maintenance Engineering	3	0	0	3	**30**	**70**
2	R18A2137 R18A2138 R18A2139	**PROFESSIONAL ELECTIVE – IV** 1. Helicopter Engineering 2. Advanced Computational Aerodynamics 3. Analysis of Composite Structure	3	0	0	3	**30**	**70**
3	R18A2140 R18A2141 R18A2142	**PROFESSIONAL ELECTIVE – V** 1. Airline and Airport Management 2. Aero-elasticity 3. Hypersonic Aerodynamics	3	0	0	3	**30**	**70**
4	R18A2191	**Project - II**	0	0	12	6	**60**	**140**
5		**TOTAL**	**9**	**0**	**12**	**15**	**150**	**350**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM -ANE   **L T/P/D /C**
                                                                       2/ - / - / - / 2

(R18A0001)ENGLISH

INTRODUCTION:

English is a global language which is a means to correspond globally. Keeping in account of its vital role in the global market, emphasis is given to train the students to acquire language and communication skills. The syllabus is designed to develop and attain the competency in communicative skills.

The lectures focus on the communication skills and the selected act as resources for the teachers to develop the relevant skills in the students. The lessons stimulate discussions and help in comprehending the content effectively. The focus is on skill development, nurturing ideas and practicing the skills.

OBJECTIVES:

1. To enable students to enhance their lexical, grammatical and communicative competence.
2. To equip the students to study the academic subjects with better perspective through theoretical and practical components of the designed syllabus.
3. To familiarize students with the principles of writing to ensure error-free writing.
4. To know to use sentence structure effectively and to understand how to convert ideas logically within a sentence.
5. To expose students to various techniques of reading skills which hone their comprehensive skills.

SYLLABUS:

Unit –I
Chapter entitled "***The Road Not Taken****" by* Robert Frost   (8 hrs)
Grammar   –Tenses and Punctuation (Sequences of Tenses)
Vocabulary   –Word Formation - Prefixes and Suffixes
Writing   – Paragraph writing –I (Focusing on Tenses and Punctuations)
Reading   – Techniques for effective reading-Reading Exercise –Type 1

Unit – II
Chapter entitled "***Abraham Lincoln's Letter to His Son's Teacher****"*   (7 hrs)
Grammar   – Voices, Transitive and Intransitive Verbs

Vocabulary   – Synonyms, Antonyms
Writing   – E-mail Writing, Letter Writing (complaints, requisitions, apologies).
Reading   – Skimming, scanning- Reading Exercise –Type 2

Unit – III
Chapter entitled "*War*" by L. Pirandello   (6 hrs)
Grammar   –Degrees of Comparison, Prepositions
Vocabulary – Phrasal Verbs
Writing   – Essay Writing (Introduction, body and conclusion)
Reading   – Comprehension- Reading Exercise – Type 3

Unit – IV
Chapter entitled "*J K Rowling's Harvard Speech*"   (6 hrs)
Grammar   – Articles, Misplaced Modifiers
Vocabulary – One-Word Substitutes
Writing   – Précis Writing
Reading   – Intensive and Extensive reading - Reading Exercise – Type 4

Unit –V
 Sentence Structures (phrases and clauses)   (7 hrs)
Grammar   – Subject-Verb Agreement, Noun-Pronoun Agreement
Vocabulary – Commonly Confused Words
Writing   – Memo Writing
Reading   – Identifying Errors - Reading Exercise – Type 5

* Exercises apart from the text book shall also be used for classroom tasks.

REFERENCE BOOKS:

1.   Practical English Usage. Michael Swan. OUP. 1995.
2.   Remedial English Grammar. F.T. Wood. Macmillan.2007
3.   On Writing Well. William Zinsser. Harper Resource Book. 2001
4.   Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5.   Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
6.   Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

OUTCOMES:

Students will be able to:

1. write formal or informal letters and applications for different purposes.
2. select and extract relevant information through skimming and scanning.
3. utilize the strategy of brainstorming in preparing analytical, argumentative and expository essays.
4. draft concise emails following professional email etiquette.
5. enhance their grammatical competency by spotting errors.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM -ANE   **L   T/P/D   C**

                                                                                                        3   1/-/-   4

(R18A0021) MATHEMATICS -I

Course Objectives: To learn

1. The concept of rank of a matrix which is used to know the consistency of system of linear equations and also to find the eigen vectors of a given matrix.
2. Finding maxima and minima of functions of several variables.
3. Applications of first order ordinary differential equations. (Newton's law of cooling, Natural growth and decay)
4. How to solve first order linear, non linear partial differential equations and also method of separation of variables technique to solve typical second order partial differential equations.
5. Solving differential equations using Laplace Transforms.

UNIT I: Matrices

Introduction, types of matrices-symmetric, skew-symmetric, Hermitian, skew-Hermitian, orthogonal, unitary matrices. Rank of a matrix - echelon form, normal form, consistency of system of linear equations (Homogeneous and Non-Homogeneous). Eigen values and Eigen vectors and their properties (without proof), Cayley-Hamilton theorem (without proof), Diagonalisation.

UNIT II:Functions of Several Variables

Limit continuity, partial derivatives and total derivative. Jacobian-Functional dependence and independence. Maxima and minima and saddle points, method of Lagrange multipliers, Taylor's theorem for two variables.

UNIT III: Ordinary Differential Equations

First order ordinary differential equations: Exact, equations reducible to exact form. Applications of first order differential equations - Newton's law of cooling, law of natural growth and decay.

Linear differential equations of second and higher order with constant coefficients: Non-homogeneous term of the type $f(x) = e^{ax}$, sinax, cosax, x^n, e^{ax} V and x^n V. Method of variation of parameters.

UNIT IV: Partial Differential Equations

Introduction, formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange's linear equation and non-linear equations, Charpit's method, Method of separation of variables for second order equations and applications of PDE to one dimensional (Heat equation).

UNIT V: Laplace Transforms

Definition of Laplace transform, domain of the function and Kernel for the Laplace transforms, Existence of Laplace transform, Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by "t", Laplace transforms of derivatives and integrals of functions, Unit step function, Periodic function.

Inverse Laplace transform by Partial fractions, Inverse Laplace transforms of functions when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem, Solving ordinary differential equations by Laplace transforms.

TEXT BOOKS:

 i) Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.

 ii) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

 iii) Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.

REFERENCE BOOKS:

i)Advanced Engineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.

ii)Advanced Engineering Mathematics by Michael Green Berg, Pearson Publishers .

iii)Engineering Mathematics by N.P Bali and Manish Goyal.

Course Outcomes: After learning the concepts of this paper the student will be able to

1. Analyze the solution of the system of linear equations and to find the Eigen values and Eigen vectors of a matrix.
2. Find the extreme values of functions of two variables with / without constraints.
3. Solve first and higher order differential equations.
4. Solve first order linear and non-linear partial differential equations.
5. Solve differential equations with initial conditions using Laplace Transform.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM -ANE   L   T/P/D C
                                                                         3   -/-/-   3

(R18A0013) ENGINEERING CHEMISTRY

COURSE OBJECTIVES:

1. To apply the electrochemical principles in batteries, understand the fundamentals of corrosion and development of different techniques in corrosion control.
2. To analyze microscopic chemistry in terms of atomic and molecular orbitals.
3. To analyze water for its various parameters and its significance in industrial and domestic applications.
4. To impart the knowledge of organic reaction mechanisms which are useful for understanding the synthesis of organic compounds.
5. To analyze different types of fuels and their applications in various engineering fields.

Unit-I: Electrochemistry and Corrosion (12 lectures)
Electrochemistry: Introduction to electrochemistry; Electrochemical cells - electrode potentials, construction and working of a galvanic cell, EMF and its applications - potentiometric titration; Nernst equation and its applications; Batteries - classification of batteries, primary cell - lithium cells and secondary cells - lead acid battery and lithium ion battery; Fuel cells - H_2-O_2 fuel cell, its applications and advantages.
Corrosion: Introduction, causes and effects of corrosion; Theories of corrosion- chemical (oxidation corrosion) and electrochemical corrosion, mechanism of electrochemical corrosion; Corrosion control methods - cathodic protection - sacrificial anodic protection & impressed current cathodic protection; Methods of application of metallic coatings - hotdipping - galvanizing & tinning, electroplating (Cu plating) and electroless plating (Ni plating) - advantages and applications of electroplating/electroless plating.

Unit -II: Atomic and Molecular Structure (8 lectures)
Atomic and molecular orbitals; Postulates of molecular orbital theory - Linear Combination of Atomic Orbitals (LCAO); Molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2 and O_2; Metallic bonding, limitations of Valence Bond Theory (VBT).
Crystal field theory (CFT) – Salient features of CFT, crystal field splitting of transition metal ion d-orbitals in tetrahedral and octahedral geometries.

Unit -III: Water and its Treatment (6 lectures)

Hardness of water- Types and units of hardness; Estimation of hardness of water by EDTA method; Softening of water by Ion exchange process; Potable water- specifications, methods of disinfectation-chlorination and ozonization; Desalination of water by Reverse Osmosis.

Unit-IV: Organic Reactions (10 lectures)

Introduction to Organic Reactions - Types of reactions; Substitution - Nucleophilic substitution reactions, mechanism of S_N1 and S_N2; Addition - electrophilic and nucleophilic addition reactions; addition of HBr to propene - Markownikoff and Anti-Markownikoff's additions; Elimination reactions - dehydrohalogenation of alkyl halides; Oxidation reactions - oxidation of alcohols using $KMnO_4$ and chromic acid; Reduction reactions - reduction of carbonyl compounds using $LiAlH_4$ and $NaBH_4$.

Unit-V: Energy Sources (8 lectures)

Fuels- Definition, classification (solid, liquid & gaseous fuels) - characteristics of a good fuel; Coal - analysis of coal - proximate and ultimate analysis and their significance; Petroleum - refining, knocking - octane and cetane number, cracking - fluid bed catalytic cracking; Natural gas, LPG, CNG - constituents, characteristics and uses.

Suggested Text Books:

1. Engineering Chemistry by P.C. Jain & M. Jain, Dhanpat Rai Publishing Company (P) Ltd, 16thEdition, New Delhi.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, C. H. Venkata Ramana Reddy, Subhendu Chakroborty, Cengage Learning Publication, India Private Limited , 2018.

Reference Books:

1. University Chemistry by B. H. Mahan, Pearson, IV Edition.
2. Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
3. Reactions, Rearrangements and Reagents by S.N. Sanyal, Bharati Bhavan Publishers.

COURSE OUTCOMES: The basic concepts included in this course will help the student to:

1. Understand the operating principles of various types of electrochemical cells, including fuel cells and batteries. Analyze and develop a technically sound, economic and sustainable solution to corrosion problems related to engineering service.
2. Achieve basic concepts of atomic, molecular and electronic changes related to conductivity and magnetism.
3. Familiarize the student with the fundamentals of the treatment technologies and the considerations for its design and implementation in water treatment plants.
4. Gain knowledge on synthesis of organic compounds by using different reaction mechanisms.

5. Comprehend the types of fuels, characteristics and combustion systems with emphasis on engineering applications.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM -ANE   L T/P/D C
                                                      3   -/-/-   3

(R18A0261) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

OBJECTIVES:
1. To introduce the concept of electrical circuits and its components.
2. To introduce the concepts of diodes & transistors, and
3. To impart the knowledge of various configurations, characteristics and applications.

UNIT –I:
Introduction to Electrical Circuits: Concept of Circuit and Network, Types of elements, R-L-C Parameters, Independent and Dependent sources, Source transformation and Kirchhoff's Laws. (Simple Problems).

UNIT –II:
Network Analysis: Network Reduction Techniques- Series and parallel connections of resistive networks, Star–to-Delta and Delta-to-Star Transformations for Resistive Networks and meshanalysis
Network Theorems: Thevenin's Theorem, Norton's Theorem and Superposition Theorem.

UNIT-III:
Electrical Machines (elementary treatment only):
DC.Generator: principle of operation, constructional features, emf equation. DC Motor: principle of operation, Back emf, torque equation.
Single phase transformer: principle of operation, constructional features and emf equation.

UNIT –IV:
 Diodes: P-n junction diode, symbol, V-I Characteristics, Diode applications, Zener Diode: characteristics , Rectifiers – Half wave, Full wave and Bridge rectifiers (simple Problems).

 UNIT –V:
Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Amplifying Action, Common Emitter, Common Base and Common Collector configurations. (elementary treatment only)

TEXT BOOKS:

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University.
2. Basic Electrical and electronics Engineering-D P Kothari. I J NagarathMcGraw Hill Education.
3. Electric Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.

REFERENCE BOOKS:

1. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.

2. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabratajit, TMH, 2/e, 1998. 3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.

3. Linear circuit analysis (time domain phasor and Laplace transform approaches)- 2 nd edition by Raymond A. DeCarlo and Pen-Min-Lin, Oxford University Press-2004.

4. Network Theory by N. C. Jagan& C. Lakshminarayana, B.S. Publications.

5. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.

OUTCOMES: After this course, the student will be able

1. To analyze and solve electrical circuits using network laws and theorems.

2. To identify and characterize diodes and various types of transistors.

3. Design and analyse the DC bias circuitry of BJT

4. Fundamentals Of Constructional Details And Principle Of Operation Of DC Machines And Transformers

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(R18A0501) PROGRAMMING FOR PROBLEM SOLVING

COURSE OBJECTIVES

1. To understand the various steps in Program development.

2. To understand the basic concepts in C Programming Language.

3. To learn how to write modular and readable C Programs

4. To learn to write programs (using structured programming approach) in C to solve problems.

UNIT - I

Introduction to Computing – Computer Systems-Hardware and Software, Computer Languages, Algorithm, Flowchart, Representation of Algorithm and Flowchart with examples.

Introduction to C– History of C, Features of C, Structure of C Program, Character Set, C Tokens-Keywords, Identifiers, Constants, Variables, Data types, Operators.

UNIT-II

Statements-Selection statements (Decision Making)- if and switch statements with examples, Repetition statements (loops)- while, for, do-while statements with examples, Unconditional statements- break, continue, goto statements with examples.

UNIT – III

Functions-Designing Structured Programs, Types of Functions-User defined functions, Standard functions, Categories of functions, Parameter Passing techniques, Storage classes, Recursion.

UNIT-IV

Arrays- Declaration and Initialization, One dimensional Arrays, Two dimensional Arrays.

Strings- Declaration and Initialization, String Input / Output functions, String manipulation functions.

UNIT-V

Pointers- Introduction, Definition and Declaration of pointers, address operator, Pointer variables, Pointers with Arrays.

Structures- Introduction, Declaration and Initialization, Array of Structures, Unions.

TEXT BOOKS:

1.   Computer Programming with C, Special Edition-MRCET, Mc Graw Hill Publishers 2017.

2.   Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg. Third Edition, Cengage Learning.

REFERENCE BOOKS:

1.   The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.

2.   Computer Programming, E.Balagurusamy, First Edition, TMH.

3.   C and Data structures – P. Padmanabham, Third Edition, B.S. Publications.

4.   Programming in *C, Ashok Kamthane*. Pearson Education India.

5.   Let us C ,Yashwanth Kanethkar, 13th Edition, BPB Publications.

COURSE OUTCOMES:

1.   Demonstrate the basic knowledge of computer hardware and software.
2.   To formulate simple algorithms for arithmetic and logical problems.
3.   To translate the algorithms to programs (in C language).
4.   To test and execute the programs and correct syntax and logical errors.
5.   Ability to apply solving and logical skills to programming in C language and also in other languages.

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(R18A0082)ENGINEERING WORKSHOP/IT WORKSHOP

COURSEOBJECTIVES:
1. Student able to learn about different tools used in the lab
2. Student able to learn about foundry, welding, plumbing, house wiring and Tin smithy operations
3. Student able to learn about different Carpentry and Fitting tools

1. TRADES FOR EXERCISES:
At least two exercises from each trade:
1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring

2. TRADES FOR DEMONSTRATION & EXPOSURE:
1. Plumbing
2. Machine Shop
3. Welding
4. Foundry
5. Metal Cutting (Water Plasma)

TEXT BOOK:
1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
   Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

COURSE OUTCOMES:
1. Students can understand different machine shop operations
2. Students can understand Foundry, welding, plumbing, house wiring and Tin smithy operations
3. Student learned about metal cutting processes

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B. TECH- I- YEAR- I- SEM -ANE   **L   T/P/D C**

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(R18A0083) IT WORKSHOP LAB

OBJECTIVES:

1. The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, and Power Point

2. PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows; In addition hardware and software level troubleshooting process, tips and tricks would be covered.

3. Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

4. Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools.

5. HTML introduction for creating static web pages

PC HARDWARE

Week 1:

Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral

Week 2:

Assembling and disassembling of PC

Week 3:

Every student should individually install MS windows on the personal computer. Basic DOS Commands

Week 4: Hardware Troubleshooting

Students have to be given a PC which does not boot due to improper assembly or defective peripherals Software Troubleshooting: Students have to be given amalfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Week 5: INTERNET & WEB BROWSERS

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers And How to access the websites and email& Search Engines & various threats on the internet and would be asked to configure their computer to be safe on the internet, Antivirus downloads to avoid viruses and/or worms.

MS OFFICE

Week 6: MICROSOFT WORD

Word Orientation: an overview of Microsoft (MS) office 2007/ 10: Importance of MS office 2007/10, overview of toolbars, saving files, Using help and resources, rulers, format painter. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Using Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word &Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 7: MICROSOFT EXCEL

Excel Orientation: The importance of MS office 2007/10 tool Excel as a Spreadsheet tool, Accessing, overview of toolbars, saving excel files, Using help and resources.

Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting .

Week 8: MICROSOFT POWER POINT

Basic power point utilities and tools which helpful to create basic power point presentation. Topic covered during this includes PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both Latex and Power point.

Create the presentation using the following tools:

Formatting: Color, font type, font size, font style etc.

Header and Footer

Bullets and Numbering

Drawing Toolbar: Auto shapes, Textboxes, etc

Design Template

Introduction to custom animation.

b) Create a presentation to conduct a creativity session using the following tools:

1. Slide transition

2. Master slide view

3. Insert picture – clipart, image

4. Action button

5. Drawing tool bar – lines, arrows

6. Hyperlink

7. Custom animation

8. Hide slide

9. Wash out

Week 9: **HTML**

Introduction to HTML & Basic HTML Tags: Understand what are the tasks used for creation of website

Designing a static web page: Understand how to create a webpage

OUTCOMES:

1. The Students are able to identify the major components of a computer and its basic peripherals. They are capable of assembling a personal computer, and can perform installation of system software like MS Windows and required device drivers.
2. Students can detect and perform minor hardware and software level troubleshooting.
3. The Students are capable of working on Internet & World Wide Web and can make effective usage of the internet for academics.
4. The Students develop ability to prepare professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools.
5. The students are able to create a static webpage's using HTML.

Text Books:

1. Introduction to Information Technology,ITL Education Solutions limited,Pearson Education
2. PC Hardware and A+ Handbook-Kate J.Chase PHI(Microsoft)

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(R18A0581) PROGRAMMING FOR PROBLEM SOLVING LAB

OBJECTIVES:
1. Understand the basic concept of C Programming, and its different modules that include conditional and looping expressions, Arrays, Strings, Functions, Pointers, and Structures.
2. Acquire knowledge about the basic concept of writing a program.
3. Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
4. Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
5. Role of Functions involving the idea of modularity.
6. Programming using gcc compiler in Linux.

Week 1:
a) Write a C program to find sum and average of three numbers.
b) Write a C program to find the sum of individual digits of a given positive integer.

Week 2:
a) Write a C program to generate the first n terms of the Fibonacci sequence.
b) Write a C program to generate prime numbers from 1 to n.
c) Write a C program to check whether given number is Armstrong Number or not.

Week 3:
a) Write a C program to check whether given number is perfect number or not.
b) Write a C program to check whether given number is strong number or not.

Week 4:
a) Write a C program to find the roots of a quadratic equation.
b) Write a C program to perform arithmetic operations using switch statement.

Week 5:
a) Write a C program to find factorial of a given integer using non-recursive function.
b) Write a C program to find factorial of a given integer using recursive function.

Week 6:

a) Write C program to find GCD of two integers by using recursive function.

b) Write C program to find GCD of two integers using non-recursive function.

Week 7:

a) Write a C program to find both the largest and smallest number in a list of integers.

b) Write a C program to Sort the Array in an Ascending Order

c) Write a C program to find whether given matrix is symmetric or not.

Week 8:

   Revision of programs

Week 9:

a) Write a C program to perform addition of two matrices.

b) Write a C program that uses functions to perform multiplication of two Matrices.

Week 10:

a) Write a C program to use function to insert a sub-string in to given main string from a given position.

b) Write a C program that uses functions to delete n Characters from a given position in a given string.

Week 11:

a) Write a C program using user defined functions to determine whether the given string is palindrome or not.

b) Write a C program that displays the position or index in the main string S where the sub string T begins, or - 1 if S doesn't contain T.

Week 12:

a) Write C program to count the number of lines, words and characters in a given text.

b) Write a C program to find the sum of integer array elements using pointers.

Week 13:

a) Write a C program to Calculate Total and Percentage marks of a student using structure.

Week 14:

   Revision of Programs

TEXT BOOKS

1. C Programming and Data Structures, P.Padmanabham, Third Edition, BS Publications

2. Computer programming in C.V.RAjaraman, PHI Publishers.

3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.

4. C Programming, M.V.S.S.N Venkateswarlu and E.V.Prasad,S.Chand Publishers

5. Mastering C,K.R.Venugopal and S.R.Prasad, TMH Publishers.

OUTCOMES:

1. Acquire knowledge about the basic concept of writing a program.

2. Understand the Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.

3. Learn how to use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.

4. Understand the Role of Functions involving the idea of modularity.

5. Understand the Concept of Array and pointers dealing with memory management.

6. Learn Structures and unions through which derived data types can be formed.

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(R18A0289) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

OBJECTIVES:

1. To Design Electrical Systems.
2. To Analyze A Given Network By Applying Various Network Theorems.
3. To Expose The Students To The Operation Of DC Generator.
4. To Expose The Students To The Operation Of DC Motor and Transformer.

CYCLE – 1

1. Verification of KVL and KCL.
2. Verification of Thevenin's theorem.
3. Verification of Norton's theorem.
4. Verification of Superposition theorem.
5. Swinburne's test on DC shunt machine.
6. OC & SC tests on single phase transformer.

CYCLE – 2

1. PN Junction diode characteristics.
2. Zener diode characteristics.
3. Half wave rectifier with and without filter.
4. Full wave rectifier with and without filter.
5. Transistor CB Characteristics (Input And Output)
6. Transistor CE Characteristics (Input And Output)

NOTE: Any 10 of Above Experiments Are To Be Conducted

OUTCOMES:

After successfully studying this course, students will:

1. Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
2. Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving both single phase and DC Machines.

3. Acknowledge the principles of operation and the main features of electric machines and their applications.
4. Acquire skills in using electrical measuring devices.

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(R18A0003) HUMAN VALUES AND SOCIETAL PERSPECTIVE
(Mandatory Course)

INTRODUCTION:

Human values are the virtues that guide us to take into account human element when one interacts with other human beings. It's both what we expect others to do for us and what we aim to give to other human beings. These human values give the effect of bonding, comforting and reassuring.

OBJECTIVES:
This introductory course input is intended:
1. to help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. to facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a natural way.
3. to highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

UNIT - I:
Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education.
Self Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self exploration. Continuous Happiness and Prosperity
A look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities - the basic requirements for fulfillment of aspirations of every human being with their correct priority.
Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario.
Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT - II:
Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'.

Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).
Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT - III:
Understanding Harmony in the Family and Society - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.
Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship.

 Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

UNIT - IV:
Understanding Harmony in the nature and Existence - Whole existence as Coexistence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature.

Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V:
Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a. Ability to utilize the professional competence for augmenting universal human order.
b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.
c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics (including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

OUTCOMES:

1. The students will be able to obtain happiness and prosperity in their life.
2. They will develop harmony at all levels.
3. They can have satisfying human behavior throughout their life.

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B. TECH- I- YEAR- II- SEM -ANE   L   T/P/D   C

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(R18A0002) PROFESSIONAL ENGLISH

INTRODUCTION:

English is a tool for global communication and is the dominant language which is sweeping almost all the fields in the world. It has become a necessity for people to speak in English comfortably, if they want to enter the global workforce. Hence, the course is designed to help the students to meet the global standards. Each unit focuses on English skill-set to improve: Interview skills, giving presentations and professional etiquette.

OBJECTIVES:

1. To enrich students to express themselves appropriately and fluently in professional contexts.
2. To enhance their employability through regular participation in group discussions and interview skills.
3. To lay foundation with writing strategies for the future workplace needs.
4. To acquaint students with different components of professional presentation skills.
5. To equip students with necessary training in listening to comprehend dialects of English language.

SYLLABUS:

UNIT-I   (7 hrs)
Listening   - Bill Gate's TED talk on Solving Big Problems
Speaking   - Description of Pictures, Places, Objects and Persons
Grammar   - Finite and Non-finite verbs
Vocabulary   - Business Vocabulary
Writing   - Paragraph Writing

Unit –II   (8 hrs)
Listening   - Google CEO Sundar Pichai's Speech I/O 2017 Keynote
Speaking   - Oral presentations
Grammar   - Transformation of Sentences
Vocabulary   - Idioms
Writing   - Abstract Writing

Unit –III   (8 hrs)
Listening   - Sample Interviews (videos)

Speaking	- Mock Interviews
Grammar	- Direct and Indirect Speech
Vocabulary	- Standard Abbreviations (Mini Project)
Writing	- Job applications I (Cover Letter)

Unit – IV (6 hrs)

Listening	- Telephonic Interviews
Speaking	- Telephonic Expressions
Grammar	- Auxiliary verbs
Vocabulary	- Word Analogy-I
Writing	- Job Application II (Resume)

Unit – V (5 hrs)

Listening	- Tanmay Bhakshi's ITU interview
Speaking	- Professional Etiquette
Grammar	- Common Errors
Vocabulary	- Word Analogy-II
Writing	- Report Writing

* Exercises apart from the text book shall also be referred for classroom tasks.

REFERNCE BOOKS:
1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

OUTCOMES:

Students will be able to:

1. draft coherent and unified paragraphs with adequate supporting details.
2. demonstrate problem solving skills, decision-making skills, analytical skills.
3. comprehend and apply the pre-interview preparation techniques for successful interview.
4. achieve expertise in writing resume and cover letter formats.
5. understand the steps of writing 'Reports and Abstract'.

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(R18A0022)MATHEMATICS-II

OBJECTIVES:

1. The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data and also used to find the roots of an equation.
2. To learn the concepts curve fitting, numerical integration and numerical solutions of first order ordinary differential equations.
3. Evaluation of improper integrals using Beta and Gamma functions.
4. Evaluation of multiple integrals.
5. In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector valued functions and their applications to line, surface and volume integrals.

UNIT – I: Solutions of algebraic, transcendental equations and Interpolation

Solution of algebraic and transcendental equations: Introduction, Bisection Method, Method of false position, Newton Raphson method and their graphical interpretations.
Interpolation: Introduction, errors in polynomial interpolation, Finite differences - Forward differences, backward differences, central differences. Newton's formulae for interpolation, Gauss's central difference formulae. Interpolation with unevenly spaced points - Lagrange's Interpolation.

UNIT – II: Numerical Methods

Numerical integration: Generalized quadrature - Trapezoidal rule, Simpson's 1/3rd and Simpson's 3/8th rules.
Numerical solution of ordinary differential equations: Solution by Taylor's series method, Euler's method, Euler's modified method, Runge-Kutta fourth order method.
Curve fitting: Fitting a straight line, second degree curve, exponential curve, power curve by method of least squares.

Unit III: Beta and Gamma functions

Introduction of improper integrals- Beta and Gamma functions - Relation between them, their properties, Evaluation of improper integrals using Beta and Gamma functions.

Unit IV: Double and Triple Integrals

Double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar).

Unit V: Vector Calculus

Introduction, Scalar point function and vector point function, Directional derivative, Gradient, Divergence, Curl and their related properties, Laplacian operator, Line integral - Work done, Surface integrals, Volume integral. Vector integral theoerem-Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

TEXT BOOKS:

 i) Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
 ii) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
iii) Mathematical Methods by S.R.K Iyenger, R.K.Jain, Narosa Publishers.

REFERENCE BOOKS:

i) Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
ii) Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.
iii) Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

Course Outcomes: After learning the contents of this paper the student must be able to

1. Find the roots of algebraic, non algebraic equations and predict the value of the data at an intermediate point from a given discrete data.
2. Find the most appropriate formula for a guesses relation of the data variables using curve fitting and this method of analysis data helps engineers to understand the system for better interpretation and decision making.
3. Find a numerical solution for a given differential equation.
4. Evaluate multiple integrals and to have a basic understanding of Beta and Gamma functions..
5. Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

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(R18A0012) ENGINEERING PHYSICS

COURSE OBJECTIVES:

1. To understand the basic concepts of oscillations exhibited by various systems in nature.
2. To understand the basic concepts of light through interference and diffraction.
3. To understand band structure of the solids and classification of materials.
4. To understand dielectric and magnetic properties of the materials and enable them to design and apply in different fields.
5. To be able to distinguish ordinary light with a laser light and their applications in different fields.

UNIT – I
HARMONIC OSCILLATIONS   (7Hours)

Mechanical and electrical simple harmonic oscillators, complex number notation and phasor representation of simple harmonic motion, damped harmonic oscillator: over, critical and lightly-damped oscillators; Energy decay in damped harmonic oscillator, Quality factor, forced damped harmonic oscillator.

UNIT – II
WAVEOPTICS   (10Hours)

Huygen's principle, Interference: Superposition of waves, interference of light by division of wave front and amplitude, Newton's rings, Michelson interferometer, Diffraction: difference between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction due to single slit, Diffraction grating: Grating spectrum and resolving power.

UNIT- III
INTRODUCTION TO SOLIDS   (7 Hours)
Free electron theory, Fermi level, Density of states, Periodic potential, Bloch's theorem, Kronig – Penny modal , E – K diagram, Effective mass, Origin of energy bands in solids, Classification of materials : Metals, semi conductors and insulators.

UNIT – IV

DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS   (10 Hours)

Dielectrics: Introduction, Types of polarizations (Electronic and Ionic) and calculation of their polarizabilities, Internal fields in a solid, Clausius-Mossotti relation.

Magnetism: Introduction, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Properties of anti-ferro and ferri magnetic materials, Hysteresis curve based on domain theory, Soft and hard magnetic materials.

UNIT-V

LASERS   (6Hours)

Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, Einstein's Coefficients, population inversion, meta stable state, types of pumping, lasing action, construction and working of Ruby Laser, Helium-Neon Laser, Applications of lasers.

COURSE OUTCOMES: After completion of studying Engineering Physics the student is able to,

1. Analyze the various oscillations made by different oscillating bodies in nature.
2. Learn to design a device to go to maximum accuracy in measuring the dimensions optically.
3. Get the knowledge of classification of materials which is used for various applications in material technology.
4. Learn dielectric, magnetic properties of the materials and apply them in material technology.
5. Learn the principles, production of LASER beam and application of LASER in various fields.

TEXT BOOKS:

1. Engineering Physics by Arumugam, Anuradha publications.

2. Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

REFERENCES:

1. Engineering Physics – R.K. Gaur and S.L.Gupta, Dhanpat Rai Publishers.
2. Engineering Physics, S Mani Naidu- Pearson Publishers.
3. Engineering physics 2nd edition –H.K.Malik and A.K. Singh.
4. Engineering Physics – P.K. Palaniswamy, Scitech publications.
5. Physics by Resnick and Haliday.

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B. TECH- I- YEAR- II- SEM -ANE   **L T/P/D C**

                                                                      3 -/-/-   3

(R18A0502)OBJECT ORIENTED PROGRAMMING

OBJECTIVES
1. To teach the student the concepts of object oriented and generic programming.
2. To differentiate between object oriented programming and procedural programming.
3. To design applications using object oriented features
4. To teach the student to implement object oriented concepts

Unit I
Introduction to Object Oriented Programming: Object oriented paradigm-Differences between Object Oriented Programming and Procedure oriented programming, Basic concepts of Object Oriented Programming, Encapsulation, Inheritance and Polymorphism, Benefits of OOP, Structure of a C++ program, namespace, Data types, C++ tokens, Identifiers, Variables, Constants, Operators, Control structures & Loops.

Unit-II
Functions, Classes and Objects:
Introduction of Classes, Class Definition, Defining a Members,Objects,Access Control, Class Scope, Scope Resolution Operator, Inline functions, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Objects as Function Arguments, Friend Functions.

Unit-III
Constructors, Destructors, Inheritance:
Introduction to Constructors, Default Constructors, Parameterized Constructors, Copy Constructors, Multiple Constructors in a Class, Destructors.
Inheritance :
Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi level Inheritance, Hierarchical Inheritance, Hybrid Inheritance.

Unit-IV

Pointers, Virtual Functions and Polymorphism:

Introduction to Memory management, new operator and delete operator, Pointers to objects, Pointers to Derived Classes, Polymorphism, Compile time polymorphism, Run time polymorphism, Virtual Functions, Overloading- Function Overloading, Operator overloading.

Unit-V

Templates and Exception handling:

Introduction to Templates, Class Templates, Class Templates with Multiple Parameters, Function Templates, Function Templates with Multiple Parameters.

Exception handling:

Basics of Exception Handling, Types of exceptions, Exception Handing Mechanism, Throwing and Catching Mechanism, Rethrowing an Exception, Specifying Exceptions.

Text Books:

1. Object Oriented Programming with C++ by Balagurusamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

References:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Educ

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B. TECH- I- YEAR- II- SEM -ANE   **L   T/P/D   C**
                                                                                        1   -/-/4   3

(R18A0301) ENGINEERING GRAPHICS

Course Objectives:
1. Learn to sketch and take field dimensions.
2. Learn to take data and transform it into graphic drawings.
3. Learn basic engineering drawing formats

UNIT – I

Introduction To Engineering Drawing: Principles of Engineering Drawing/Graphics – Various Drawing Instruments – Conventions in Drawing- Dimensioning – Lettering practice – BIS Conventions.

a) Polygons – Construction of regular polygons (General Method only)
b) Conic Sections (General Method only- Eccentricity Method)
c) Cycloid, Epicycloid and Hypocycloid
d) Scales-Plain, Diagonal and Vernier

UNIT – II

Orthographic Projection in First Angle only: Principles of Orthographic Projections – Conventions – First and Third Angle projections (Introduction).

Projections of Points. Points in all four quadrants.

Projections of Lines – Parallel and inclined to both planes.

UNIT – III

Projections of Planes: Projection of regular planes, Plane inclined to both reference planes (No conditional problems).

Projections of Solids: Projections of regular solids prism and pyramid inclined to both planes (No conditional problems).

UNIT – IV
Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and Compound Solids.

UNIT – V

Transformation of Projections: Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects

Basic Principles of ACAD – Demo Only.

Course Outcomes:

1. Student's ability to convert sketches to engineered drawings will increase.
2. Students will be able to draw orthographic projections and sections.
3. Student's ability to perform basic sketching techniques will improve.

TEXT BOOKS

1. Engineering Drawing, Special Edition-MRCET, McGrahill Publishers, 2017.
 2. Engineering Drawing, N.D. Bhatt
3. Engineering Drawing by K.Venu Gopal& V.Prabu Raja New Age Publications.

REFERENCES

1. Engineering drawing – P.J. Shah .S.Chand Publishers.
2. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.

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B. TECH- I- YEAR- II- SEM -ANE   **L   T/P/D   C**
                                                                              -   -/4/-   2
(R18A0083) ENGINEERING PHYSICS / CHEMISTRY LAB
(Any 8 experiments compulsory)

OBJECTIVES

1. The engineering students are exposed in physics lab to understand physical parameters practically.
2. The list of experiments enables the students to know different branches like mechanics, optics and electronics.
3. The students are thoroughly trained in learning practical skills by completing all the experiments in physics lab.

This course on physics lab is designed with 10 experiments in an academic year. It is common to all branches of Engineering in B.Tech 1st year.

LIST OF EXPERIMENTS: (Any eight experiments compulsory)

1. Torsional pendulum-Rigidity modulus of given wire.
2. Melde's experiment –Transverse and Longitudinal modes.
3. Stewart and Gee's method- Magnetic field along the axis of current carrying coil.
4. Spectrometer-Dispersive power of the material of a prism
5. Diffraction grating-using laser -Wave length of light.
6. Newton's Rings –Radius of curvature of Plano convex lens.
7. C-R circuit – Time Constant of RC circuit
8. Characteristics of LED.
9. Characteristics of a Solar cell.
10. Evaluation of numerical aperture of optical fiber.

Reference practical physics books:

1. Practical physics by **Dr. Aparna**, V.G.S.publications.
2. Engineering physics practical lab manual – **MRCET.**

OUTCOMES

1. The students learn the concepts of error, analyze and try to formulate new solutions to the problems related to engineering physics.

2. B.Tech students basically learning the mechanical behavior of the wire and practically determining the elastic constant. Transverse and longitudinal waves are practically studied. Variation of the magnetic fields along with terrestrial magnetism is practically studied.

3. Dispersion of the composite light is clearly observed by the students. Wavelengths of the source of light/laser are determined experimentally.

4. Opto electronic devices and their working are practically realized by the students. In addition the functioning of optical fiber is practically studied.

5. The students learn experimental skills to design new experiments suitable for requirements in different fields(industrial, medical, scientific fields etc.)

ENGINEERING CHEMISTRY LAB
(Any Eight Experiment Compulsory)

OBJECTIVES

This course on chemistry lab is designed with 10 experiments in an academic year. It is common to all branches of Engineering in 1st B.Tech.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student. At the end of the course the student is expected to

1. Provide the students with a solid foundation in chemistry laboratory required to solve engineering problems.
2. Practical implementation of fundamental concepts.
3. The students are thoroughly trained in learning practical skills by completing all the experiments in chemistry lab.

List of Experiments

Titrimetry:
1. Estimation of hardness of water by EDTA method.

Instrumental Methods:
Colorimetry:
2. Determination of Ferrous iron in cement by Colorimetric method
3. Estimation of Copper by Colorimetric method.

Conductometry:
4. Estimation of HCl by Conductometric titrations.

5. Estimation of Acetic acid in a mixture of HCl and Acetic acid by Conductometric titrations.

Potentiometry:
6. Estimation of HCl by Potentiometric titrations.
7. Estimation of Fe^{2+} by Potentiometry using $KMnO_4$.

Preparation:
8. Preparation of Aspirin.

Physical properties:
9. Determination of Viscosity of sample oil by Redwood Viscometer.
10. Determination of Surface Tension of a given liquid by Stalagmometer.

Text Book:
1. Inorganic quantitative analysis, Vogel
2. A text book on experiments and calculation in Engineering Chemistry by S.S. Dara

Suggested Readings:
1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Text Book of Engineering Chemistry by R. N. Goyal and Harrmendra Goel, Ane Books Private Ltd.

OUTCOMES: At the end of the course students will be able to
1. Estimate the total hardness present in a sample of water.
2. Select lubricants for various purposes and determine the surface tension of a given liquid.
3. Prepare synthetic drug molecule.
4. Determine the strength of an acid by conductometric and potentiometric methods.
5. Find the amount of Fe^{+2} and Cu^{2+} present in unknown substances using titrimetric and instrumental methods.

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B. TECH- I- YEAR- II- SEM -ANE   **L T/P/D   C**
                                                                                -    -/3/- 1.5
(R18A0582)OBJECT ORIENTED PROGRAMMING LAB

Objectives:

1. To strengthen problem solving ability by using the characteristics of an object-oriented approach.
2. To design applications using object oriented features
3. To handle Exceptions in programs.
4. To teach the student to implement object oriented concepts

Week 1:

Basic C++ Programs

Week2:

a) Write a C++ program to find the sum of individual digits of a positive integer.
b) Write a C++ program to generate the first n terms of the sequence.
Week 3:

a) Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
b) Write a C++ program to find both the largest and smallest number in a list of integers.
Week 4:

a) Write a C++ program to sort a list of numbers in ascending order.
b) Write a Program to illustrate New and Delete Keywords for dynamic memory allocation
Week 5

a) Write a program Illustrating Class Declarations, Definition, and Accessing Class Members.

b) Program to illustrate default constructor, parameterized constructor and copy constructors

c) Write a Program to Implement a Class STUDENT having Following Members:

Member	Description
Data members	
Sname	Name of the student

Marks array	Marks of the student
Total	Total marks obtained
Tmax	Total maximum marks
Member functions	
Member	Description
ssign()	Assign Initial Values
compute()	to Compute Total, Average
display()	to Display the Data.

Week 6:

      a) Write a Program to Demonstrate the i)Operator Overloading.ii) Function Overloading.

      b) Write a Program to Demonstrate Friend Function and Friend Class.

Week 7:

a) Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.

b) Write a Program to Generate Fibonacci Series use Constructor to Initialize the Data Members.

Week 8:

Revision laboratory

Week 9

Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are:

      a) Reading a matrix. b) Addition of matrices. c) Printing a matrix.

      d) Subtraction of matrices. e) Multiplication of matrices

Week 10

Write C++ programs that illustrate how the following forms of inheritance are supported:

a)Single inheritance b)Multiple inheritance c)Multi level
inheritance d)Hierarchical inheritance

Week 11

a.)Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.

b) Write a Program to Invoking Derived Class Member Through Base Class Pointer.

Week 12

    a)   Write a Template Based Program to Sort the Given List of Elements.

    b)   Write a C++ program that uses function templates to find the largest and smallest number in a list of integers and to sort a list of numbers in ascending order.

Week 13

    a)   Write a Program Containing a Possible Exception. Use a Try Block to Throw it and a Catch Block to Handle it Properly.

    b)   Write a Program to Demonstrate the Catching of All Exceptions.

Week 14

Revision

Text Books:

1. Object Oriented Programming with C++ by Balagurusamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

References:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.

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                                                                     -   -/3/-   1.5

(R18A0081)ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The Language Lab focuses on phonetic knowledge of the English language and its use in everyday situations and contexts.

OBJECTIVES:

1. To expose students to a variety of self-instructional, learner-friendly modes of language learning
2. To enable students to learn accurate pronunciation through stress on word accent, intonation and rhythm.
3. To enable students to overcome public speaking anxiety and equip them to become employable.
4. To familiarize students with formal telephonic expressions by means of appropriate tone.
5. To foster sentence-level and holistic understanding of the context through active listening.

Syllabus: English Language Communication Skills Lab has two parts:

        a. Computer Assisted Language Learning (CALL) Lab
        b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab.

UNIT –I
    CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants-Transcriptions
    ICS Lab: Ice-Breaking Activity - JAM Session- Greetings – Taking Leave – Introducing Oneself and Others.

UNIT –II
    CALL Lab: Syllabification - Stress &Intonation- Rules of Stress Markings and Intonation
    ICS Lab: Situational Dialogues/Role Plays - Making Requests and Seeking Permissions.

UNIT –III
    CALL Lab: Listening Activities (Its Importance – Purpose- Process- Listening for General and Specific Details.)
    ICS Lab: Communication at Work Place - Professional Etiquettes, Telephone Etiquette.

ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab:**

   The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

   System Requirement (Hardware component):

   Computer network with LAN with minimum 60 multimedia systems with the following specifications:
   i) P –IV Processor
          a)Speed –2.8 GHZ
          b)RAM –512 MB Minimum
          c)HardDisk –80 GB
    ii) Headphones of High quality

2. **Interactive Communication Skills (ICS) Lab :**

   A spacious room with movable chairs and audio-visual aids with a public address system, a T. V, a digital stereo –audio & video system and camcorder etc.

DISTRIBUTION AND WEIGHTAGE OF MARKS

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the other institution.

OUTCOMES:

Students will be able to:

1. understand the importance of learning phonetics.
2. learn how to pronounce words using phonetic transcription.
3. know the importance of speaking English with rhythm and intonation.
4. effectively participate in JAM session.
5. use polite expressions in all formal situations.
6. effectively communicate through telephone.

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	L	T/P/D	C
II Year B. Tech, ANE-I Sem	**3**	-/-/-	**3**

(R18A0361)MECHANICS OF FLUIDS

Objectives:
- The student will gain insight into a number of potentially useful phenomena involving movement of fluids.
- He/she will learn to do elementary calculations for engineering application of fluid motion.
- This course also prepares the student for more advanced courses such as Aerodynamics- I & -II.

UNIT I
Fluid Properties: Density, specific weight, specific gravity, surface tension & capillarity, Newton's law of viscosity, incompressible & compressible fluid, [numerical problems on viscosity]
Hydrostatic forces on submerged bodies: Pressure at a point, Pascal's law, pressure variation with temperature and height, Center of pressure on vertical, inclined and curved surfaces. [numerical problems on inclined surfaces]
Manometers- simple and differential manometers, inverted manometers, micro manometers, Pressure gauges [only working principle, no numerical problems]
Buoyancy- Archimedes's Principle, Metacenter, Meta centric height experimental determination.[no numerical problems]

UNIT II
Fluid Kinematics: Stream line, path line, streak line, stream surface, stream tube, Classification of flows: steady, unsteady, uniform, non uniform, laminar, turbulent flows. One dimensional approximation, examples of real 1-D flows, two dimensional approximation, 2-D flow in wind tunnel,
Continuity equations for 1-D and 2-D flows both compressible and incompressible [numerical problems on continuity equation], Velocity potential function and stream function.
Angular velocity and Vorticity, irrotational flow, Introduction to vortex flows.

UNIT III
Fluid Dynamics: Surface & body forces, substantial derivative, local derivative and convective derivative, momentum equation, Euler equation, Bernoulli's equation [numerical problems on Bernoulli's equation]. Phenomenological basis of Navier-Stokes equation.
Flow measurements: pressure, velocity and mass flow rate, viscosity, Pitot-static tube, venturi meter and orifice meter, viscometers. [numerical problems on venturi-meter and orifice meter]
Flow of through pipes: Darcy's Weisbach Equation, major and minor losses [numerical problems on Darcy's Weisbach Equation]

UNIT IV
Viscous flow and Boundary Layer: Role of viscosity in fluid flow, Introductory concepts of boundary layer, Prandtl's boundary layer hypothesis, Boundary layer growth along a flat plate and nearly flat surface, Large Reynolds number flows.

Qualitative description of Boundary layer thicknesses(Dispacement, Energy and Momentum), Von Karman's Momentum Integral Equation, Velocity profile on a flat plate and forces due to laminar and turbulent boundary layer(Blasius solution for the flat plate).

Separation of boundary layer: Adverse pressure gradient and Sharp bending/turning of surface. Methods of preventing separation of boundary layer.

UNIT V

Dimensional and Model Analysis: Statement of Buckingham's π-theorem, Similarity parameters: Dimensionless numbers [stress on Mach number and reynold's Number], Types of similarities, Similarity laws, Model testing and Classification of models.

Aerodynamic forces and Moments: Nomenclature of Airfoil , Angle of Attack, Aerodynamic forces and moments and coefficients, Pressure and shear stress distribution on an airfoil, Expressions for drag and lift and pitching moment. Stalling, Types of drag, Stalling and its prevention

Text Books:
1. Engineering Fluid mechanics – K.L . Kumar, S.Chand & Co.
2. Introduction to Fluid Mechanics and Fluid machines – S.K. Som and G. Biswas
3. Fluid Mechanics and Hydraulic Machines – RK Bansal, Laxmi Publications
4. Fundamentals of Aerodynamics, Anderson, Jr., J.D., International edition, McGraw Hill, 2001, ISBN: 0-07-118146-6.

Reference Books:
1. Fluid Mechanics – Frank M and White, Mc-Grawhill.
2. Fluid Mechanics- Fox and Mc Donald
3. Fluid Mechanics – E. Rathakrishnan

Outcomes:
- Students can define the governing equations of fluid flow problems.
- It makes the student ready to understand about aerodynamics.
- Students can able to create models for experimental analysis.

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II Year B. Tech, ANE-I Sem

	L	T/P/D	C
	3	-/-/-	3

(R18A0302)ENGINEERING MECHANICS

Unit – I

Introduction to Engineering Mechanics – Basic Concepts. **Resultants of Force System:** Parallelogram law –Forces and components- Resultant of coplanar Concurrent Forces – Components of forces in Space – Moment of Force - principle of moments – Coplanar Applications – Couples - Resultant of any Force System.

Unit – II

Equilibrium of Force Systems: Free Body Diagrams, Equations of Equilibrium - Equilibrium of planar Systems -Equilibrium of Spatial Systems.

FRICTION: Introduction – Theory of Friction – Angle of friction - Laws of Friction – Static and Dynamic Frictions –Motion of Bodies: Wedge, Screw, Screw-jack, and Differential Screw-jack.

Unit – III

Centroids and Centers of Gravity: Introduction – Centroids and Centre of gravity of simple figures (frombasic principles) – Centroids of Composite Figures - Theorem of Pappus – Center of gravity of bodies and centroids of volumes.

Unit – IV

Moments of Inertia: Definition – Polar Moment of Inertia –Radius of gyration - Transfer formula for moment ofinertia - Moments of Inertia for Composite areas - Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia: Moment of Inertia of Masses- Transfer Formula for Mass Moments of Inertia - massmoment of inertia of composite bodies.

Unit – V

Kinematics of a Particle: Motion of a particle – Rectilinear motion – motion curves – Rectangular componentsof curvilinear motion– Kinematics of Rigid Body - Types of rigid body motion -Angular motion - Fixed Axis Rotation

Kinetics of particles: Translation -Analysis as a Particle and Analysis as a Rigid Body in Translation – Equations ofplane motion - Angular motion - Fixed Axis Rotation – Rolling Bodies.

TEXT BOOKS:
1. Engineering Mechanics/ S. Timoshenko and D.H. Young, Mc Graw Hill Book Company.
2. Engineering Mechanics - Statics and Dynamics by Vijaya Kumar Reddy K , Suresh Kumar J.BS Publications

REFERENCES:

1. Engineering Mechanics / S.S. Bhavikati & K.G. Rajasekharappa
2. A text of Engineering Mechanics / YVD Rao / K. Govinda Rajulu/ M. Manzoor Hussain, Academic Publishing Company
3. Engg. Mechanics / M.V. Seshagiri Rao & D Rama Durgaiah/ Universities Press
4. Engineering Mechanics, Umesh Regl / Tayal.
5. Engineering Mechanics / KL Kumar / Tata McGraw Hill.
6. Engineering Mechanics / Irving Shames / Prentice Hall

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	L	T/P/D	C
II Year B. Tech, ANE-I Sem	2	1/-/-	3

(R18A0303)THERMODYNAMICS

Objectives:
- Learn about concepts and laws used in thermodynamics.
- Students acquire knowledge of various cycles.
- Students gain information about the working principle of different engines.

UNIT - I
Introduction: Basic Concepts: System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic view points, Concepts of Continuum, Thermodynamic Equilibrium, State, Property, Process, Exact & Inexact Differentials, Cycle - Reversibility - Quasi - static Process, Irreversible Process, Causes of Irreversibility - Energy in State and in Transition, Types, Displacement & Other forms of Work, Heat, Point and Path functions, Zeroth Law of Thermodynamics - Concept of Temperature - Principles of Thermometry - Reference Points - Const. Volume gas Thermometer - Scales of Temperature, Ideal Gas Scale - Joule's Experiments - First law of Thermodynamics – applied to a process and system, Corollaries , Steady Flow Energy Equation.

UNIT - II
Limitations of the First Law - Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries, PMM of Second kind, Carnot's principle, Carnot cycle and its specialties, Thermodynamic scale of Temperature, Clausius Inequality, Entropy, Principle of Entropy Increase - Energy Equation, Availability and Irreversibility - Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations - Elementary Treatment of the Third Law of Thermodynamics.

UNIT - III
Perfect Gas Laws - Equation of State, specific and Universal Gas constants - various Non-flow processes, properties, end states, Heat and Work Transfer, changes in Internal Energy - Throttling and Free Expansion Processes - Flow processes. Perfect Gas Model, derivations - Vader Waals Equation of State - Compressibility charts - variable specific Heats - Gas Tables - Phase Transformations - Triple point at critical state properties during change of phase, Dryness Fraction - Clausius - Clapeyron Equation Property tables. Mollier charts - Various Thermodynamic processes and energy Transfer - Steam Calorimetry.

UNIT - IV
Mixtures of perfect Gases - Mole Fraction, Mass friction Gravimetric and volumetric Analysis - Dalton's law of partial pressure, Avogadro's Laws of additive volumes - Mole fraction, Volume fraction and partial pressure, Equivalent Gas const. and Molecular Internal Energy. Enthalpy, specific heats. Heats and Entropy of Mixture of perfect Gases and Vapour, Atmospheric air - Psychrometric Properties and Psychrometric chart.

UNIT - V

Thermodynamic Cycles: Power cycles: Otto, Diesel, Dual Combustion cycles, Sterling Cycle, Atkinson Cycle, Lenoir Cycle - Description and representation on P-V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis - comparison of Cycles. Application of Brayton cycles in aviation.

Refrigeration Cycles: Bell-Coleman cycle - Vapour compression cycle performance Evaluation.

Text Books:
1. Engineering Thermodynamics, Special Edition - MRCET, McGrawHill Publishers-2017
2. Engineering Thermodynamics / PK Nag / TMH, 5th Edition
3. Engineering Thermodynamics / E Rathakrishnan / PHI / Second Edition / 2013

Reference Books:
1. Engineering Thermodynamics / DP Mishra / Cengage Learning / Second impression 2012
2. Thermodynamics - An Engineering Approach - Yunus Cengel & Boles / TMH
3. Thermodynamics - J.P. Holman / McGrawHill
4. Engineering thermodynamics - Jones & Dugan
5. Engineering Thermodynamics / P. Chattopadhyay / Oxford higher Education / Revised First Edition
6. Thermodynamics & Heat Engines - Yadav - Central Book Dept. Allahabad

Outcomes:
- Basic concepts can be applied by the students
- Students can correlate cycles applicable for engines.
- Students should be able to analyze the relationship between various processes and working mechanisms of the engines.

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	L	T/P/D	C
II Year B. Tech, ANE-I Sem	3	-/-/-	3

(R18A2101) INTRODUCTION TO AERONAUTICAL ENGINEERING

Objective:

1. Insight overview of various important areas in Aeronautical Engineering
2. Students will acquire the knowledge of the Evolution of Aerospace industry.
3. To provide an exposure of various forces and performance aspects important for flight.

UNIT - I

History of Flight - The Aerospace Environment

Evolution of flight, usage of balloons, dirigibles, Heavier than air aircraft, various advances in techniques for commercial transportation. Helicopters, missiles, Conquest of space and exploring solar system and beyond, Earth's atmosphere, standard atmosphere, the temperature extremes of space, laws of gravitation low earth orbit, microgravity, benefits of micro gravity. The near earth Radiative environment, magnetosphere, Environmental impact on spacecraft. Meteoroids, micrometeoroids, space debris and the planetary environments.

UNIT - II

Aerodynamics and Performance

Airfoil- nomenclature and types, Aerodynamic forces on a wings and bodies, Generation of lift, Sources of drag, Force and moment coefficients, centre of pressure. Rotary wing aircraft concepts – Forces while hovering, Propeller Theory.

Performance requirements of a civil and military aircrafts. Control surfaces,

UNIT - III

Propulsion- Aircrafts, Rockets and Missiles: Thrust for flight, Reciprocating engines-2 stroke/4 stroke; Jet engine and types, Rocket engines - Description, Principles of operation. Types of orbits and maneuvers, Types of Missiles, simililarities and differences with launch vehicle, controls for missiles, Airframe components of missiles

Evolution of Space Missions: Space missions, Mission objectives, Case studies, Human space flight missions - goals, historical background, The Soviet and US missions, The Mercury, Gemini, Apollo (manned flight to the moon), Skylab, Apollo-Soyuz, Space Shuttle, International Space Station, extravehicular activity, Life support systems. History and evolution of ISRO, Missions carried in ISRO.

UNIT – IV

Structures: History of airplane construction, Loads on aircraft, Lift production/augmentation devices, Low speed/ high speed airfoils, Monocoque and semi-monocoque structures, Load bearing structural components, use of composites in aircraft and aerospace vehicles.

UNIT - V

Experimental Aerodynamics: Requirement and importance of Wind tunnel, Shock Tubes, Shock Tunnel – types and principle of operation,

Measurement Techniques: Sensors and instrumentation- Pitot static tube, Cockpit layout of modern civil aircraft, Basic principles of Gyro, accelerometers.

TEXT BOOKS:

1. Anderson, J.D., Introduction to Flight, fifth edition, Tata McGraw-Hill, 2007, ISBN: 0-07-006082-4.
2. Kermode, Flight Without Formulae, fifth edition, Pearson Education, 2004, *ISBN*-10: 0273403605; *ISBN*-13: 978-0273403609

REFERENCES:

1. Bamard, R. H. and Philpot, D.R., Aircraft Flight, third edition, Pearson, 2004, ISBN: 81-297-0783-7.

Outcome:

1. Students acquire knowledge with Aerospace Engineering to take up study in detail through subsequent courses.
2. Students acquire fundamental concepts of all aspects of flight.
3. Students acquire the knowledge of the important design aspects of aerospace vehicles.

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

	L	T/P/D	C
II Year B. Tech, ANE-I Sem	**3**	**-/-/-**	**3**

(R18A2102) AIRCRAFT PRODUCTION TECHNOLOGY

Objectives:

Student can acquire knowledge on various production technologies involved in aircraft manufacturing.

UNIT - I

Casting and Welding Techniques: Various molding process employed in aircraft industry, Types of patterns, Casting Process involved in Sand casting, die-casting, centrifugal casting, investment casting and shell molding. Working Principles and equipment used with emerging trends in arc welding, gas welding, resistance welding, Laser welding, EBM, EDM, Soldering and brazing techniques.

UNIT - II

Machining and Forming: Classification of machining processes, Types of chips, working principles (with schematic diagram only) , types-lathe, shaper, milling machines, grinding (designation of grinding wheel), drilling m/c, CNC machining (overview of G-Codes, M-Codes). Sheet metal operations- shearing, punching, super plastic forming and diffusion bonding. Bending, Automation in bend forming and different operations in bending like stretch forming, spinning, drawing etc.

UNIT - III

Unconventional Machining: Principles of working and applications of abrasive jet machining, ultrasonic machining, electron beam, EDM, and plasma arc machining, Water jet machining, Ion beam machining.

UNIT - IV

Heat Treatment and Surface Finishing: Heat treatment of Aluminum alloys, titanium alloys, steels, case hardening, initial stresses and the stress alleviation procedures. Corrosion prevention, protective treatment for aluminum alloys, steels, anodizing of titanium alloys, organic coating, and thermal spray coatings.

UNIT - V

Jigs & Fixtures: Jigs, fixtures, stages of assembly, types and equipment for riveted joints, bolted joints (only). Aircraft Tooling Concepts.- types of tools used in A/C industry.

NDT and Other Inspection Techniques: comparison of NDT & DT, process involved in Dye Penetrate Test, X-ray, and magnetic particle and ultrasonic testing.

Text Books:

1. "Manufacturing Engineering and Technology" by Kalpajikau - Addison Wesley.
2. "Aircraft production techniques' Keshu S.C, Ganapathy K.K, Interline Publishing House, Bangalore-1993.

Reference Books:

1. "Production technology" - R.K. Jain - Khanna Publishers - 2002.
2. "Production technology" - O.P.Khanna and lal. M.Dhanpat rai publications - New delhi - 1997.

Outcomes:

- The Students can able to use different manufacturing process and use this in industry for component production.
- The student can correlate the various methods of manufacturing employed for different materials.

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	L	T/P/D	C
II Year B. Tech, ANE-I Sem	**3**	-/-/-	**3**

(R18A2103) AEROSPACE MATERIALS AND COMPOSITES

Objectives:
- To study the types of mechanical behavior of materials for aircraft applications.
- To make the student understand the analysis of composite laminates under different loading Conditions and different environmental conditions.
- To impart the knowledge in usage of composite materials in aircraft component design.

UNIT-I MECHANICAL BEHAVIOUR OF ENGINEERING MATERIALS

Linear and non linear elastic properties – Yielding, strain hardening, fracture, Bauschinger's effect – Notch effect testing and flaw detection of materials and components – creep and fatigue – Comparative study of metals, ceramics, plastics and composites.

UNIT-II HEAT TREATMENT OF METALS AND ALLOYS

Light Metal Alloys: Aluminum and its alloys, high strength and high corrosion alloys. Titanium and its alloys: applications, Classification of steels alloys, effect of alloying elements, magnesium alloys and their properties, maraging steels: properties and applications.

High Strength and Heat Resistant Alloys: Classification of heat resistant materials, iron, nickel and cobalt based alloys, refractory materials, silica based ceramics, properties of inconel, monel, nimonic and super alloys; application of heat resistant alloy in aerospace vehicles. Heat treatment of steel and its alloys. Case hardening, initial residual stresses and stress alleviation procedures, corrosion prevention and protective treatments.

UNIT-III INTRODUCTION T O F COMPOSITE M A T E R I A L S

Introduction, polymer matrix composites, metal matrix composites, ceramic matrix composites, carbon-carbon composites, fiber, reinforced composites and nature-made composites and applications.

Reinforcements: Fibers Glass, Silica, Kevlar, carbon, boron, silicon carbide, and born carbide, fibres. Particulate composites, Polymer composites, Thermoplastics, Thermosetting

UNIT-IV Hybrid Composites

Basic design concepts of sandwich construction - Materials used for sandwich construction. Failure modes of sandwich panels. Basic design of composite structure, Smart materials, Functionally Graded Materials (FGM)

Selection criteria for Aerospace Materials: Properties of flight vehicle materials, importance of strength/ weight ratio of materials for aerospace vehicles structures, importance of temperature variations, factors affecting the selection of material for different parts of airplanes.

UNIT-V Application and Testing

Classification of Aircraft Materials used for Aircraft Components-Application of Composite Materials- Super Alloys (Ni & Mg Alloys), Indigenes Alloys (Ti6AL4V, Si-Al-Cu). Emerging Trends in Aerospace Materials (Shape memory alloys). Latest techniques in testing and Flaw Detection of Material and Components by mechanical and NDT checks.

Text Books
1. G. F. Titterton, Aircraft Materials and Processes, 5/e, Sterling Book House,1998.
2. D. Agarwal, L.J. Broutman and K. Chandrasekhara, Analysis and Performance of Fibre Composites, Wiley, 3rd edition, 2015
3. Vijay K.Varadan, K.J.Vinoy, S.Gopalakrishnan, Smart Material Systems and MEMS: Design and Development Methodologies,Wiley

References
1. Martin, J.W., "Engineering Materials, Their properties and Applications", Wykedham Publications (London) Ltd., 1987.
2. G. E. Dieter, Mechanical Metallurgy, 1/e, McGraw Hill, 1976.
3. Nonlinear Approaches in Engineering Applications

Outcomes:
- Exposure to high temperature materials for space applications
- Understanding the mechanics of composite materials
- Knowledge gained in manufacture of composites

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II Year B. Tech, ANE-II Sem

L	T/P/D	C
-	-/3/-	1

(R18A2181)AIRCRAFT PRODUCTION TECHNOLOGY LAB

Objectives:
Basic Exercises in Lathe, Shaper, Milling, Slotting, CNC and Grinding machines welding equipment comprising Microscopes polishing disc grinders as under.

PRODUCTION LAB

1. Plain Turning, Facing, Knurling, Taper turning, Thread Cutting.
2. Drilling, boring, counter boring, counter sinking.
3. Simple exercises on shaping
4. Simple exercises in Planing
5. Plain Milling
6. Gear Milling
7. Sheet metal joining by Soldering.
8. Simple exercises on CNC machines and Programme generation.
9. Simple exercises in Gas.
10. Simple exercises in Arc Welding.
11. Aircraft wood gluing practice
12. Study of properties of sandwich structures

Note: Any 10 experiments can be conducted.

Equipment needed: Lathe, Shaper, Milling, Slotting, EDM, CNC and Grinding machines welding equipment and metallurgy equipment comprising Microscopes polishing disc grinders.

Reference Books:

1. "Aircraft production techniques" Keshu S.C, Ganapathy K.K., Interline Publishing House, Banglore- 1993.
2. "Manfacturing Engineering and Technology" by Kalpakajam - Addison Wesley.

Outcomes:
* Student will have hands on experience on various production techniques.
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	L	T/P/D	C
II Year B. Tech, ANE-I Sem	0	3	1.5

(R18A2182)AIRCRAFT ENGINEERING DRAWING LAB

OBJECTIVES:

- T o expose them to existing national standards related to technical drawings.

- It gives all the external and internal details of the machine component from which it can be manufactured. The machining symbols, tolerances, bill of material, etc. are specified on the drawing.

- The knowledge of machine drawing helps in designing the various parts of machine elements. The course content is designed in such a way that the balancing of part drawings (machine components) and assembly drawings of aircraft can be known.

Unit 1
Machine Drawing Conventions: Need for drawing conventions – introduction to IS conventions - Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.

Unit 2
Limits and tolerances: Limit System – Tolerances – Fits - Tolerances of Form and Position – Standards followed in Industry

Unit 3
Surface Roughness: Introduction – Surface Roughness – Machining Symbols – Indication of Surface roughness.

Unit 4
Drawing of Machine Elements and simple parts: Selection of Views, additional views for the following machine elements and parts with every drawing proportion:
a) Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.
b) Keys, cotter joints and knuckle joint.
c) Riveted joints for plates

Unit 5
Assembly Drawings:
Drawings of assembled views for the part drawings of the following using conventions and easy drawing proportions.
a) Engine parts – stuffing boxes, cross heads, Eccentric.
b) Other machine parts - Screws jacks, Machine Vices Plummer block, Tailstock.
c) Wing, Landing gear, horizontal stabilizer.

NOTE: First angle projection to be adopted. The student should be able to provide working drawings of actual parts

Outcomes:
On Completion of the course the student will be able to
- An Ability to understand and apply the knowledge of machine drawing as a system of Communication in which ideas are expressed clearly and all information fully conveyed.
- To produce detailed drawings of machines parts from assembly drawing

TEXT BOOK
1. Machine Drawing by K. L. Narayana, P. Kannaiah, K. Venkata Reddy New Age International

2. Raymer, D.P., Aircraft Design: A Conceptual Approach, third edition, AIAA Education Series, AIAA, 1999, ISBN: 1-56347-281-0.

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II Year B.Tech. ANE -I Sem

L	T/P/D	C
2	0	0

(R18A0014)ENVIRONMENTAL SCIENCES
(MANDATORY COURSE)

Objectives:
1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

UNIT-I:
Introduction: Definition of Environment and multidisciplinary nature of environmental sciences.
Ecosystems: Definition, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles (Carbon, Nitrogen, Water cycle) Bioaccumulation and Biomagnification with examples.

UNIT-II:
Natural Resources: Classification of Resources: water resources:types: surface and ground water and over utilization effects of ground water. Dams: benefits and problems. Forest resources: functions, causes and effects of Deforestation, Energy resources: renewable and non-renewable energy sources, use of alternate energy resources.

UNIT-III:
Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. Hot spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT-IV:
Environmental Pollution and Control Technologies: Environmental Pollution: **Classification of pollution, Air Pollution**: Primary and secondary pollutants, sources, causes, effects and control measures**Water pollution**: Sources and types of pollution, causes and effects, water treatment methods. **Soil Pollution**: Sources and types, Impacts of modern agriculture. Solid waste management, e-Waste management.

Global Environmental Problems: Green house effect, Global warming, Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS).

UNIT-V:

Environmental Policy, Legislation & EIA: Environmental Protection act1986, Air act 1981, Forest conservation act 1980, Biomedical waste management and handling rules, International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

EIA: EIA structure, methods of baseline data acquisition. Concepts of Environmental Management Plan (EMP).

Towards Sustainable Future: Concept, threats and strategies of Sustainable Development, Environmental Education.

SUGGESTED TEXT BOOKS:

1. Environmental Studies by Anubha Kaushik, 4th Edition, New age international
   Publishers.
2. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS
    Publications.
3. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL
   Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela
   .2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin& Edward A.Keller, Wiley INDIA edition.
4. Principles of Environmental Science by William . P. Cunnningham& Mary Inn
   Cunnningham Tata McGRAW –Hill Publishing Company Ltd.
5. Environmental Studies by S. Rama Lakshmi & Purnima Smarath Kalyani Publishers.

Outcomes:

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of

Ecological principles and environmental regulations which in turn helps in sustainable development

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II Year B. Tech, ANE-II Sem

L	T/P/D	C
2	1/-/-	3

(R18A2104)AERODYNAMICS

Objectives:
- To introduce the concepts of mass, momentum and energy conservation relating to aerodynamics.
- To make the student understand the concept of vorticity, irrotationality, theory of airfoils and wing sections.
- To introduce the basics of viscous flow.

UNIT I [NEW]

Basics of Aerodynamics: Continuum and Free molecular flow [definition only], Developments in aerodynamics, Review of Forces on Aerodynamic forces and Moments, Buckingham's Pi theorem and Fundamental aerodynamics variables

Governing equations of flow- Continuity, momentum and Energy equations in integral and differential form.

Role of Mach number and Reynolds number in air flow: incompressible and compressible flows, Flow regimes basing on Mach number, Mach cone, aerodynamic heating at high Mach numbers, Variation of coefficient of drag with respect to Reynolds number.

UNIT - II
Inviscid Incompressible Flows: Angular Velocity, Vorticity and circulation, Kelvin Theorem and irrotational flow velocity potential, Stream function, Laplace equation, boundary condition at infinity and wall, Elementary flows and their combinations, Magnus effect, D'Alembert's Paradox, Kutta - Joukowsky theorem, kutta condition. Kelvin's circulation theorem & starting vortex,

Concept of small perturbation & thin airfoil theory, expressions for calculating the aerodynamic center and Center of pressure,, linearization of the boundary condition, resolution of thin airfoil problem into lifting & nonlifting cases, their solutions by method of singularity distribution

UNIT – III
Inviscid Flow over Wings & Panel Methods: Vortex filament statement of Helmholtz's vortex theorems, Biot - Savart Law, starting, bound & trailing vortices of wings,
Prandtl's Lifting line theorem - downwash and induced drag, Elliptic loading & wings of elliptic platforms, expression for induced drag, minimum induced drag for Elliptic platform.
Source and vortex panel methods for airfoils.

UNIT IV

Applied Aerodynamics: Drag reduction & lift augmentation - Sweep, winglets, Flaps, slats and vortex generators. Supercritical Airfoil, Swept back wings, Area rule, Airfoil design for high C_{lmax} , Multiple lifting surfaces, Circulation control, Streamwise vorticity, Secondary flows, Vortex lift strakes.

UNIT – V
Experimental Aerodynamics
Types of Wind tunnel, Flow in a wind tunnel, Flow Visualization

Text books:
1. Fundamentals of Aerodynamics, Anderson, Jr., J.D., International edition, McGraw Hill, 2001, ISBN: 0-07-118146-6.
2. Aerodynamics by L.J. Clancy
3. Compressible Aerodynamics, John D. Anderson
4. Karamcheti, Krishnamurthy, Idea fluid Aerodynamics.

Reference Books:
1. Aerodynamics for Engineers, fourth edition, Bertin, J.J., Pearson Education, 2012, ISBN: 81-297-0486-2.
2. Kuchemann, D., The Aerodynamic Design of Aircraft, Pergamon, 1978.
3. Shevell, R.S., Fundamentals of Flight, Indian reprint, Pearson Education, 2004, ISBN: 81-297-0514-1.
4. McCormick, B.W., Aerodynamics, Aeronautics & Flight Mechanics second edition John Wiley, 1995, ISBN: 0-471-575062.

Outcomes:
• An ability to apply thin airfoil theory to predict aerodynamic characteristics of air foil
• Application of Elementary flows to develop real problems.

• Development of devices to enhance aerodynamic characteristics of aircraft components.

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II Year B. Tech, ANE-II Sem

L	T/P/D	C
2	1/-/-	3

(R18A0362) MECHANICS OF SOLIDS

Unit – I

Analysis of stress- Introduction to Solid Mechanics – Basic Concepts, Types of Stress, General State of Stress at a Point, State of stress at a point, Complimentary Shear stresses, Stresses on Oblique planes, Materials Subjected to pure shear, Material subjected to two mutually perpendicular direct stresses, Material subjected to combined direct and shear stresses, Principal plane inclination in terms of associated principal stress, graphical solution – mohr's stress circle.

Unit – II

Analysis of Strain: Concept of Strain, Hook's law, Modulus of Elasticity, Poisson's ratio, 3D state of Strain, Principal strains, 2D Strain, Hydrostatic stress, Volumetric Strain, Strains on Oblique Plane, Plane Strain, Mohr's Strain Cycle, Stress-Strain relations, Elastic Constants and their relations, Mechanical Properties,

Unit – III

Members Subjected to Asymmetric Loading: Pressurized thin walled Cylinder, Hoop stress, Longitudinal Stress, Volumetric Strain, and Cylindrical Vessel with Hemispherical Ends

Members Subjected to Torsional Loads: Torsion, Generation of Stresses, and Angle of twist, Simple Torsion Theory or Development of Torsion Formula.

Members Subjected to Flexural Loads: Geometric Forms of beams, Classifications of beams, statistically determinate and Indeterminate Beams, Concept of Shear Force and bending moment in beams, Basic Relationship between the Rate of Loading, Shear Force and Bending Moment Diagrams, Simple Bending theory and Derivation of flexural equation.

Unit – IV

Shear Stress Distribution: rectangular section, I section, Circular Cross Section, Bending of flitched beams.

Deflection of beams: for a simply supported and Cantilever beam with problems using Double Integration method and Macaulay's method. Concept of overhanging, fixed and Continuous beams.

Unit – V

Elastic stability of Columns: Theories of Elastic Failure**,** Euler's theory, Critical load determination of columns with different constraints, Rankine and Johnson Formulae.

Introduction to Aircraft Structures: Skin as a thin plate, monocoque and semi-monocoque structures, different loadings on Aircraft Structural Members.

TEXT BOOKS:

3. Strength of Materials by S Ramamrutam, Dhanpat Rai Publications
4. Aircraft Structures for Engineering Students by THG Megson, Elsevier Aerospace Engineering

Series.

REFERENCES:

1. Strength of Materials by R S Khurmi, S Chand and company Ltd

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II Year B. Tech, ANE-II Sem

L	T/P/D	C
3	-/-/-	3

(R18A2105)AIR BREATHING PROPULSION

Objective:

• Students can focus on various propulsion systems available in aerospace industry and also understand the future scenario.

• Understand the performance aspects at the design point and off design operations.

• To provide an exposure with reference to numerical calculations and design limitations.

UNIT I

FUNDAMENTALS OF PROPULSION: Types of aerospace propulsion, working principles, advantages, disadvantages, applications – reciprocating engines, propellers, jet engine, turboprop, turbofan, turbo-shaft, ramjet, scramjet, pulsejet. Engine components- performance requirements, thermodynamic processes- change of state- representation by T-sand p-v diagrams - pressure ratios, temperature ratios. Energy transfer, losses- entropy generation- mechanisms. Performance- polytropic, stage and component efficiencies, burning efficiency Station numbering in engine, thrust generation, momentum equations, equation of thrust for installed and uninstalled cases, factors affecting thrust, Role of propulsion in aircraft performance.

UNIT II

ANATOMY OF JET ENGINE-I

INLETS: Locations, Types of inlets, operating principle, functions, geometry, operating conditions, flow field, capture area, sizing, flow distortion, drag, and diffuser losses and methods of mitigation, performance.

NOZZLE: Exhaust nozzles- primary nozzle, fan nozzle- governing equations of flow- choking, engine back pressure control, nozzle-area ratio, thrust reversal, vectoring mechanisms. Afterburner functions and its components, design requirements and parameters. Performance gross thrust coefficient, discharge, coefficient, velocity coefficient, angularity coefficient, performance maps, Numericals on nozzles.

UNIT III

ANATOMY OF JET ENGINE-II COMPRESSOR & TURBINE: Types, construction, stage, cascade, blade geometry, velocity triangles, Euler equation, types of flow analysis, diffusion factor, stage loading, Variable stator, limits on compressor performance, typical blade profiles, Numericals on turbo machinery, Axial flow turbines-, similarities and differences with compressors, Velocity diagram analysis, no exit swirl condition, flow losses, causes tangential stresses, repeating stages, Computation of stage parameters for turbine, blade geometry and initial flow conditions and turbine speed- procedure.

Typical turbine blade profiles, turbine performance maps, Thermal limits of blades, cooling, materials, construction, and methods of production, multistage, multi-spooled turbines. Design parameters.

UNIT IV

ANATOMY OF JET ENGINE-III BURNER: Burners- types, components- function, schematic diagram, airflow distribution, cooling- types, cooling effectiveness, performance parameters, combustion efficiency, overall total pressure loss, exit temperature profile, ignition relight envelope- effect of combustor design, Fuel injection, atomization, vaporization, recirculation- flame stabilization, flame holders. Afterburners, function, components, bypass duct, total pressure losses, Mixing process- pressure losses,   fuels- composition.

UNIT V:

DESIGN OF GAS TURBINE ENGINE: Aircraft Mission Analysis, Engine Selection- Performance and Parametric Analysis, Sizing the Engine, Major Considerations in Engine Component Design - Rotating Turbo-machinery, Combustion Systems, Inlets and Exhaust Nozzles

SYSTEM MATCHING AND ANALYSIS: Matching of Gas Turbine Components, Cycle Analysis of one and two spool engines, Gas Generator, Component Modeling, Solution of Matching Problem, Dynamic or Transient behavior, Matching of Engine and Aircraft, Use of Matching and Cycle analysis in Second stage design

Text Books:

1. Mattingly, J.D., Elements of Gas Turbine Propulsion, McGraw-Hill, 1996, ISBN0-07- 912196-9.

2. Flack, R.D., Fundamentals of Jet Propulsion with applications, Cambridge University Press, 2005, ISBN0-521-81983-0.

References:

1. Cohen, Henry, Rogers, G. F. C., Saravanamuttoo, H.H., Gas Turbine Theory, Longman Pub Group, ISBN 10: 0582236320 ISBN 13: 9780582236325.

2. V. Ganesan, Gas Turbines, Tata McGraw-Hill, 1999, ISBN, 0070681929.

Outcomes:
• Students attain knowledge of all propulsion systems in use and under developed.
• Students will be able to configure the engine required for specific need.
• Students understand design requirements of engine and aircraft.

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	L	T/P/D	C
II Year B. Tech, ANE-II Sem	**2**	**1/-/-**	**3**

(R18A2106) AIRCRAFT PERFORMANCE

OBJECTIVES OF THE COURSE:
- **To equip the students with fundamental understanding of aircraft performance in various flight regimes.**
- **To familiarize the concepts and parameters affecting flight performance.**

UNIT – I: INTRODUCTION TO AIRCRAFT PERFORMANCE- THE FORCE SYSTEMS OF THE AIRCRAFT:
The role and design mission of an aircraft. Specification of the performance requirements and mission profile. Importance of performance analysis, estimation, measurement, operational safety and economy. The Standard Atmosphere. Off-standard and design atmosphere. Measurement of air data. Air data computers. Equations of motion for performance - the aircraft force system. Lift, drag, side force. Total airplane drags- estimation, drag reduction methods. The propulsive forces - the thrust production engines, power producing engines, variation of thrust, propulsive power and specific fuel consumption with altitude and flight speed.

UNIT – II: CRUISE PERFORMANCE:
Maximum and minimum speeds in level flight. Range and endurance with thrust production, and power producing engines. Cruise techniques - constant angle of attack, constant Match number; constant altitude, methods- comparison of performance. The effect of alternative fuel flow laws, weight, altitude and temperature on cruise performance. Cruise performance with mixed power-plants.

UNIT – III: CLIMB & DESCENT PERFORMANCE:
Climb and descent techniques, safety considerations, performance analysis- maximum climb gradient, climb rate. Energy height and specific excess power, optimal climbs - minimum time, minimum fuel climbs. Measurement of climb performance. Descent performance in aircraft operations. Effect of wind on climb and descent performance.

UNIT – IV: MANEUVER PERFORMANCE:
Accelerated motion of aircraft - equations of motion- the maneuver envelope. Longitudinal maneuvers- the pull-up, push over maneuvers. Lateral maneuvers- turn performance- turn rates, turn radius- limiting factors. Maneuver boundaries, Maneuver performance of military aircraft, transport aircraft.

UNIT-V: TAKE-OFF AND LANDING- SAFETY REQUIREMENTS - FLIGHT PLANNING:
Estimation of take-off distances. The effect on the take-off distance with respect to weight, wind, runway conditions, ground effect. Take off safety factors. The estimation of landing distances, the discontinued landing, baulked landing, air safety procedures and requirements on performance. The effect on the landing distance, of weight, wind, runway conditions, ground effect. Fuel planning, fuel requirement, trip fuel, reserve and tankering.
Outcomes:

1. The student will have a clear understanding of the fundamental concept leading to aircraft performance including military and passenger aircraft.

TEXT BOOKS:
Eshelby, M.E., Aircraft Performance; Theory and Practice, AIAA Education Series, AIAA, 2000, ISBN: 1-56347-398-4.

REFERENCE BOOKS:

1. Raymer, D.P., Aircraft Design: A Conceptual Approach, third edition, AIAA Education Series, AIAA, 1999, ISBN: 1-56347-281-0.
2. Yechout, T.R. et al., Introduction to Aircraft Flight Mechanics, AIAA Education Series, AIAA, 2003, ISBN: 1-56347-577-4.

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II Year B. Tech, ANE-II Sem

L	T/P/D	C
2	**1/-/-**	**3**

(R18A0024)PROBABILITY AND STATISTICS

Objectives:

1. To understand a random variable that describes randomness or an uncertainty in certain realistic situations which can be either discrete or continuous type.
2. To learn functions of multiple random variables through joint distributions since the random situations are described as functions of multiple random variables.
3. To learn some of the important probability distributions like Binomial, Poisson Distributions (discrete case) and the Normal Distribution (continuous case).
4. To understand linear relationship between two variables and also to predict how a dependent variable changes based on adjustments to an independent variable.
5. To make inferences about a population from sample data(large and small samples) using probability theory.

UNIT – I: Random Variables

Single and multiple random variables -discrete and continuous. Probability distribution function, mass function and density function of probability distributions.Mathematical expectation and variance.

UNIT-II: Probability distributions

Binomial distribution – properties, mean and variance, Poisson distribution – properties, mean and variance and normal distribution – properties, mean and variance.

UNIT -III: Correlation and Regression

Correlation -coefficient of correlation, rank correlation. Regression-regression coefficients, lines of regression.

UNIT –IV: Sampling

Sampling: Definitions of population, sampling, statistic, parameter - types of sampling - expected values of sample mean and variance, standard error - sampling distribution of means and variance. Estimation - point estimation and interval estimation.

Testing of hypothesis: Null and Alternative hypothesis - Type I and Type II errors, critical region - confidence interval - Level of significance, one tailed and two tailed test.
Unit-V: Statistical Inferences

Large sample Tests: Test of significance - Large sample test for single mean, difference of means, single proportion, and difference of proportions.
Small samples: Test for single mean, difference of means, test for ratio of variances (F-test) - Chi-square test for goodness of fit and independence of attributes.

TEXT BOOKS:

i.   Fundamental of Statistics by S.C. Gupta, Himalaya Publishing House.
ii.   Fundamentals of Mathematical Statistics by SC Gupta and V.K. Kapoor, Sultan Chand Publishers.
iii. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

REFERENCES:

i.   Probability and Statistics for Engineers and Scientists by Sheldon M.Ross, Academic Press.
ii.   Probability and Statistics by Dr.T.K.V Iyengar , B.KrishnaGandhi ,S. Ranganatham & M V S S A N Prasad. S Chand Publishers.

Course Outcomes: After learning the contents of this paper the student will be able to

- Describe randomness in certain realistic situation which can be either discrete or continuous type.
- Provide very good insight which is essential for industrial applications by learning probability distributions.
- Make data-driven decisions by using correlation and regression.
- Understand the importance of sampling distribution of a given statistic of a random sample.
- *Draw statistical inference* using samples of a given size which is taken from a population and to apply statistical methods for analyzing experimental data.

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II Year B. Tech, ANE-I Sem

L	T/P/D	C
-	-/3/-	1.

(R18A0391) MECHANICS OF SOLIDS AND MECHANICS OF FLUIDS LAB

Objectives:
- To supplement the theoretical knowledge gained in Mechanics of Solids with practical testing for determining the strength of materials under externally applied loads.
- This would enable the student to have a clear understanding of the design for strength and stiffness**.**
- Upon Completion of this subject, the students can able to have hands on experience in flow measurements using different devices

(A) MECHANICS OF SOLIDS LAB:
1. Direct tension test
2. Torsion test
3. Hardness test
a) Brinells hardness test
b) Rockwell hardness test
4. Test on springs
5. Compression test on cube
6. Impact test
7. Punch shear test

(B) MECHANICS OF FLUIDS LAB
8. Calibration of Venturimeter
9. Calibration of orifice meter
10. Calibration of Triangular notch
11. Verification of Bernoulli's apparatus.
12. Pipe friction.
13. Determination of co-efficient of loss of head in a sudden retraction (Mouth Piece Apparatus)

Note: Any 10 experiments can be conducted minimum five from each section.

Equipment needed
 MOS – lab
1. UTM – 20 / 40 Tons with load Vs Elongation graphical attachment and provision for Bending and sheering along with accessories and end grips
2. Deflection test rig (Fabricated hardware + precession dial gauge)
3. Torsion testing Machine
4. Hardness testing Machine (Brinnel and Rockwell)
5. Impact Testing Machine

6. Spring testing Machine.

MOF – lab
  1 Venturimeter test rig
  2.Test rig for Flow over notch
  3.Pipe friction apparatus
  4.Bernoulli's apparatus
  5.test rig for Orifice meter
6. Mouthpiece apparatus.

Outcomes:
- Ability to characteristic materials
- Ability to use the measurement equipments for flow measurement

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ANE-II Sem

L	T/P/D	C
4	**0**	**4**

(R18A0392) CAD LAB

LIST OF EXPERIMENT:

1. INTRODUCTION to CAD
    2. AutoCAD – BASICS
    2.1 Starting with AutoCAD
    2.2 Layout and sketching
    2.3 Drawing environment
    2.4 Elements of drawing
    2.4.1 Draw commands
    2.5 3D functions
    3. 2D – FIGURES for practice USING AutoCAD
    4. ISOMETRIC DRAWING for practice USING AutoCAD
    5. 3-D SOLID FIGURES USING ACAD
6. INTRODUCTION TO CREO 3.0
6.1 Learning Different Operations like Threading, Sweep, Sweptblend.
6.2 Modeling
    6.3 Assembling

Software: AUTOCAD 2013 and CREO – 3.0

REFERENCES:

1. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishes

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	L	T/P/D	C
II Year B. Tech, ANE-II Sem	**2**	**0**	**0**

(R18A0004)FOREIGN LANGUAGE: FRENCH
(Mandatory Course)

INTRODUCTION

In view of the growing importance of foreign languages as a communication tool in some countries of the world, French has been identified as one of the most popular languages after English. As a result, French program is introduced to develop the linguistic and communicative skills of engineering students and to familiarize them to the French communication skills. This course focuses on basic oral skills.

OBJECTIVES
1. To inculcate the basic knowledge of the French language.
2. To hone the basic sentence constructions in day to day expressions for communication in their vocation.
3. To culminate their major with evidence of a purposeful education.

UNIT - I:

Speaking: Introduction to the French language and culture – Salutations - French alphabet - Introducing people

Writing: Understand and fill out a form

Grammar: The verbs "to be ' and "to have '' in the present tense of the indicative

Vocabulary: The numbers from 1 to 20 - Professions – Nationalities

UNIT - II:

Speaking: Talk about one's family – description of a person - express his admirations and preferences - express possession - express negation

Writing: Write and understand a short message

Grammar: Nouns (gender and number) - Articles - The –er verbs in the present - Possessive adjectives Qualifying adjectives

Vocabulary: The family – Clothes - Colors - The numbers from 1 to 100 - The classroom

UNIT - III

Speaking: Talk about your daily activities - be in time - ask and indicate the date and time - talk about sports and recreation - express the frequency

Writing: A letter to a friend

Grammar: The expression of time – The –ir verbs in the present - The verbs do, go, take, come,
-        Adverbs - Reflexive verbs

Vocabulary: The days and months of the year -   The sports – Hobbies

UNIT - IV

Speaking: Express the quantity - ask and give the price - express the need, the will and the capacity - compare (adjective) - speak at the restaurant / in the shops

Writing: A dialogue between a vendor and a customer at the market

Grammar: Verbs "to want", "to can" - Express capacity / possibility - Express will / desire – the future tense

Vocabulary: The food – Meals - Fruits and vegetables – The parts of the body

UNIT - V

Speaking: Express the prohibition and the obligation - describe an apartment - talk about the weather / ask the weather - ask the opinion - give your opinion - express your agreement or disagreement

Writing: Descriptions

Grammar: Demonstrative adjectives -Prepositions - The verb 'must' to indicate obligation and necessity in the present

Vocabulary: Seasons – Holidays - The city – Furniture

NOTE: The students are exposed to simple listening and reading activities.

REFERENCE BOOKS

1. Apprenons le Français 1& 2, New Saraswati House, 2015
2. A propos, A1, Langers International, 2010
3. Easy French Step-by-step by Myrna Bell Rochester
4. Ultimate French Beginner-Intermediate (Coursebook) By Livid Language
5. Ã L'Aventure: An Introduction to French Language and Francophone Cultures by Evelyne Charvier-Berman, Anne C. Cummings.

OUTCOMES

1. The students will be able to communicate in French at A1 level.
2. The student will have an advantage in the competitive job market.
3. This course benefits the graduates when pursuing study *opportunities* in the countries where French is the official language.

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	L	T/P/D	C
II Year B. Tech, ANE-I Sem	**2**	**0**	**0**

(R18A0005)FOREIGN LANGUAGES: GERMAN
(Mandatory Course)

INTRODUCTION

This is the age of globalization. Faster communication, extensive travel, greater interaction, outsourcing of jobs, demand of skilled person had made the engineering graduates to learn GERMAN language. Nowadays Aircraft and mechanical domain require more and more graduates with minimum knowledge to speak in German language

German language has been one of the fastest learning language in the world. This course is customized according to the demand of the requirement in job industries.

OBJECTIVES:

1. To equip with the vocabulary to create new sentences, sentence pattern, correct pronunciation.
2. To make the students an efficient German language speaker.
3. To focus on basic linguistic and communicative structures of the German language.

SYLLABUS

UNIT 1 : Basics of Deutsch
        1.1 Introduction – (About German Country, Language & Culture)
        1.2 Formal And Informal Greetings
        1.3 Alphabet
        1.4 Numbers (0-50)
        1.5 Days Of The Week And Months Of The Year
        Vocabulary, Exercises and Assignments

UNIT 2 : Getting closer with Deutsch
        2.1 Family
        2.2 Seasons & Weather
        2.3 Time & Directions, Days Of Weak, Months
        2.4 Colours & Shapes, Numbers (51 – 100)
        2.5 Subject Pronouns
        Vocabulary, Exercises and Assignments

Unit 3 : **Construction of Simple Sentences**

        3.1 Formal Introduction

        3.2 Asking Questions

        3.3 Responding to the Questions

        3.4 Simple Sentences

        3.5 Articles, Numbers (101 And Above)

        Vocabulary, Exercises and Assignments

Unit 4 : **Dialogue Writing**

        4.1 Introduce Oneself

        4.2 Introduce Others

        4.3 At the Restaurant

        4.4 At the Railway Station

        4.5 At the University

        Vocabulary, Exercises and Assignments

REFERENCE BOOKS

6. Collins easy learning GERMAN dictionary
7. Hallo deutsch – Parul sharma
8. Studio D A1 – Hermann
9. So geht das – New Saraswati book house
10. Practice German language for beginners – Dominic
11. German Made easy – Diego Agundez

OUTCOMES

Student will be able to:

1. stand ahead of getting the opportunity in the Job market by learning German language.
2. learn German language with engineering degree that will give them a sense of identity among the competitive global engineering industry.
3. learn German language on a regular basis that will help them in improving multi-lingual ability.

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II Year B.Tech ANE-II Sem

L	T/P/D	C
3	-/-/-	3

OPEN ELECTIVE - I
(R18A0451) DIGITAL ELECTRONICS

OBJECTIVES:

The main objectives of the course are:

1. To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions.
2. To introduce the methods for simplifying Boolean expressions.
3. To outline the formal procedures for the analysis and design of combinational and sequential circuits.
4. To introduce the concept of memories and programmable logic devices.
5. To illustrate the concept of synchronous and asynchronous sequential circuits.

UNIT I

BINARY SYSTEMS AND LOGIC GATES:

Binary Systems: The Advantage of Binary, Number Systems, The Use of Binary in Digital Systems,

AND, OR, NOT, NAND, NOR, Exclusive-OR, Exclusive-NOR and Exclusive-NAND implementations of Logic Functions using gates, NAND-NOR implementations.

UNIT II

MINIMIZATION TECHNIQUES:

Minimization Techniques: Boolean postulates and laws-De-Morgan's Theorem-Principle of Duality-Boolean expression-Minimization of Boolean expressions-Minterm-Maxterm-Sum of Products (SOP)-Product of Sums (POS)-Karnaugh map minimization-Don't care conditions-Quine Mc-Cluskey method of minimization.

UNIT III

COMBINATIONAL CIRCUITS:

Design Procedure-Half Adder-Full Adder-Half Subtractor-Full Subtractor-Parallel binary adder-Parallel Binary Subtractor-Multiplexer/ Demultiplexer-Decoder-Encoder.

UNIT IV

SEQUENTIAL CIRCUITS:

Latches, Flip-flops-SR, JK, D, T and Master-Slave-Characteristic table and equation-Application Table-Edge Triggering-Level Triggering-Realization of one flip-flop using other flip-flops-serial adder/subtractor-Asynchronous Counter-Asynchronous Up/Down Counter, Decade counter-Synchronous Counters-Synchronous Up/Down Counters, Decade Counters

UNIT V

MEMORY DEVICES:

Classification of Memories-ROM_ROM Organization, PROM-EPROM-EEPROM-EAPROM, RAM-RAM Organization-Write operation-Read Operation-Programmable Logic Devices-Programmable Logic Array (PLA), Programmable Array Logic (PAL)-Implementation of combinational logic circuits suing ROM, PLA, PAL.

OUTCOMES

After the completion of the course, the student will be able to:

1. Analyse different methods used for simplification of Boolean expressions
2. Design and implement Combinational and Sequential circuits.
3. Design and implement Synchronous and Asynchronous Sequential Circuits.

TEXT BOOK:

1. M Morris Mano, "Digital Design", 4th Edition, Prentice Hall of India PVt., Ltd., 2008/Pearson Education (Singapore) Pvt., Ltd., New Delhi, 2003.
2. Donald P Leach and Albert Paul Malvino, "Digital Principles and Applications", 6th Edition, TMH, 2006.

REFERENCES:

1. John F Wakerly. "Digital Design, Fourth Edition, Pearson/PHI, 2008
2. John M Yarbrough, "Digital Logic Applications and Design", Thomson Learning, 2006
3. Charles H Roth, "Fundamentals of Logic Design", 6th Edition, Thomson Learning, 2013
4. Thomas L Floyd, "Digital Fundamentals", 10th Edition, Pearson Education Inc, 2011.

Donald D Givone, "Digital Principles and Design", TMH, 2003.

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II Year B.Tech ANE-II Sem   L   T/P/D   C
                                                                3   -/-/-   3

OPEN ELECTIVE - I
(R18A0251) ELEMENTS OF ELECTRICAL ENGINEERING

OBJECTIVES:

1. To introduce the fundamental concepts of electromechanical energy conversion
2. To familiarize the students with the principle of operation, constructional features and operational characteristics of various types of Motors used in the engineering and consumer Industry

UNIT – I
Electromechanical Energy Conversion: Electromechanical Energy conversion – forces and torque in magnetic field systems – energy balance – energy and force in a singly excited magnetic field system, determination of magnetic force - co-energy – multi excited magnetic field systems.

UNIT – II
D.C. Generators & Motors :
D.C. Generators – Principle of operation – Action of commutator – constructional features – armature windings –– simplex and multiplex windings – use of laminated armature –   E. M.F Equation
D.C. Motors**:** Principle of operation – Back E.M.F. - Torque equation – characteristics and application of shunt, series and compound motors – Armature reaction and commutation.
Speed control of DC Motors**:** Armature voltage and field flux control methods. Ward-Leonard system. – protective devices.

UNIT – III:
Single Phase Transformers:
Single phase transformers-principle of operation-constructional details- types-emf equation-equivalent circuit – operation on no load and on load-phasor diagrams –losses- minimization of hysteresis and eddy current losses-efficiency-all day efficiency-regulation-effect of variations of frequency and supply voltage on iron losses.

UNIT – IV:
Polyphase Induction Motors &Their Speed control
Polyphase induction motors:construction details of cage and wound rotor machines-production of a rotating magnetic field – principle of operation – rotor emf and rotor frequency –Rotor power input, rotor copper loss and mechanical power developed and their inter relation-torque equation – expressions for maximum torque and starting torque – torque slip characteristic – double cage and deep bar rotors
Speed control:change of frequency; change of poles and methods of consequent poles; cascade connection. injection of an emf into rotor circuit (qualitative treatment only)-induction generator-principle of operation

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UNIT – V:

Single Phase Motors & Special Machines: Single phase Motors: Single phase induction motor – Constructional features-Double revolving field theory Equivalent circuit - split-phase motors - Capacitor start Capacitor run motors. Principles of A.C. Series motor-Universal motor, Stepper motor shaded pole motor, Reluctance Motors, Brushless DC motors (Qualitative Treatment only).

Text Books:
1. Electrical Machines, P.S. Bimbra, Khanna Publishers.
2. Principles of Electrical Machines, V. K. Mehta, Rohit Mehta, S. Chand Publishing.
3. Electric Machines by I.J. Nagrath & D.P. Kothari, Tata Mc Graw – Hill Publishers.

Reference Books:
1. Electric Machines, Mulukutla S. Sarma, Mukesh K. Pathak, Cengage Learning.
2. Fundamentals of Electric Machines, B. R. Gupta, Vandana Singhal, New Age International Publishers.
3. Electric machinery – A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw Hill Companies, 5th edition.
4. Theory of Alternating Current Machinery- by Langsdorf, Tata McGraw-Hill Companies, 2nd edition

OUTCOMES:

At the end of the course the student will
1. Have a clear understanding of the materials used and features in the construction of the electrical machines like transformers, DC and AC motors and special purpose motors.
2. Acquire a basic knowledge on the principle of operation of all these machines
3. Have a basic knowledge on the Torque speed relations and the effect of load torque on their performance.
4. Will have fundamental concept on the speed control of the various types of motors.

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L	T/P/D	C
3	-/-/-	3

OPEN ELECTIVE - I
(R18A0551) DATABASE SYSTEMS

OBJECTIVES

1. To understand the basic concepts and the applications of database systems
2. To Master the basics of SQL and construct queries using SQL
3. To understand the relational database design principles
4. To become familiar with the basic issues of transaction processing and concurrency control
5. To become familiar with database storage structures and access techniques

UNIT I: INTRODUCTION

Data- Database: File Processing System Vs DBMS, History, Characteristic-Three schema Architecture of a database, Functional components of a DBMS.DBMS Languages-Database users and DBA.

UNIT II: DATABASE DESIGN

ER Model: Objects, Attributes and its Type. Entity set and Relationship set-Design Issues of ER model-Constraints. Keys-primary key, Super key, candidate keys. Introduction to relational model-Tabular, Representation of Various ER Schemas. ER Diagram Notations- Goals of ER Diagram- Weak Entity Set- Views.

UNIT III: STRUCTURED QUERY LANGUAGE

SQL: Overview, The Form of Basic SQL Query -UNION, INTERSECT, and EXCEPT– join operations: equi join and non equi join-Nested queries - correlated and uncorrelated- Aggregate Functions-Null values.

UNIT IV - DEPENDENCIES AND NORMAL FORMS

Importance of a good schema design,:- Problems encountered with bad schema designs, Motivation for normal forms- functional dependencies, -Armstrong's axioms for FD's- Closure of a set of FD's,- Minimal covers-Definitions of 1NF,2NF, 3NF and BCNF- Decompositions and desirable properties -

UNIT V:

Transactions: Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability**,** Serializability by Locks-Locking Systems with Several Lock Modes-Concurrency Control by Timestamps, validation.

TEXT BOOK:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan," Database System Concepts", McGraw-Hill, 6th Edition , 2010.

2. Fundamental of Database Systems, by Elmasri, Navathe, Somayajulu, and Gupta, Pearson Education.

REFERENCES:

1. Raghu Ramakrishnan, Johannes Gehrke, "Database Management System", McGraw Hill., 3rd Edition 2007.

2. Elmasri&Navathe,"Fundamentals of Database System," Addison-Wesley Publishing, 5th Edition, 2008.

3. Date.C.J, "An Introduction to Database", Addison-Wesley Pub Co, 8th Edition, 2006.

4. Peter rob, Carlos Coronel, "Database Systems – Design, Implementation, and Management", 9th Edition, Thomson Learning, 2009.

OUTCOMES

1. Demonstrate the basic elements of a relational database management system
2. Ability to identify the data models for relevant problems
3. Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech ANE-II Sem

L	T/P/D	C
3	-/-/-	3

OPEN ELECTIVE - I
(R18A0351) ELEMENTS OF MECHANICAL ENGINEERING

OBJECTIVES:
1. To give an insight to students about the behaviour of materials under external forces.
2. The concept of stress, strain, elasticity etc. as applied to various structures under loading are included.
3. The student able to learn about concept of fluids, turbines and engines.

UNIT - I

Stresses and strains: kinds of – stress-strains, elasticity and plasticity, Hooks law, stress –strain diagrams, modules of elasticity, Poisson's ratio, linear and volumetric strain, relation between E, N, and K, bars of uniform strength, compound bars and temperature stresses.

Shear force and bending moment: Types of supports – loads – Shear force and bending moment for cantilever and simply supported beams without overhanging for all types of loads.

UNIT - II

Theory of simple bending: simple bending formula, Distribution of Flexural and Shear stress in Beam section – Shear stress formula – Shear stress distribution for some standard sections.
Thin cylindrical shells: stress in cylindrical shells due to internal pressures, circumferential stress, longitudinal stress, design of thin cylindrical shells, spherical shells, change in dimension of the shell due to internal pressure, change in volume of the shell due to internal pressure
Thick Cylinders: Lame's equation- cylinders subjected to inside and outside pressures Columns and Struts.

UNIT - III

Properties of Fluid : Stream line , streak line , path line , continuity equation   pipes are in series, pipes are in parallel, HGL, TGL , Bernoullis equation .

Hydraulic pumps and turbines: working principles and velocity diagrams.

UNIT - IV

Internal combustion engines: classification of IC engines, basic engine components and nomenclature, working principle of engines, Four strokes and two stroke petrol and diesel engines, comparison of CI and SI engines, comparison of four stroke and two stroke engines, simple problems such as indicated power, brake power, friction power, specific fuel consumption, brake thermal efficiency, indicated thermal efficiency and mechanical efficiency.

UNIT - V

Belts - Ropes and chain: belt and rope drives, velocity ratio, slip, length of belt , open belt and cross belt drives, ratio of friction tensions, centrifugal tension in a belt, power transmitted by belts and ropes, initial tensions in the belt, simple problems.

Gear trains: classification of gears, gear trains velocity ratio, simple, compound –reverted and epicyclic gear trains.

TEXT BOOKS:

1. "Strength of Materials and Mechanics of Structures", B.C.Punmia, Standard Publications and distributions, 9 th ed.
2. Thermal Engineering, Ballaney,P.L., Khanna Publishers, 2003 .
3. Theory of Machines , S.S. Rattan , Tata McGraw Hill.
4. Fluid Mechanics and Hydraulic Machinery R.K. Bansal .

REFERENCE BOOKS:

1. Thermal Engineering, R.K. Rajput , Laxmi Publications .
2. Theory of Machines, R.S. Khurmi, S. Chand Publications.
3. Fluid Mechanics and Hydraulic Machinery, Modi & Seth.

OUTCOMES:
1. The student would be exposed to basic mechanical engineering machinery.
2. The student learned about mechanical components.
3. Student understand about engines and turbines .

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II Year B.Tech ANE-II Sem   **L   T/P/D   C**
                                                                 3   -/-/-   3

OPEN ELECTIVE - I
(R18A0352) GREEN ENERGY SYSTEMS

OBJECTIVES:
1. The course aims to highlight the significance of alternative sources of energy.
2. Green energy systems and processes and provides the theory and working principles of probable sources of renewable and green energy systems that are environmental friendly.

UNIT-I
Introduction:
Solar Radiation: Role and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems. Photo voltaic energy conversion –
types of PV cells, I-V characteristics.
Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT – II
Solar Energy Storage And Applications: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney.
Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement.

UNIT – III
Bio-Mass: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, bio fuels,
I.C. engine operation and economic aspects.
Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India.
Ocean Energy: OTEC, Principles of utilization, setting of OTEC plants,thermodynamic cycles.
Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT –IV
Energy Efficient Systems: (A) Electrical Systems: Energy efficient motors, energy efficient lighting and control, selection of luminaire, variable voltage variable frequency drives (adjustable speed drives), controls for HVAC (heating, ventilation and air conditioning),
demand site management.
(B) Mechanical Systems: Fuel cells- principle, thermodynamic aspects, selection of fuels & working of various types of fuel cells, Environmental friendly and Energy efficient compressors and pumps.

UNIT-V

Energy Efficient Processes: Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems, selection of recyclable and environment friendly materials in manufacturing, design and implementation of efficient and sustainable green production systems with examples like environmental friendly machining, vegetable based cutting fluids, alternate casting and joining techniques, zero waste manufacturing.

Green Buildings: Definition, features and benefits. Sustainable site selection and planning of buildings for maximum comfort. Environmental friendly building materials like bamboo, timber, rammed earth, hollow blocks, lime & lime pozzolana cement, agro materials and industrial waste, Ferro cement and Ferro-concrete, alternate roofing systems, paints to reduce heat gain of the buildings. Energy management.

TEXT BOOKS:
1. Sukhatme S.P. and J.K.Nayak, Solar Energy – Principles of Thermal Collection and Storage, TMH.
2. Khan B.H., Non-Conventional Energy Resources, Tata McGraw Hill, New Delhi, 2006.
3. Green Manufacturing Processes and Systems, Edited by J. Paulo Davim, Springer 2013.

REFERENCES:
1. Alternative Building Materials and Technologies / K.S Jagadeesh, B.V Venkata Rama Reddy and K.S Nanjunda Ra.
2. Principles of Solar Energy / Frank Krieth & John F Kreider.
3. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
4. Renewable Energy Technologies /Ramesh & Kumar /Narosa
5. Renewable Energy Technologies/ G.D Roy

OUTCOMES:
1. The student shall understand the principles and working of solar, wind, biomass, geo-thermal, ocean energies.
2. Green energy systems and appreciate their significance in view of their importance in the current scenario and their potential future applications.

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3	-/-/-	3

OPEN ELECTIVE - I
(R18A0051) INTELLECTUAL PROPERTY RIGHTS

OBJECTIVES:

1. The objective of this course is to provide the knowledge on International IPR's and to make students efficient to take decisions in Global Corporate.

Unit-I

Introduction: Intellectual property rights basics, the role and value of IP in international commerce, Issues affecting IP internationally. Agreement on trade related aspects of Intellectual Property Rights. (TRIPS) - Agreement on TRIPS and India.

Unit-II

Parties to IP Rights: Owner, customer, authorized user, licensee, attorney, protection of the weak and strong, finalizing ownership and use rights.

Unit-III

Ensuring the value of IP: Ensuring the value of IP at creation stage, after creation stage, precise contractual protection of IP rights. Key issues related to IP internationally. IP rights in international forums. Fundamentals in Country legal systems, generalities. Validity of IP rights locally: specifics.

Unit-IV

Managing IP Rights: Acquiring IP Rights: letters of instruction, joint collaboration agreement, work made for hire agreement - Protecting IP Rights: non disclosure agreement, cease and desist letter, settlement memorandum. Transferring IP Rights: assignment contract, license agreement, deed of assignment or license agreement, addendum to unrecorded assignment or license.

Unit-V

Remedies and IPR Evaluation - GATT - WTO - Role of WTO in solving IPR issues.

REFERENCES:

- A short course in International Intellectual Property Rights – Karla C. Shippey, World Trade Press – 2nd Edition.
- Intellectual Property Rights – Heritage, Science, & Society under international treaties – A. Subbian, - Deep & Deep Publications – New Delhi.
- Intellectual Property Rights: N K Acharya: ISBN: 9381849309
- Intellectual Property Rights: C B Raju : ISBN-8183870341
- Intellectual Property : Examples and Explanation – Stephen M McJohn, 2/e, ISBN-13: 978-0735556652
- Intellectual Property Rights in the Global Economy – Keith E Maskus, PIIE, ISBN paper 0-88132-282-2

OUTCOMES

1. It allows students how to prepare and protect the Inventions , start up ideas and rights of patents and copy rights etc.,
2. This subject brings awareness to the students the basic legal aspects at present following at Global level.

MODEL QUESTION PAPERS

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
UG Model question paper
Time: 3 hours   ENGLISH (R18A0001)   Max Marks: 70
BRANCH: B.TECH I - I (Common to all Branches)

This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

Q.NO : 1 a) Do you think, in the poem 'The Road not Taken', the speaker regrets his choice, or
         is happy about it? Why?   [7M]
       b) Correct the following sentences.   [7M]
          i) I (learn) ------- English for seven years now.
          ii) But last year I (not / work) ---------- hard enough for English, that's why my marks
             (not / be) --------- really that good then.
          iii) During my last summer holidays, my parents (send) --------- me on a language
              course to London.
          iv)There I (notice) -------- how important it (be) --------- to speak foreign languages
             nowadays.
          v) And after my apprenticeship, maybe I (go) ---------- back to London to work there for
             a while.

OR

Q.NO: 2 a) Write a paragraph on the any **one** of the following.
            i) Importance of success. ii) Best moment in your life.   [7M]
          b) Punctuate the following sentences.   [4M]
             i.   We had a great time in france the kids really enjoyed it
             ii. Some people work best in the mornings others do better in the evenings
             iii. What are you doing next weekend
             iv. Mother had to go into hospital she had heart problems
          c) What are affixes? Explain with one example.   [3M]

SECTION-II

Q.NO: 3 a) What does Abraham say to his Son's teacher to explain him?   [7M]
          b) Do as directed.   [7M]
          i) John collects money. (passive voice)
          ii) Anna opened the window. -(passive voice)
          iii) William will not repair the car. -(passive voice)
          i v) We are taught grammar by Ms Sullivan. (active voice)
          v) He was praised by the teacher. (active voice)
          vi) The teacher was pleased with the boy's work. (active voice)
OR
Q.NO: 4 a) Write a letter to the principal requesting him to grant you one week leave for your

sister's wedding. [7M]

   b) Lodge a complaint to the lgcompany@gmail.com about the malfunctioning of newly bought refrigerator. [4M]

   c) What are transitive and intransitive verbs. Give examples. [3M]

SECTION-III

Q.NO: 5 a) Write the summary of the lesson 'War' along with a brief introduction to the author. [8M]

   b) Do as directed. [6M]

i) Very few students in the school are so talented as Mary (comparative)

ii) Jacob is richer than most other business icons in the group. (positive)

iii) No other boy in his class is so tall as he. (superlative)

OR

Q.NO: 6 a) Write an essay on " Improtance of holidays" [7M]

   b) Use appropriate prepositions for the following. [3M]

i) This material is different ………………… that. (from / to / with)

ii) You should explain this ………………… them. (to / at / with)

iii) I haven't been to the theatre ………………… a long time. (since / for /from)

   c) Complete the phrasal verbs according to their meanings in brackets. [4M]

   (look after , Take off, try on, find out)

i) ---------your shoes. (Remove)

ii) Somebody has to --------- the baby. (Take care of)

iii) She wants to -------- the truth? (Discover)

iv) Where can I -------- true !". the sweater? (See if it fits)

SECTION-IV

Q.NO: 7 a) What are the benefits of imagination according to J.K Rowling's experience? [7M]

   b) Choose the correct article: a, an, the or x (no article) [7M]

i. Are you coming to ------ party next Saturday?

ii. I bought -------- new TV set yesterday.

iii. I think -------- man over there is very ill. He can't stand on his feet.

iv. I watched --------- video you had sent me.

v. She was wearing -------- ugly dress when she met him.

vi. I am crazy about reading ----------- history books.

vii. She is -------- nice girl.

OR

Q.NO: 8 a) What are the rules of making a précis? [3M]

   b) Give one word substitute for the following. [4M]

i) Hard to please

ii) One who is the first to think about something.

iii) A person who never drinks.

v) Belief in many Gods

c) How failure is a stepping stone to success according to J. K. Rowling?   [7M]

SECTION-V

Q.NO: 9 a) Write a memo to your company staff. Ensure that your message is clear, concise, courteous and complete. Include in your memo: [8M]

      1. The importance of being punctual

      2. Some recommendations on how they can be punctual.

    b) Choose the correct word to fill in the blank.   [6M]

  i) Justin was _____ for the big exam when he discovered it had been cancelled.

    all ready / already

  ii) It was _____ seven o'clock by the time we reached Boston.

    all ready/ already

  iii) As a waitress, I was only allowed one fifteen-minute _____.

    Brake / break

  iv) I'm afraid the _____ in this car aren't very reliable.

    Brakes / breaks

  v) The English _____ I took last semester was the best I've ever taken.

    Course / coarse

  vi) This pattern works best with _____, heavy fabric.

    Course / coarse

OR

Q.NO: 10   a) Fill in the blanks with correct pronoun.   [7M]

  i)   All of the jewels have lost _____ glow.

  ii) The jury read _____ verdict.

  iii) The family members disagreed among _____

  iv) He delivered _____ inaugural address at 9:00 AM

  v) Matthew hopes that someone will give _____ a Lego set for his birthday

  vi) Anyone can do this if _____ tries.

  vii) I hurt _____.

  b) Fill in the blanks with correct verb.   [7M]

  i. The student or the committee members _____ every day.

  ii. A lot of money _____ donated to the charity every year.

  iii. Her shorts _____ very comfortable.

  iv. The committee _____ in various volunteer activities in their private lives.

  v. Strategies that the teacher _____ to encourage classroom participation include using small groups and clarifying expectations.

  vi. Neither the plates nor the serving bowl _____on that shelf.

  vii. She, my friends, and I _____ not going to the festival.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
UG Model question paper
Time: 3 hours   ENGLISH (R18A0001)   Max Marks: 70
BRANCH: B.TECH I - I (Common to all Branches)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks. Each question may or may not have a, b, c as sub questions.

<div align="center">SECTION-I</div>

Q. No. 1 a) Critically analyze the poem, "The Road Not Taken".   [5M]
     b) Write a paragraph on the recipe for success.   [5M]
     c) Given below are few words which must be made into a noun, adverbs and
        adjective using suffixes.
        i. to be brave   ii. Childiii. Spect   iv. Create   [4M]

<div align="center">OR</div>

Q. No. 2 a) Is the title "The Road Not Taken" apt. Suggest another title and justify its
        relevance.   [9M]
     b) Using the verb in the correct tense, fill in the blanks   [5M]
   i.   Do you know Priya and Sameer _____ next month (marry)
   ii. He _____ situations well. (handle)
   iii. The writer _____ to pass his strong beliefs to the students. (try – past
        tense)
   iv. By the time you call Ramya tonight, she _____ a message from Ratna.
        (receive)
   v.   I _____ my breakfast just now. (take)

<div align="center">SECTION-II</div>

Q. No. 3 a) What made Lincoln write such a letter to his son's teacher.   [7M]
     b) Change the voice of the sentences: [7M]
            i. advertise the post.
            ii. Ram gave flowers to Vaishnavi
            ii. The courier has been sent by him.
            iv. Somebody cooks meal every day.
            v. the master punished the servant.
            vi. She paid a lot of money.
            vii. Does the police officer catch the thief?

<div align="center">OR</div>

Q. No. 4 *a) "Teach him to sell his talents and brains to the highest bidder but never to put a
        price tag on his heart and soul."* Elaborate this in the light of "Abraham Lincoln
        letter to his son's teacher."   *[4M]*
     b) Label the underlined word as non-finite, transitive, intransitive or ergative: [5M]

i.   At the age of 6 months, teeth <u>grow.</u>
ii. A gentleman <u>opens</u> the door for a lady.
iii. He loves <u>to read</u> in the library.
iv. He <u>slept</u>.
v.   He <u>kept</u> the book under the table.

c) Write an email to customer care of Amazon complaining about a recent purchase and your dissatisfaction with the product and the service.   [5M]

SECTION-III

Q. No. 5 a) In "War" by Pirandello, five characters are travelling in the second train carriage. Write the character sketches of any two characters.   [6M]

b) Write the meanings of the words and make sentences of your own using the words: [4M]
   i. Accelerate   ii. Spectacle   iii. sluggish   iv. Myriad

c) Write an essay on "A model student"   [4M]

OR

Q. No.6 a) Write the meanings of the following phrasal verbs and make sentences of your Own   [7M]
   i.   Give in
   ii. Ask around
   iii. Break down
   iv. Drop out
   v.   Figure out
   vi. Get away
   vii. Hand in

b) Fill in the following blanks with a suitable preposition: [7M]
   i. Rohit has a taste _____ music.
   ii. She is not familiar _____ her tricks.
   iii. Akanksha has an initiation _____ lunch.
   iv. Helen is a disgrace _____ her family.
   v. her mother has no control _____ her.
   vi. Venu is fit _____ that job. He can row _____ the lake.
   vii. The first victim gave evidence against him.

SECTION-IV

Q. No. 7 a) From Rowling's speech, explain how failure is beneficial?   [7M]

b) c) Use article(s) if necessary.   [5M]
   i.   _____ doctors say that _____ apple a day keeps _____ away.
   ii. He has _____ MBA from Osmania University.
   iii. Cyclops is _____ eyed man.

c) Substitute these phrases with one-word each: [2M]
   i. One who does not believe in God
   ii. One who hates women.

OR

Q. No. 8 a) Write a précis for the paragraph below (in 50 words) and suggest a suitable title.

[9M]

We all know what we mean by a "good" man. The ideally good man does not drink or smoke, avoids bad language, converses in the presence of men only exactly as he would if there were ladies present, attends church regularly and holds the correct opinion on all subjects. He has a wholesome horror of wrong-doing and realizes that it is our painful duty to castigate sin. He has a still greater horror of wrong thinking, and considers it the business of the authorities to safeguard the young against those who question the wisdom of the views generally accepted by middle-aged successful citizens. Apart from his professional duties, at which he is assiduous, he spends much time in good works: he may encourage patriotism and military training; he may promote industry, sobriety and virtue among wage earners and their children by seeing to it that failures in these respects receive due punishment; he may be a trustee of a university and prevent an ill-judged respect for learning from allowing the employment of professors with subversive ideas. Above all, of course, his "morals" in the narrow sense must be irreproachable.

b) Label the underlined word as transitive or intransitive :   [5M]
   i.   Jack can hear Jill when she whispers clearly.
   ii.   He only eats ice-cream.
   iii. Having read your letter, my dog will be taken to the vet for a test.
   iv. Walking down the street, the sky was a brilliant blue.
   v.   To complete the survey properly, the form must be signed and sealed in the provided envelope.

SECTION-V

Q. No. 9 a) b) Fill in the blanks with the appropriate words from the two in brackets: [5M]
   i.   Neither she nor I _____ ready for the party.(are/is)
   ii.   Always wait until *every student* _____ attentive. (are/is)
   iii. The boys _____ been talking to the sportsperson. (have/has)
   iv. Oranges or banana _____ rich in vitamin C.(are/is)
   v.   The car with many riders _____ speeding round the curve. (are/is)

b) Fill in the sentences with the appropriate words from the two in brackets: [5M]
   i.   Our _____ have always advised us to keep our culture alive. (forbear, forebear)
   ii. You are _____ (fair, fare)
   iii. _____ your smile, I like the way you interact with others. (Beside, besides)
   iv. That merit student was given a fee _____(waiver, waver)
   v. Yesterday I went with my son to buy _____ (stationary, stationary)

c) Fill in the blanks with an appropriate pronoun: [4M]

i. Ariel is usually optimistic, but _____is very upset today.
ii. When _____ arrived in Los Angeles, the Smiths had trouble clearing customs, so they were at the airport for four hours.
iii. Reginald wanted to try throwing the ball _____
iv. Example: The kitten is huge for _____rage.

OR

Q. No. 10 a) You are the Head of the department of a college. You have been informed that a certain student often arrives late for class. Write a memo addressing the problem.   [6M]
  ✓ Saying how often the student arrives late
  ✓ Describing the effect on other student
  ✓ Suggesting what the student should do about the situation.

b) What are the techniques of reading? Elucidate   [8M]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
UG Model question paper
Time: 3 hours   ENGLISH (R18A0001)   Max Marks: 70
BRANCH: B.TECH I - I (Common to all Branches)
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks. Each question may or may not have a, b, c as sub questions.

SECTION-I

Q. No. 1 a) Why does the poet Robert Frost say, "I shall tell people this with a sigh"?   [6M]

  b) Fill in the blanks with correct tense.   [6M]
 i) I (not/work) _____   hard enough for English, that's why my marks got
   increased   [4M]
 ii) It (be) _____ great and I (think) _____ I (learn) _____ a lot.

  c) Use a prefix or a suffix to make a new word out of the word in brackets**.**   [4 M]
  i) Don't stand near the water. It's too _____(danger)
  ii) If you have a haircut it will change your _____ (appear)
  iii)I can't answer this question. It's _____ (possible)
  iv)When you _____ (write) this paragraph, make it a bit shorter.

Q. No. 2 a) Does the poem "The Road Not Taken" contain only one theme?   [5M]
    b) Use appropriate punctuation marks in the following sentences   [5M]

    i)   We had a great time in France the kids really enjoyed it
    ii)   Some people work best in the mornings others do better in the evenings
    iii)   What are you doing next weekend
    iv)   Mother had to go into hospital she had heart problems
    v)   Did you understand why I was upset
    c) Write a paragraph on, "a day I will always remember".   [4M]

SECTION – II

Q. No. 3 a) What are the major skills that Lincoln wanted his son to possess?   [5M]
    b) Change the voice of the following sentences.
        i)   The spectators thronged the streets.
        ii) Bicycle has been sold by me.
        iii) He will finish the work in the fortnight.
        iv) Admittance was refused to him by the guide.
    c) Write an email to your principal seeking permission to raise funds in the college for
      the welfare of the flood victims.   [5M]

OR

Q. No. 4 a**)** Why is it essential for someone to have "sublime faith in mankind"?   [5M]
    b) Underline the verb and state whether its transitive or intransitive   [5M]

i) You must speak loudly.

ii) We clean our room everyday

iii) Those people painted their house blue.

iv) I like her

c) Write a letter to your class teacher requesting to grant five days leave due to health issues. [5M]

SECTION III

Q. No. 5 a) Bring out the patriotism of the parents from the lesson "war"? [5M]

b) Write an essay on "ban on mobile phone in colleges". [7M]

c) Complete the following sentences using the appropriate form of the adjective.

i) Supriya is the …………………… girl in the class.(intelligent/more intelligent/most intelligent)

ii) China is a ……………….. country. (big/bigger/biggest) **[2M]**

OR

Q. No. 5 a) According to you, What is important - love for family or love for country ? [5M]

b) Fill in the blanks with appropriate preposition. [5M]

i. This material is different ………………… that. (from / to / with)

ii. You should explain this ………………… them. (to / at / with)

iii. He has been absent ………………… Monday. (since /for / from)

iv. I haven't been to the theatre ………………… a long time. (since / for /from)

v. He goes ………………. school by car. (to / at / on)

c) Fill in the blanks with apt phrasal verb. [4M]

i. Quick! _____ the bus. It's ready to leave.

ii. It's dark inside. Can you _____ the light, please?

iii. It's so loud here. Can you _____ the radio a little.

iv. Does your little brother _____ ghosts?

SECTION IV

Q. No. 7 a) According to Rowling, why 'Imagination' is crucial in one's life? [4M]

b) Fill in the article A, An or The where necessary. Tick X where no articles used. [7M]

i. Mary has ____ terrible headache.

ii. What do you usually have for _____ breakfast?

iii. Do you still in _____ Canada?

iv. I read ____ story yesterday.

v. My brother doesn't eat _____ chicken.

vi. Vic can play _____ jazz.

vii. _____ night is quite. Let's take a walk.

c) Fill up the blanks with appropriate one word substitute. [3M]

i. A person of good understanding knowledge and reasoning power.

ii. The study of ancient societies.

iii. That which cannot be corrected.

OR

Q. No. 8 a) How does J.K.Rowling want the Harvard graduates to make the use of their 'status' to influence the world? [5M]

b) Rewrite each sentence, moving the misplaced modifier to its correct position. [4M]

i) The bus station was located by a river which was made of red brick.

ii) The results will only be known after all the votes have been counted.

iii) The contractors needed all kinds of artists to paint the mural badly.

iv) Left alone in the house, the thunderstorm terrified the two small children.

v) Sam asked me to go for a ride on the telephone.

c) Write a précis of the following reducing each of them to one third of the length.[5M]

Men and women are of equal rank but they are not identical. They are be peerless pair being supplementary to one another, each helps the other so that without one the existence of the other cannot be conceived and, therefore it follows as a necessary corollary from these facts that anything that will impair the status of either of them will involve the equal ruin of them both. In framing any scheme of women's education this cardinal truth must be constantly kept in mind. Man is supreme in the outward activities of a married air and therefore it is in the fitness of things that he should have a greater knowledge thereof. On the other hand, noise life is entirely the sphere of woman and, therefore in domestic affairs, in the upbringing and education of children, woman ought to have more knowledge Not that knowledge should be divided into water tight compartment's or that so that some branches of knowledge should be closed to anyone, but unless courses of instruction are based on discriminating appreciation of these basic principles, the fullest life of man and woman cannot be developed. Among the manifold misfortunes that may befall humanity, the loss of health is one of the severest. All the joys which life can give cannot outweigh the sufferings of the sick. Among the manifold misfortunes that may befall humanity, the loss of health is one of the severest. All the joys which life can give cannot outweigh the sufferings of the sick.

SECTION V

Q. No. 9 a) As a boss of an organization write a memo to your employees about their poor time management and professional behaviour within the organization. [7M]

b) Complete the given sentences putting the words, phrases and clauses given in
brackets, in the right order.   [7M]

   i. ……………….. is called Bodh Gaya. (place, where the Buddha got enlightenment, the)

  ii. ……………….. will have to pay a fine. (who do not return the library books by the due date, boys, those)

 iii. ……………. is a Member of Parliament. (who has just spoken, man, the)

 iv. ……………. move around the sun. (planets, which belong to the solar system, all, the)

  v. ……………. is for a school. (new, which the villagers have built, this, building)

 vi. ……………. never returned empty-handed. (men, who went to the Raja for help)

vii. ……………… woke up everybody in the neighborhood. (loud, the, of the sudden explosion, noise)

OR

Q. No. 10 a) Choose the correct word.   [7M]

   i. I am _____ by the images I see on TV. (effect, affect)

  ii. Justin has _____ of problems. (alot, a lot)

 iii. What is your _____reason for moving to Chicago? (principal, principle)

 iv. _____hiding in your closet? (Whose, Who's)

  v. Last year Becky (lead, led) the league in goals.

 vi. Computers are being called on to perform many new functions, including the consumption of homework (formally, formerly) eaten by the dog.

vii. The handle was (lose, loose) and could (have, of) fallen off at any moment

.   b) Correct the following subject verb agreement sentences.   [7M]
Neither he nor she are ready to solve the problem.

   i)   Raghu did not brought a book to the class.

   ii)   Everyone in the ground are playing cricket.

  iii) The boy with lot of books look great.

  iv) Virat want to go home now..

   v)   The brothers as well as their sister is good at their studies.

  vi) The students accompanied by their teacher has gone on a picnic

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
UG Model question paper
Time: 3 hours   **MATHEMATICS-I (R18A0021)**   **Max Marks: 70**
BRANCH: B.TECH I - I (Common to all Branches)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

Q.NO: 1 a) Define Rank of a Matrix. Find the rank of the matrix A = $\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 2 & 3 & -4 \\ 2 & 3 & 5 & -5 \\ 3 & -4 & -5 & 8 \end{bmatrix}$ by reducing

into canonical form or normal form.   [7M]

   b) Discuss for what values of λ, μ the simultaneous equations x + y + z = 6, x+2y+3z =10, x+2y+λz = μ have (i). No solution (ii). A unique solution (iii). An infinite number of solutions   [7M]

OR

Q.NO: 2 a) Find the Eigen values and Eigen vectors of the matrix is $\begin{bmatrix} 3 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$ [14M]

SECTION-II

Q.NO: 3 a) If x + y + z = u, y + z = uv, z = uvw then evaluate $\dfrac{\partial(x, y, z)}{\partial(u, v, w)}$.   [7M]

   b) Expand $x^2 y + 3y - 2$ in powers of $(x - 1)$ and $(y + 2)$ using taylor's theorem. [7M]

OR

Q.NO: 4 a) The Find the stationary points of u(x, y) = sin x siny.sin(x+y) where $0 < x < \pi ; 0 < y < \pi$ and find the maximum.   [7M]

   b) Find the volume of the largest rectangular parallelepiped that can be inscribed in the ellipsoid $x^2/a^2 + y^2/b^2 + z^2/c^2 = 1$.   [7M]

SECTION-III

Q.NO: 5 a) A pot of boiling water 100^0 C is removed from the fire and allowed to cool at 30^0 C room temperature. Two minutes later, the temperature of the water in the pot is 90^0 C. What will be the temperature of water after 5 minutes?   [7M]

   b) Solve $(D^2 - 2D + 1) y = x^2 e^{3x} - \sin 2x + 3$.   [7M]

OR

Q.NO: 6 a) The number N of bacteria in a culture grew at a rate proportional to N . The value of N initially was 100 and increased to 332 in one hour. What was the value of N after $1\dfrac{1}{2}$

hours?

b)Solve $(D^2 + a)y = \tan ax$, by the method of variation of parameters. [7M]

SECTION-IV

Q.NO: 7 a) Solve the partial differential equation $p\sqrt{x} + q\sqrt{y} = \sqrt{z}$ [4M]

b) Solve $z(p^2-q^2) = x - y$ [4M]

c) Solve by the method of separation of variables $2xz_x - 3yz_y = 0$ [6M]

OR

Q.NO: 8 a) Solve z^2 = pqxy by charpit's method [7M]

b) Solve $p^2+q^2 = x^2+y^2$ [7M]

SECTION-V

Q.NO: 9 a) Find inverse Laplace transform of $\dfrac{5s-2}{s^2(s+2)(s-1)}$ [4M]

b) Find $L\{\int_0^t te^{-t} \, sin4t dt\}$ [6M]

c) Find the inverse Laplace transform of $\dfrac{e^{-\pi(s+2)}}{s+2}$ [4M]

OR

Q.NO: 10 a) Find the Laplace transform of $e^{3t} - 2e^{-2t}$ + sin2t + cos3t + sinht - 2cosh3t + 8 [4M]

b) Using Laplace transform, evaluate $\int_0^\infty te^{-t} \, sintdt$ [4M]

c) State and prove Convolution theorem? [6M]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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UG Model question paper
Time: 3 hours   MATHEMATICS-I (R18A0021)   Max Marks: 70
BRANCH: B.TECH I - I (Common to all Branches)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

Q. No.1 State Cayley-Hamilton theorem and find the Characterstic polynomial of the matrix

$A = \begin{bmatrix} 3 & 1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{bmatrix}$ verify Cayley-Hamilton theorem and hence find A^{-1} [14M]

OR

Q. No. 2 a) Define Rank of a matrix   [2M]

b) Diagonalize the matrix $A = \begin{bmatrix} 2 & 2 & -7 \\ 2 & 1 & 2 \\ 0 & 1 & -3 \end{bmatrix}$ and hence find A^4.   [12M]

SECTION-II

Q. No. 3 a) A rectangular box open at the top is to have volume of 32 cubic ft. Find the dimensions of the box requiring least material for its construction.   [7M]

b)Determine whether the function $u = x \sqrt{(1 - y^2)} + y \sqrt{(1 - x^2)}, v = \sin^{-1} x + \sin^{-1} y$ is functionally dependent if so find the relation.   [7M]

OR

Q. No. 4 a) Expand $e^x \cos y$ near $(1, \frac{\pi}{4})$ using Taylor's theorem   [4M]

b) If $x = e^r \sec\theta, y = e^r \tan\theta$ prove that $\dfrac{\partial(x, y)}{\partial(r, \theta)} \cdot \dfrac{\partial(r, \theta)}{\partial(x, y)} = 1$

[10M]

SECTION-III

Q. No. 5 a) Solve $\left(1 + e^{\frac{x}{y}}\right) dx + e^{\frac{x}{y}}\left(1 - \dfrac{x}{y}\right) dy = 0$

[7M]

b) Solve $(D^2 + a^2)y = \tan ax$ by the method of variation of parameters   [7M]

OR

Q. No.6 Solve (D^2+1) x = t cos2t given x = 0, $\frac{dx}{dt} = 0$ at t = 0 [14M]

SECTION-IV

Q. No. 7 a)Solve the partial differential equation $\frac{p}{x^2} + \frac{q}{y^2} = z$ [7M]

b)Solve the partial differential equation $\frac{x^2}{p} + \frac{y^2}{q} = z$ [7M]

OR

Q. No. 8. Solve the equation $\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$, $u(x,0) = 6e^{-3x}$ by the method of separation of variables

[14M]

SECTION-V

Q. No. 9 a) Evaluate $i)\int_0^\infty te^t \sin t \, dt = \frac{3}{50}$ [7M]

b) Using Convolution theorem ,Evaluate $L^{-1}\left\{\frac{s}{(s+2)(s^2+9)}\right\}$ [7M]

OR

10. a) Find the laplace transform of $\frac{e^{-at} - e^{-bt}}{t}$ [4M]

b) Solve $y'' + 2\,y' - 3y = \sin t$ using laplace transform given that $y = \frac{dy}{dt} = 0$ when $t = 0$

[10M]

Time: 3 hours   **MATHEMATICS-I (R18A0021)**   Max Marks: 70
BRANCH: B.TECH I - I (Common to all Branches)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

Q.No. 1 a) Define Rank of a Matrix.   [2M]

b) Reduce the matrix A to normal form where $A = \begin{bmatrix} 0 & 1 & 2 & -2 \\ 4 & 0 & 2 & 6 \\ 2 & 1 & 3 & 1 \end{bmatrix}$,hence find the

rank.   [6M]

c)Find the values of p & q so that the equations 2x+3y+5z=9,7x+3y+2z=8,2x+3y+pz=q has

i)No solution ii)Unique solution iii)An infinite number of solutions.   [6M]

OR

Q.No. 2 a) Find the Characterstic polynomial of the matrix $A = \begin{bmatrix} 3 & 1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{bmatrix}$ verify Cayley-

Hamilton theorem and hence find A⁻¹ and A⁴   [14M]

SECTION-II

Q.No. 3 a) Prove that u = $\frac{x^2-y^2}{x^2+y^2}$, v = $\frac{2xy}{x^2+y^2}$ are functionally dependent and find the relation

between them.   [7M]

b) Find the minimum value of $x^2 + y^2 + z^2$, given that xyz = a³   [7M]

OR

Q.No. 4 a) A rectangular box open at the top is to have volume of 32 cubic ft. Find the

dimensions of the box requiring least material for its construction.   [7M]

b) Show that the rectangular solid of maximum volume that can be inscribed in a
    sphere is a cube.   [7M]

SECTION-III

Q.No. 5 a) Solve $\frac{d^2y}{dx^2} + y = x \sin x$ by the method of variation of parameters   [10M]

b) Solve $\frac{d^4y}{dx^4} - y = 0$ [4M]

OR

Q.No. 6 a) Solve the differential equation $y(xy + e^x)dx - e^y dy = 0$.   [6M]
b. Solve $(D^2 + 4)y = e^x + \sin x$ [8M]

SECTION-IV

Q.No. 7 Solve px+qy = pq using charpit's method   [14M]

OR

Q.No. 8 a) Solve $x^2 p^2 + xpq = z^2$ [6M]

b) Using the method of separation of variables solve $4\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 3u$ given $u = 3e^{-y} -$
e^{-5y} where x=0.   [8M]

SECTION-V

Q.No. 9 a) Find $L^{-1}\left\{\log\left(\frac{s+3}{s+2}\right)\right\}$
                                                                                        [4M]

)Using the convolution theorem find $L^{-1}\left\{\frac{s}{\left(s^2 + a^2\right)^2}\right\}$
                                                                                        [10M]

OR

Q. No. 10 Solve by Laplace transform
$\frac{d^3y}{dt^3} + 2\frac{d^2y}{dt^2} - \frac{dy}{dt} - 2y = 0$, $y(0) = 1$, $y'(0) = y''(0) = 2$ [14M]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
UG Model question paper
Time: 3 hours   ENGINEERING CHEMISTRY (R18A0013)   Max Marks: 70
BRANCH: B.TECH I - II (ECE, EEE, CSE, IT)
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

Q.NO: 1 a) Explain the construction & working of H_2- O_2 fuel cell. Give the advantages and
applications of fuel cells.   [7M]

b) Write process and applications of Electroplating and Electroless plating.   [7M]

OR

Q.NO: 2 a) Define primary battery. Write a note on Li cells.   [7M]

b) Write causes and effects of corrosion.   [4M]

c) Explain oxidation corrosion.   [3M]

SECTION-II

Q.NO: 3 a) State the postulates of Molecular Orbital theory.   [4M]

b) Draw the Molecular Orbital energy level diagram of N_2 molecule.   [4M]

c) Explain LCAO method.   [6M]

OR

Q.NO: 4 a) State the salient features of crystal field theory.   [7M]

b) Discuss the splitting of d-orbitals in case of octahedral complexes.   [7M]

SECTION-III

Q.NO: 5 a) Explain disinfection of water by chlorination and ozonization.   [7M]

b) Explain how to estimate harness of water by EDTA method.   [7M]

OR

Q.NO: 6 a) Differentiate between temporary hardness and permanent hardness   [4M]

b) Explain how to soften hard water by ion exchange process. Give merits and
demerits of the process.   [10M]

SECTION-IV

Q.NO: 7 Define organic reactions. How are they classified? Discuss the mechanism of
nucleophilic substitution (S_N1 and S_N2) with examples.   [14M]

OR

Q.NO: 8 a)Write reaction of dehydrohalogenation of alkylhalide by using E1 elimination.   [7M]

b) Discuss reduction reaction. Explain reduction of ketone and aldehyde compounds
by using $LiAlH_4$ and $NaBH_4$ with reactions.   [7M]

SECTION-V

Q.NO: 9 a) Explain ultimate analysis of coal with its significance.   [7M]

b) Define petroleum. How is it refined by fractional distillation? Write various
fractions with boiling range.   [7M]

OR

Q.NO: 10 a) Define cracking. Explain fluid bed catalytic cracking with neat sketch   [7M]
      b) Write note on:
      (i) Knocking, (ii) Octane number, (iii) Cetane number   [7M]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
UG Model question paper
Time: 3 hours   ENGINEERING CHEMISTRY (R18A0013)   Max Marks: 70
BRANCH: B.TECH I - II (ECE, EEE, CSE, IT)
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

Q.NO: 1 a) What is Galvanic cell? Explain the construction and working principle of Galvanic Cell.   [7M]

b) Derive Nernst equation for single electrode potential and explain the terms involved in it. Write its applications.   [7M]

OR

Q.NO: 2 a) Write charging and discharging reactions of Li-ion cells with applications   [7M]

b) Explain Rusting of iron with the help of electro chemical theory of corrosion.[7M]

SECTION-II

Q.NO: 3 a) Define Atomic and molecular Orbital .Draw the molecular orbitals of diatomic molecules.   [4M]

b) Draw the MO diagrams of N_2 and O_2 molecules and prove that the molecule of oxygen is paramagnetic in nature.   [10M]

OR

Q.NO: 4 a) Define metallic bond. Explain the limitations of Valence bond Theory.   [4M]

b) Explain the crystal field splitting of d-orbitals in case of octahedral and tetrahedral complexes.   [10M]

SECTION-III

Q.NO: 5. a) Define hard water ,soft water ,hardness, temporary hardness ,permanent hardness and units of hardness.   [7M]

b) Explain the principle involved in EDTA method.   [7M]

OR

Q.NO: 6 a) What is potable water .Write its specifications.   [4M]

b) Explain Softening of water by Ion-Exchange method and how ion exchange resins are regenerated.   [10M]

SECTION-IV

Q.NO: 7 a) Explain Peroxide effect with example.   [4M]

b) Write a note on Electrophiles and Nucleophiles.   [4M]

c) Explain Nucleophilic addition with example.   [6M]

OR

Q.NO: 8 a) Explain addition reaction. Write reaction of Br_2 and HBr on alkenes   [4M]

b) Explain Electrophilic addition by Markownikoff Rule.   [6M]

c) Differentiate between S_N^1 and S_N^2 reactions.   [4M]

SECTION-V

Q.NO: 9 a) Explain the proximate and ultimate analysis of coal with its significance. [14M]

OR

Q.NO: 10 a) Define cracking. Explain the process of fluid bed catalytic cracking with a neat
sketch.   [10M]

b)Write constituents ,characteristics and uses of Natural gas, LPG and CNG.   [4M]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
UG Model question paper

Time: 3 hours   ENGINEERING CHEMISTRY (R18A0013)   Max Marks: 70

BRANCH: B.TECH I - II (ECE, EEE, CSE, IT)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks
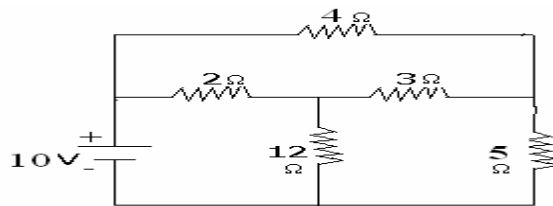
SECTION-I

Q.NO: 1 a) Explain the construction, working and applications of Lead acid storage cell.   [7M]
    b) Define electrode potential and EMF.   [3M]
    c) What is a battery? How does it differ from a cell?   [4M]

OR

Q.NO: 2 a) What is cathodic protection. Explain both sacrificial anodic and impressed current
    cathodic protection method.   [10M]
    b) Define galvanizing and tinning and write their applications.   [4M]

SECTION-II

Q.NO: 3 a) Discuss the crystal field splitting of d-orbital in case of tetrahedral complex [10M]
    b) Write a note on bonding and anti-bonding orbitals   [4M]

OR

Q.NO: 4 a) Discuss briefly about MOT. Discuss the formation of O_2 molecule on the basis of
    MOT.   [10M]
    b) Differentiate between atomic and molecular orbitals.   [4M]

SECTION-III

Q.NO: 5 a) Explain ion exchange resin process for treatment of boiler feed water.   [10M]
    b) Define hardness and explain the types of hardness of water.   [4M]

OR

Q.NO: 6 a) What is desalination of brackish water? Describe desalination of brackish water by
    reverse osmosis method.   [10M]
    b) Write specifications of potable water.   [4M]

SECTION-IV

Q.NO: 7. a) What are organic reactions? Explain in detail about nucleophlic substitution
    reactions (S_N1 and S_N2)with examples.   [10M]
    b) State Markonikov's rule with examples.   [4M]

OR

Q.NO: 8 a) Explain in detail about elimination reactions (E_1 and E_2) with examples.   [10M]
    b) Define oxidation. Write the oxidation of alcohols in presence of $KMnO_4$ and
    chromic acid.   [4M]

SECTION-V

Q.NO: 9 a) Explain the proximate analysis of coal and its significance   [10M]
    b) Define fuel. Give classification and characteristics of a good fuel.   [7M]

OR

Q.NO: 10 a) Write a short note on knocking, octane and cetane number.   [7M]
    b) What is Cracking? Explain the fluid bed catalytic cracking with a neat sketch.   [7M]

UG Model question paper

Time: 3 hours   BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (R18A0261)   **Max Marks: 70**

BRANCH: B.TECH I - I (MECH.ANE)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

Q.NO: 1. a) Explain about the types of network elements.   [7M]

b) Explain about the types of sources.   [7M]

OR

Q.NO: 2. a) State and explain Kirchhoff's laws with an example.   [7M]

b) Explain about source transformation technique with neat diagrams.   [7M]

SECTION-II

Q.NO: 3 a) Explain about mesh analysis with an example.   [7M]

b) Find out the power absorbed by the 12ohm resistor by using nodal analysis.   [7M]

OR

Q.NO 4. a) State and explain superposition theorem.   [7M]

b) Determine the current flowing through the 6 ohms resistor using Thevenin's theorem

[7M]
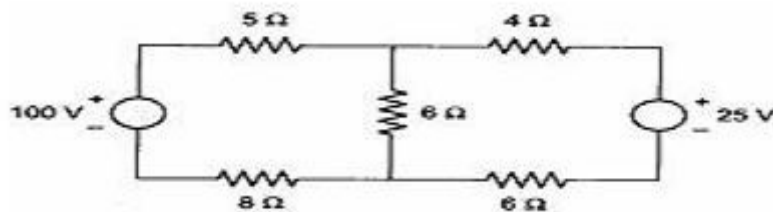
SECTION-III

Q.NO: 5. a) A 8 pole wave wound D.C generator is having 100 slots with 30 conductors per slot and rotating at 1500 rpm.The flux per pole is 0.016 Wb, calculate the EMF generated.   [7M]

        b) Explain the principle of operation of DC generator.   [7M]

OR

Q.NO: 6. a) Explain the basic principle of operation of D.C Motor.   [7M]

        b) Derive the Torque equation of DC Motor.   [7M]

SECTION-IV

Q.NO: 7. Explain the construction and operation of PN junction diode with neat diagrams.   [14M]

OR

Q.NO: 8. Explain the principle of operation of half wave bridge rectifier and draw the wave forms.   [14M]

SECTION-V

Q.NO: 9. Draw the basic band structure of NPN and PNP transistors and explain its operation [14M]

OR

Q.NO: 10. Explain about the input and output characteristics of transistor in CB configuration. [14M]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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UG Model question paper
Time: 3 hours   BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (R18A0261)   **Max Marks: 70**
BRANCH: B.TECH I - I (MECH.ANE)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks
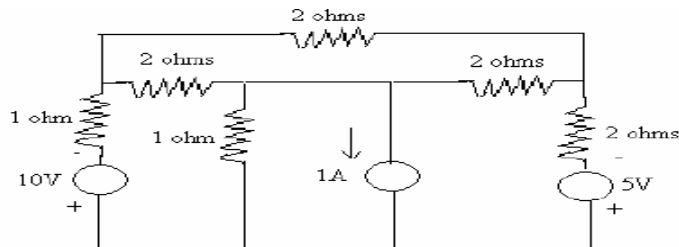
SECTION-I

Q.NO: 1. a) Explain independent and dependent sources with neat sketch.   [7M]

b) Explain Kirchhoff's laws with example?   [7M]

OR

Q.NO: 2. a)Explain about passive elements in detail.   [9M]

b) Write about source transformation with neat diagrams.   [5M]

SECTION-II

Q.NO: 3. a) Three resistances R_{ab} , R_{bc} and R_{ca} are connected in delta connection,
Derive the expressions for equivalent star connection.   [7M]

b) Find the current supplied by 10 V battery by using Star – Delta
transformation for the following network.   [7M]

OR
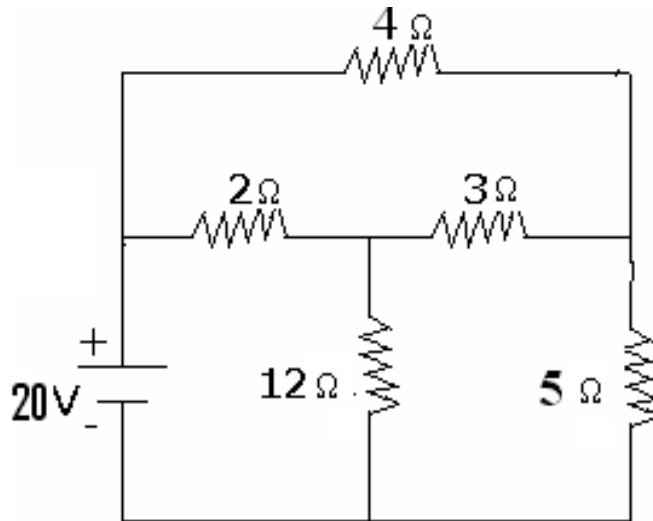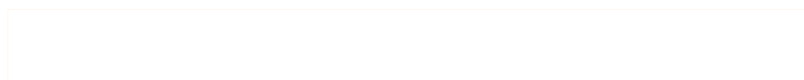
Q.NO: 4. a)Explain about the Superposition theorem with example　　　　　[7M]

b) For the network shown in figure determine all branch currents and the voltage across 6 ohm resistor using mesh analysis.　　　　　[7M]
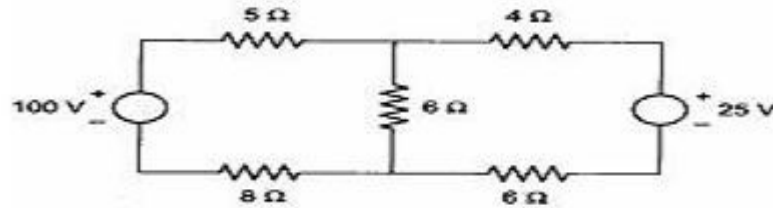
SECTION-III

Q.NO: 5. a) Explain the basic principle of operation of D.C generator.　　　　　[7M]

b) A 6 pole wave wound D.C generator is having 50 slots with 25 conductors per slot and rotating at 1500 rpm.The flux per pole is 0.015 Wb, calculate the EMF generated.　　　　　[7M]

OR

Q.NO: 6. a) Write the similarities and dissimilarities between the motor and generator.　　　　　[7M]

b) A 230V, 6-pole wave wound DC series motor has 1000 conductors on its armature.It has armature and field resistance of 0.88 ohms .The motor takes a current of 100A. Determine the gross torque developed if it has a flux per pole of 30 mWb.　　　　　[7M]

SECTION-IV

Q.NO: 7 Draw V-I characteristics of p-n diode and justify your answer with the help of a neat circuit diagram explain the working principle of Single phase full wave rectifier. What is ripple factor and obtain the ripple factor for single phase full wave rectifier.　　　　　[14M]

OR

Q.NO: 8. a) Explain the operation of Zener diode with neat diagrams　　　　　[7M]

b) Explain the operation of full wave rectifier with neat waveforms.　　　　　[7M]

SECTION-V

Q.NO: 9. a) Mention any four applications of PNP transistors.　　　　　[6M]

b) Explain about the construction of NPN transistor　　　　　[8M]

OR

Q.NO: 10 Explain about the operation and characteristics of BJT in CB configuration.　[14M]
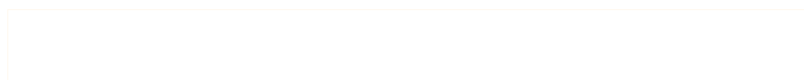
MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
UG Model question paper
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (R18A0261)

Time: 3 hours   **Max Marks: 70**

BRANCH: B.TECH I - I (MECH.ANE)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks
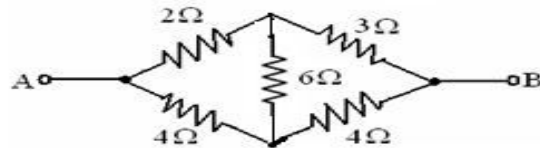
SECTION-I

Q.NO: 1. a) Explain Active & Passive elements in detail.   [7M]
         b) Explain types of sources.   [7M]

OR

Q.NO: 2. a) Explain about the source transformation technique.   [7M]
         b) Explain about resistor and derive necessary equations.   [7M]

SECTION-II

Q.NO: 3 a)Determine the equivalent resistance for the series connection of resistors. [6M]
        b)Determine the mesh currents using mesh analysis   [8M]

OR

Q.NO: 4. a) Explain about the Norton's theorem with example.   [7M]
         b) Determine the equivalent resistance across AB terminals.   [7M]
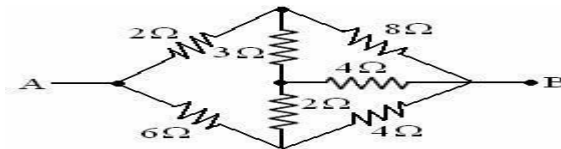
SECTION-III

Q.NO: 5. a) The armature of a 4-pole D.C. generator has a lap winding containing 600 conductors. Calculate the generated EMF when the flux per pole is 0.06 Wb and the speed is 400 rpm.   [9M]

b) What is the necessity of back EMF in DC motor? [5M]

OR

Q.NO: 6. Explain the construction of DC machine with neat sketch. [14M]

SECTION-IV

Q.NO: 7. a) Explain the operation of a full wave bridge rectifier. [7M]

b) A single phase 230V, 1 kW heater is connected across single-phase 230V, 50Hzsupply through a diode. Calculate the power delivered to the heater element.

[7M]

OR

Q.NO: 8.Explain the construcion and operaion of Bridge rectifier with neat diagrams.[14M]

SECTION-V

Q.NO: 9. a) Explain the operation of PNP transistor. [9M]

b) Explain the transistor as an amplifier [5M]

OR

Q.NO: 10 Explain about the operation and characteristics of BJT in CC configuration. [14M]
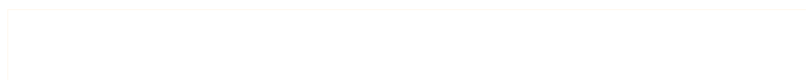
Time: 3 hours   BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (R18A0261)   **Max Marks: 70**
BRANCH: B.TECH I - I (MECH.ANE)
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

Q.NO 1. a) Explain about the types of elements with an example.   [7M]

b) Explain about the source transformation.   [7M]

OR

Q.NO: 2.Explain about the dependent and independent soureces in detail.   [14M]

SECTION-II

Q.NO: 3. a)Explain mesh analysis with example.   [7M]

b) Determine the equivalent resistance across AB terminals.   [7M]

OR

Q.NO: 4 a)Three resistors 1ohm,2ohm,3ohm are connected in delta determine their star equivalent network hence deduce the expression used ?   [7M]

b) Determine the current flowing through 6 ohms resistor using superposition theorem.
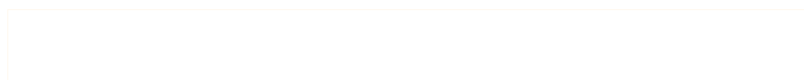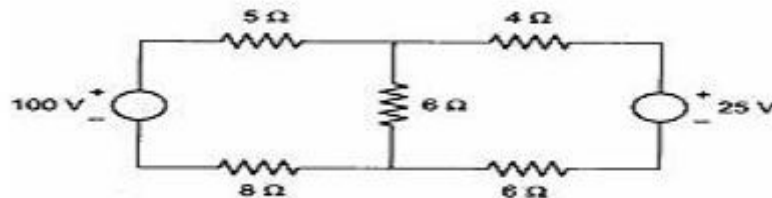
SECTION-III

Q.NO: 5. a) Derive the torque equation of DC motor.   [7M]

      b) A 250V, 4-pole wave wound DC series motor has 888 conductors on its armature. It has armature and field resistance of 0.88 ohms .The motor takes a current of 80A. Determine the gross torque developed if it has a flux per pole of 28 mWb.

                                                           [7M]

OR

Q.NO: 6.a)Derive the EMF equation of single phase transformer.   [7M]

      b) A 120 KVA transformer having primary voltage of 2000V at 50 Hz has 180 primary and 60 secondary turns. Neglecting losses, calculate:

      i) The full load primary and secondary currents.

      ii) The no-load secondary induced EMF.

      iii) Maximum flux in the core.   [7M]

SECTION-IV

Q.NO: 7. Explain the construction and operation of PN junction diode with neat diagrams.

                                                          [14M]

OR

Q.NO: 8. Explain the working principle of full bridge rectifier and obtain the formula for its ripple factor.   [14M]

SECTION-V

Q.NO: 9. a) Explain the operation of NPN transistor.   [9M]

      b) Explain the transistor as an amplifier   [5M]

OR

Q.NO: 10 Explain about the operation and characteristics of BJT in CB configuration. [14M]

UG Model question paper
Time: 3 hours   BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (R18A0261)   Max Marks: 70
BRANCH: B.TECH I - I (MECH.ANE)
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

Q.NO: 1. a) Explain about the active and passive elements.   [7M]

b) State and explain Kirchhoff's laws with example.   [7M]

OR

Q.NO: 2. a) Explain about the inductor with necessary equations.   [7M]

b) Explain about the source transformation technique.   [7M]

SECTION-II

Q.NO: 3 .a) Explain about the mesh analysis with an example.   [7M]

b) Derive the expressions for star to delta transformation.   [7M]

OR

Q.NO: 4. a) state and explain the Thevenin's theorem.   [7M]

b) Find Thevenin's equivalent circuit for the circuit shown in below figure.   [7M]
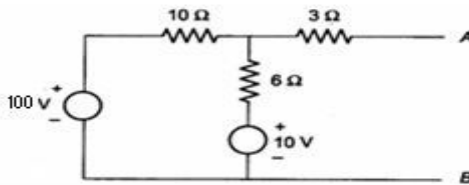
SECTION-III

Q.NO: 5. a) Describe with the suitable sketches the main parts of a DC machine. Explain the main functions of each part making specific reference to the properties of the material used for the construction of each part.   [7M]

b) Derive the EMF equation of DC generator.   [7M]

OR

Q.NO: 6. a) Explain the principle of operation of DC motor.   [7M]

b) Explain the principle of operation of Single phase transformer.   [7M]

SECTION-IV

Q.NO: 7. Explain the construction and operation of NPN junction diode with neat diagrams.   [14M]

OR
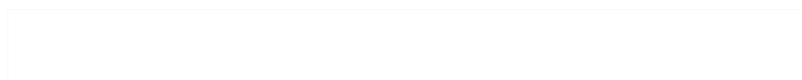
Q.NO: 8. Explain the working principle of full wave rectifier and obtain the formula for its ripple factor. [14M]
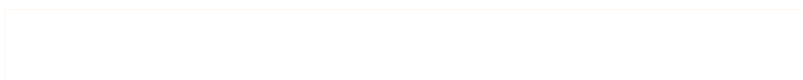
SECTION-V

Q.NO:9. a) Explain the construction of PNP transistor. [7M]

b) Explain the operation of NPN transistor [7M]

OR

Q.NO:10 Explain about the operation and characteristics of BJT in CE configuration. [14M]

Time: 3 hours   PROGRAMMING FOR PROBLEM SOLVING(R180501)   **Max Marks: 70**

BRANCH: B.TECH I - I (COMMON TO ALL)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

Q. No. 1 a) State the hardware and software in Computer system   [4 M]
   b) Differentiate a flowchart and an algorithm with an example.   [10 M]

OR

Q. No. 2 a) Differentiate Type casting and co-ercion   [4 M]
   b) Explain operator precedence and associativity   [10 M]

SECTION-II

Q. No. 3 a) Differentiate entry-controlled-loop and exit-controlled-loop   [8 M]
   b) Write a C program to print the prime numbers between 1 and n.   [6 M]

OR

Q. No. 4 a) State the difference between break and continue statement with example.[6M]
   b) Write a C program to find arithmetic operations using switch statement   [8M]

SECTION-III

Q. No. 5 a) Clearly state the parameter passing techniques with example program.   [8 M]
   b) State the difference between iteration and recursion.   [6 M]

OR

Q. No. 6 a) What is meant by inter function communication?   [8 M]
   b) Write the syntax for function declaration, function definition, and function call   [6M]

SECTION-IV

Q. No.7 a) Define an Array?   [2M]
   b) Explain declaration and initialization of one dimensional array?   [4M]
   c) Write a C program to find multiplication of matrices.   [8 M]

   OR

Q. No.8 a) Write a C program to insert a sub-string into a given main string at a given position.   [6 M]
   b) State any six string manipulation functions and explain.   [8 M]

SECTION-V

Q. No.9 a)What is a Pointer?   [2M]
   b) Explain declaration and initialization of a pointer variable?   [6M]
   c) Explain various arithmetic operations performed on pointers.   [6 M]

OR

Q. No. 10 a) Differentiate between a structure and Union. Give examples for each   [8 M]
   b) Define: (i) enum (ii) bit-fields   [6 M]
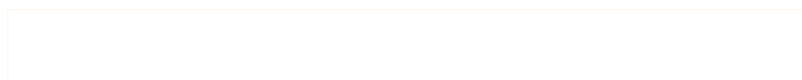
MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
UG Model question paper

Time: 3 hours   PROGRAMMING FOR PROBLEM SOLVING(R180501)   **Max Marks: 70**

BRANCH: B.TECH I - I (COMMON TO ALL)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

Q. No. 1 a) State the different computer languages.   [4M]

b) Draw the flowchart of finding largest of three positive numbers?   [5 M]

c) Define algorithm and write its properties   [5M]

OR

Q. No. 2 a) Explain the basic structure of a C program   [4M]

b) Write about different types of operators   [10M]

SECTION-II

Q. No. 3 a) State the different decision-making statements in C with example.   [14M]

OR

Q. No. 4 a) State the usage of goto statement.   [2M]

b) Differentiate while and do-while loop.   [6M]

c) Write a C program to generate the Fibonacci sequence.   [6M]

SECTION-III

Q. No. 5 a)Define function . Explain categories of functions with example programs .   [7M]

b)Describe parameter passing method with example program.   [7M]

OR

Q. No. 6 a) List out different types of storage classes   [8M]

b)Define recursion.Write a C program to find factorial of a number using recursion
                                                                                    [4M]

c)State the user-defined functions.   [2M]

SECTION-IV

Q. No. 7 a)Definearray.Declare an array and initialize it.Write about applications of

array.   [6M]

b) Explain the different types of arrays.   [4M]

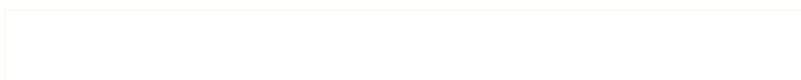c)Write a C program to perform addition of two matrices.   [4M]

OR

Q. No.8 a)Definestring.Write about string I/O functions with example   [7M]

b) Explain different string manipulation functions with example   [7M]

SECTION-V

Q. No. 9 a) Define pointer and state the uses of pointer.   [4M]

b) Explain pointer with arrays.   [4M]
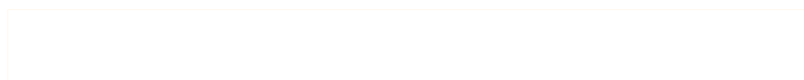
c) Write a short note on pointer arithmetic   [6M]

OR

Q. No. 10 a)State the definition and format for accesing the members of a structure.

[6M]

b) Compare structure and union and write a program on each of them.   [8M]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
UG Model question paper

Time: 3 hours   PROGRAMMING FOR PROBLEM SOLVING(R180501)   **Max Marks: 70**

BRANCH: B.TECH I - I (COMMON TO ALL)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

Q. No. 1 a) What is an Algorithm? Discuss basic characteristics of algorithm?   [7M]

b) What do you mean by flow chart? Explain it with Example?   [7M]

OR

Q. No. 2 a) Explain: (i) Keyword (ii) Identifier (iii) Constant (iv) Datatype   [8M]

b) State the precedence of operators with example.   [6M]

SECTION-II

Q. No. 3 a) State the difference between the usages of else-if ladder and nested if-else in detail.   [8M]

b) Write a short note on multi-way selection.   [6M]

OR

Q. No. 4 State the usage of loops with example program for each of them.   [14M]

SECTION-III

Q. No.5 a) Define function. Explain categories of functions with example programs.[7M]

b) Describe parameter passing techniques with example program.   [7M]

OR

Q. No.6 a) List out different types of storage classes in C with example for each.   [8M]

b) Define recursion. Write a C program to find factorial of a number using recursion.   [4M]

SECTION-IV

Q. No.7 a) Define array. Declare an array and initialize it. Write about applications of array.   [8M]

b) Write a C program to display the transpose of a matrix.   [6M]

OR

Q. No.8 a) Define String. Explain declaration and initialization of strings.   [6M]

b) Explain the different String manipulation Functions.   [8M]

SECTION-V

Q. No. 9 a) Define a pointer.   [2M]

b) Explain declaration and initialization of pointer variable.   [6M]

c) Explain Pointer with arrays.   [8 M]

OR

Q. No. 10 a) Differentiate structure and union with example.   [8M]

b) What are bit-fields? Write a program illustrating the usage of bit-fields[6M]
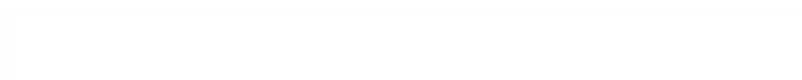
MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
UG Model question paper
Time: 3 hours   PROFESSIONAL ENGLISH (R18A0002)   Max Marks: 70
BRANCH: B.TECH I - II (COMMON TO ALL)
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I
Q. No. 1 a) What are finite and non-finite verbs? Supply three examples for each. [5M]
b) Describe you first day engineering college experience. (300 words)   [5M]
c) Write a paragraph on 'women safety in India'.   [4M]
.
OR
Q. No. 2 a) Write a brief note on Bill Gates TED talk?   [5M]
b) Write a note on importance of business vocabulary.   [4M]
c) List out five dos and don'ts of paragraph writing.   [5M]

SECTION-II
Q. No. 3 a) Write down any seven idioms with example sentences.   [7M]
b) Write down seven tips to give effective presentation.   [7M]
OR
Q. No. 4 a) What are the tips to follow to write an effective 'Abstract'   [5M]
b) Write down five dos and five don'ts to make an effective presentation   [5M]
c) Rewrite the following Simple Sentences as Compound Sentences.   [4M]

1. The old man being weak could not walk properly.
2. His father in spite of being poor is a contended man.
3. She must work hard to be successful in the examination.
4. Our teacher is popular among students for his diligence.

SECTION-III
Q. No.5 a) Change the following direct speech sentences into indirect speech.   [4M]
1."Where is your sister?" she asked me.
2."I never make mistakes," he said
3."I can't drive a lorry," he said.
4."Don't waste your money" she said.
b) Write any five standard abbreviations with their full form.   [5M]
c) Write down any five likely-to-be-asked questions in an interview.   [5M]
OR
Q. No.6 a) Write a cover letter of your own which displays your core qualifications. [10M]
b) List out four dos and four don'ts of writing a cover letter.   [4M]

SECTION-IV

Q. No. 7 a) How do you ace a telephonic interview? [7M]

b) Write a telephonic interview conversation between an HR and an fresh
applicant for a post that he/she applied for. . [7M]

OR

Q. No.8 a) Frame a resume for the post of junior engineer at fabrics ltd.? [7M]

b) Write down five dos and five don'ts of resume making. [7M]

SECTION-V

Q. No.9 a) What is the importance of professional etiquette? Mention any seven. [7M]

b) Write a report on your college annual day. [7M]

OR

Q. No.10 a) Correct the following sentences. [7M]

1. Myself suresh kumar form Delhi.
2. I am having four brothers.
3. He don't have a latop
4. Does she has a car?
5. He didn't wrote exam.
6. I came to office by walk.
7. Our classroom is in the second floor.

b) Complete the following analogies. [7M]

1. Author : novel : : _____ : song
 A)   singer   B)   musician   C)   composer   D)   writer

2. Wind : blow : : rain : _____
 A)   flood   B)   water   C)   fall   D)   drops

3. Profess : creed : : advocate : _____
 A)   nuance   B)   intimations   C)   cherub   D)   doctrine

4. Inarticulate : verbal : : contemporary : _____
 A) delicate   B)   Philistine   C)   prehistoric   D)   mortal

5. Ludicrous : satirical : : delicious : _____
 A) succulent   B)   intriguing   C)   obscure   D)   grasping

6. Conspicuous: obscure: : eccentric : _____
 A) picturesque   B)   tedious   C)   conventional   D)   foolhardy

7. Smile : happiness : : crocus : _____
 A)   flower   B)   spring   C)   garden   D)   planting

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
UG Model question paper

Time: 3 hours   PROFESSIONAL ENGLISH (R18A0002)   **Max Marks: 70**
BRANCH: B.TECH I - II (COMMON TO ALL)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

Q.NO: 1 a) What are the steps involved in an oral presenttion?   [7M]
     b) Describe your college in your own words.   [7M]

OR

Q.NO:2 a) Underline the verbs in the statements and mention whether it is finite or Non-finite.   [3M]
    i.   Nancy does her homework every day ii. They are writing a letter
   iii. He has a big care   iv. She speaks Chinese very well.
    V. The proposal has been examined today vi. Hema is doing her homework now.

   b) Write three paragraphs about smart phone addiction.   [7M]
   c) Identify the business vocabulary in the following sentences   [4M]
    i. The company has reasons for its actions.
    ii. Industrial action has affected production.
    iii. We need to develop an action plan.
    iv. Let's use an advertising agency.

SECTION-II

Q.NO: 3. a) Use the following idioms in sentences of your own.   [4M]
   i. A hot potato   ii. A penny for your thought
   iii. Ball is in your court   iv. Back to the drawing board
   b) Write an abstract for the paper that you are going to publish in your core journal
    (Words restricted to 150)   [8M]
   c) Convert the given simple sentences into complex sentences   [2M]

    i. I finished my work. I went out ii. I breathe alright. At least I think so.

OR

Q.NO: 4. a) Suggest the most important points to your friend who is going to make his first public speaking speech.   [7M]
   b) Match the suitable idioms from the I column with the sentences given in column- II.   [4M]

i	Once in a blue moon	a	I am sure your performance will be great
ii	A piece of cake	b	Seldom I go to the library
iii	Break a leg	c	Two business giants finally agreed with each other
iv	See eye to eye	d	Today's exam was very easy
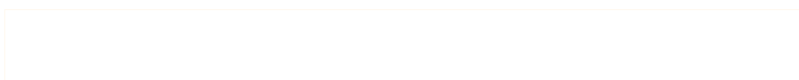
c) Write a small abstract of 50 words to present your proposal on your project.
[3M]

SECTION -III

Q.NO: 5 a) Write at least eight exchanges of conversation between a HR and a fresher
(the latter, seeking for the post of Assistant engineer in L&T).   [8M]

b) Expand the given standard abbreviations.   [3M]
i. ISRO ii. CBI iii. ONGC iv. ASAP v.ETA vi. CEO

c) Change the sentences as directed   [3M]
i . "What time does the train arrive? " She asked. (Change into indirect speech)
ii.   She asked when they could have dinner. (Change into direct speech)
iii. Peter said to John," Good luck". (Change into indirect speech)

OR

Q.NO: 6 a) Write a job application letter to the HR of Crystal systems. The job description is
as follows: Needed Fresh Engineering Graduates, graduated in the year 2018
from CSE/IT discipline with basic knowledge in Oracle and should also possess
excellent communication skills.   [8M]

b) Write down ten most important interview skills that will get you hired for a job.
[6M]

SECTION-IV

Q.NO: 7 Respond to the given job description with both your job application letter and
Resume' to the HR of the Company, TVS Lucas.   [14M]
Job Description is as follows:
Title: Total Quality Manager ; Basic Qualification: B.Tech in Mechanical Engineering/
Electrical Engineering. Preference will be given to candidates without any standing
backlogs. Knowledge of Robotics and Multi skilled in basic Electrical practices is a
requirement.

OR

Q.NO: 8 a) List out ten keys to succeed in a telephonic interview.   [8M]

b) Choose the right analogy from the following   [6M]
i. iron: Fe :: Silver :_____ (Na, Cl, Ag, K)
ii. Warm: hot; _____ ::hilarious (Humid, raucous, summer amusing)
iii. board : train ; _____:: horse (stable, shoe ,ride, mount)
iv. Son: Nuclear ; _____ :: Extended (father, mother , cousin and daughters)
v. Poetry: Rhyme; Philosophy::_____ (imagery, music, bi- law, theory)
vi. fear: Composure; _____:: Zenith (apex, heaven, heights, nadir)

.   **SECTION-V**

Q.NO: 9 a) List out the professional etiquette to be followed in your workplace.   [7M]

b) Write a Report to your Manager about the recent internal inspection conducted
for the year end stock verification.   [7M]

OR

Q.NO: 10 a) Assume yourself as the Class representative and write a report to your HOD
about the recent workshop you attended in IIT Hyderabad.   [8M]

b) Spot the errors in the following sentences: [6M]

   i.   An European visited India
   ii.   Everyone must brew their own coffee.
   iii.   Divide this apple between the girls.
   iv.   The boys with their teacher is out in the fields
   v.   The teacher was impressed with I and Mark
   vi.   Yedi is a man that loves his work more than anything else in the world.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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UG Model question paper
Time: 3 hours   PROFESSIONAL ENGLISH (R18A0002)   Max Marks: 70
BRANCH: B.TECH I - II (COMMON TO ALL)
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

Q. No. 1. a) What does Bill Gates discuss in his TED talk?   [5M]
.   b) Describe your mother.   [5M]
              c) Write paragraph on "FIFA World Cup"   [4M]

OR

Q. No. 2 a) Write a note on Bill Gate's TED talk on Solving Big problems?   [6M]
              b) Describe a place of your choice.   [6M]
              c) What is business vocabulary? Give two examples.   [2M]

SECTION-II

Q. No. 3 a) What inspiration do you get from Google CEO, Sundar Pichai's speech?   [7M]
              b) Write an abstract on "Women Empowerment"   [7M]

OR

Q. No. 4 a) What are the dos and don'ts of Oral Presentation?   [6M]
              b) Write sentences by using the following idioms.   [2M]
              1) Black sheep 2) Once in a blue moon 3) A big wig 4) A wet blanket
              c) Define simple, complex and compound sentences with two examples for each
                                                                                                                              [6M]

SECTION-III

Q. No. 5 a) Write any three questions with answers asked in interviews?   [7M]
              b) Write a resume and cover letter for the post of Software Professional in
                 Wipro.   [7M]

OR

Q. No.6 a) Convert the following sentences into indirect speech   [5M]
                 1. He said, "I am going to canteen to have a cup of tea."
                 2. Ram said to Sam, "Did they meet you yesterday?"
                 3. " Please post these letters" Rana said to Mona.
                 4. She said to her mother, "Why have you broken my glass?"
                 5. They said," We have won the match!"
              b) Write a note on Mock Interviews.   [5M]
              c) Write any 4 standard abbreviations.   [4M]

SECTION-IV

Q. No. 7a) What are the advantages of Telephonic Interviews?   [5M]
              b) Write any five expressions used in telephonic interviews.   [5M]
              c) Use the correct auxiliary verbs in the following blanks.   [4M]

1) _____ you a student?
2) He _____ not like tea.
3) He _____ not come yet.
4) They _____ invited him to the party

OR

Q.No. 8. a) What are the requisites of resume writing?   [5M]
   b) Write a dialogue between the interviewer and interviewee on telephone.
                                                                                      [5M]
   c) Choose the right word and fill in the blanks.   [4M]
   1. virus : illness : : flood : _____
      a. rain b. destruction c. hurricane d. drought
   2. olive branch : peace :: lamb : _____
      a. meekness b. evil c. love d. royalty
   3. smart: intelligent :: ecstatic : _____
      a. despaired b. blissful c. unhappy d. miserable
   4. sweet : sour :: _____ : biased
      a. impartial b. concerned c. unfair d. predisposed

SECTION-V

Q. No.9 a) Write your comment on Tanmay Bhakshi's ITU interview.   [5M]
   b) What is Professional Etiquette? Explain with examples.   [5M]
   c) Choose the right word and fill in the blanks.   [4M]
   1. _____ : zenith ::fear : composure
      a. apex b. heaven c. Heights d. nadir
   2. _____ : trail :: grain : grail
      a. train b. path c. wheat d. holy
   3. poetry : rhyme :: philosophy : _____
      a. imagery b. music c. bi-law d. theory
   4. humble: arrogance :: miserable: _____
      a. mournfulness b. gloom c. elation d. distress

OR

Q. No. 10 a) Write report on the "Technical Fest in your college".   [7M]
   b) Correct the following sentences.   [7M]
   1. Every one of the shirts have a green collar.
   2. They have been studying since two hours.
   3. They have met with their friends.
   4. I doesn't come to college every day.
   5. They have visited Kashmir last year.
   6. He has four brother-in-laws.
   7. She have four brother.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
UG Model question paper
Time: 3 hours   MATHEMATICS-II (R18A0022)   Max Marks: 70
BRANCH: B.TECH I - II (COMMON TO ALL)

Note: This question paper contains of 5 sections. Answer five questions, choosing one
question from each section and each question carries 14 marks
.

SECTION-I

Q.NO: 1 a) Find a root of an equation $3x = cosx + 1$ using Newton Raphson method.
   b) Construct difference table for the following data

x	0.1	0.3	0.5	0.7	0.9	1.1	1.3
y	0.003	0.067	0.148	0.248	0.370	0.518	0.697

   and find $f(0.6)$.   [7+7M]

OR

Q.NO: 2 a) Find the value of y when x = 3 and also find interpolating polynomial function
      using Lagrange's Interpolation formula from the following data.

x	0	1	2	5
y	-2	6	9	15

   b) Find a root of an equation x $\log_{10} x$= 1.2 using Bisection method which lies
      between 2 & 3.   [7+7M]

SECTION-II

Q.NO: 3 Evaluate $\int_{0}^{1} \frac{1}{1+x^2} dx$ using (i) Simpsons rule (ii) Simpsons $\frac{3}{8}$ rule iii)Trapezoidal

   rule and compare the results with its actual values.   [14M]

OR

Q.NO: 4 Solve $\frac{dy}{dx} = x - y^2$, y(0) =1 find y(0.3) by taking h= 0.1using modified Euler's
      method .   [14M]

SECTION-III

Q.NO: 5 a) Find $\int_{0}^{3} \frac{dx}{\sqrt{9-x^2}}$

   b) Show that $\int_{a}^{b} (x-a)^{m} (b-x)^{n} dx = (b-a)^{m+n+1} \beta(m+1,n+1)$ [7+7M]

OR

Q.NO: 6 a) Show that $\int_0^\infty e^{-x^2}dx = \dfrac{\sqrt{\pi}}{2}$ `

b) If m and n are +ve integers, then Prove that $\beta(m,n) = \dfrac{(m-1)!(n-1)!}{(m+n-1)!}$ [7+7M]

SECTION-IV

Q.NO: 7 a) Change the order of integration and evaluate $= \int_0^a \int_{x/a}^{\sqrt{x/a}} \left(x^2 + y^2\right)dx\,dy$

b) Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} xyz\,dx\,dy\,dz$ [7+7M]

OR

Q.NO: 8 a) Change the order of integration in $\int_0^1 \int_{x^2}^{2-x} xy\,dx\,dy$ and hence evaluate the double

integral.

b) Evaluate the integral by changing to polar co-ordinates $\int_0^a \int_0^{\sqrt{a^2-y^2}} \left(x^2 + y^2\right)dx\,dy$

[7+7M]

SECTION-V

Q.NO: 9 a) Verify Green's theorem in plane for $\oint(2xy - x^2)dx + (x^2 + y^2)dy$, where 'c'
is the closed curve of the region bounded by $y = x^2$ and $x = y^2$.   [7+7M]
b) Find the unit normal vector to the rface $x^2 + y^2 + 2z^2 = 6$ *at the point* (2,2,3).

OR

Q.NO: 10 a) State Gauss Divergence Theorem.   [4+10M]

b) Evaluate $\dfrac{\iint_S \bar{F}.\bar{n}ds}{}$ where $\bar{F} = 2x^2 y\bar{i} - y^2\bar{j} + 4xz^2\bar{k}$ and 's'is closed the surface of
the region in the first octant bounded by the cylinder $y^2 + z^2 = 9$ and planes x=0,

x=2, y=0, z=0.
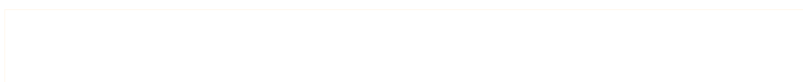
MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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UG Model question paper
Time: 3 hours   **MATHEMATICS-II (R18A0022)**   **Max Marks: 70**
BRANCH: B.TECH I - II (COMMON TO ALL)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks
.

<p align="center">SECTION-I</p>

Q.NO: 1 a) Using Newton's forward interpolation formula, and the given table of values

X	1.1	1.3	1.5	1.7	1.9
$f(x)$	0.21	0.69	1.25	1.89	2.61

Obtain the value of $f(x)$ $when$ $x = 1.4$

  b) Find a root of an equation e^x sinx = 1 using Regula false method.   [7+7M]

<p align="center">OR</p>

Q.NO: 2 a) Using Gauss back ward difference formula, find y(8) from the following table

x	0	5	10	15	20	25
y	7	11	14	18	24	32

  b) Find a root of an equation $x^4 - x - 10 = 0$ using Bisection method.   [7+7M]

<p align="center">SECTION-II</p>

Q.NO: 3 a) Using Taylor series method, find an approximate value of y at x = 0.2 for the
        differential equation $y' - 2y = 3e^x$ for y (0) = 0.

  b) Derive the normal equation to fit the straight line $y = a + bx$.   [10+4M]

<p align="center">OR</p>

Q.NO: 4 a) The velocity v (m/sec) of a particle at distance S(m) from a point on its path
        given by following table

S	0	10	20	30	40	50	60
v	47	58	64	65	61	52	38

     Estimate the time taken to travel 60 meters by Simpsons 1/3 and 3/8 rules.

  b)Derive the normal equation to fit the parabola $y = a + bx + cx^2$.   [8+6M]

<p align="center">SECTION-III</p>

Q.NO: 5 a) Show that $\overline{|(n)} = \int_0^1 \left(\log \frac{1}{x} \right)^{n-1} dx, n > 0$

     b) Show that $\beta(m,n) = \int_0^1 \frac{x^{m-1} + x^{n-1}}{(1+x)^{m+n}} dx$ [7+7M]

OR

Q.NO: 6 a) Prove $\int_0^1 x^m (\log x)^n dx = \dfrac{(-1)^n n!}{(m+1)^{n+1}}$

b) Prove that $\int_b^a (x-b)^{m-1}(a-x)^{n-1} dx = (a-b)^{m+n-1} \beta(m,n)$ [7+7M]

SECTION-IV

Q.NO: 7 a) Evaluate $\iint r^3 dr d\theta$ over the area included between the circles r=2sin θ and r=4 sin θ

b) Change the order of integration in $\int_0^1 \int_{x^2}^{2-x} xy\,dx\,dy$ and hence evaluate the double

integral.   [7+7M]

OR

Q.NO: 8 a)Evaluate $\iint (x^2 + y^2) dx\,dy$ over the area bounded by the ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$

b)Evaluate $\int_0^{\pi/4} \int_0^{a\sin\theta} \dfrac{r dr d\theta}{\sqrt{a^2 - r^2}}$ [7+7M]

SECTION-V

Q.NO: 9 a) If $=(5xy-6x^2) \bar{i} + (2y-4x) \bar{j}$, evaluate $\int_C \bar{F}.d\bar{r}$ along the curve C in xy-plane

y=x³from (1,1) to (2,8).

b) Show that the vector $(x^2 - yz)\bar{i} + (y^2 - zx)\bar{j} + (z^2 - xy)\bar{k}$ is irrotational and find its scalar potential.   [7+7M]

OR

Q.NO: 10. Find $\int_s \bar{F}.\bar{n}dS$ where $\bar{F} = 2 x^2\bar{i} - y^2\bar{j} + 4xz\bar{k}$ and S is the region in the first octant bounded by $y^2 + z^2 = 9$ and x=0,x=2.   [7+7M]
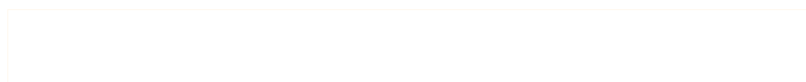
MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
UG Model question paper
Time: 3 hours   **MATHEMATICS-II (R18A0022)**   **Max Marks: 70**
BRANCH: B.TECH I - II (COMMON TO ALL)
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

Q.NO: 1 a) Using Bisection method ,find the negative root of $x^3 - 4x + 9 = 0$ correct to two   decimals.

b) Using appropriate interpolation formula ,find y(8) from the following table[7+7]

x	0	5	10	15	20	25
y	7	11	14	18	24	32

OR

Q.NO: 2 a) A curve passes through the points (0,18) ,(1,10),(3,-18) and (6,90).Find the slope of the curve at x=2.

b) By using Iteration method find a root for the equation
$$f(x) = 2x - \log_{10} x - 7 = 0$$ [7+7M]

SECTION-II

Q.NO: 3 a) Find a and b so that $y = ab^x$ best fits the following data.

x	0.2	0.3	0.4	0.5	0.6	0.7
y	3.16	2.38	1.75	1.34	1.00	0.74

b) Using Taylor series method, find an approximate value of y at x = 0.2 for the differential equation $y' - 2y = 3e^x$ for y (0) = 0.   [7+7M]

OR

Q.NO: 4 a) Evaluate $\int_0^1 \frac{1}{1+x} dx$ by using trapezoidal , simpson's 1/3,Simpsons 3/8 rule
                    [7+7M]

b) Fit a parabola of the form $y = ax^2 + bx + c$

X	1	2	3	4	5	6	7
Y	2.3	5	9.7	16.5	29.4	35.5	54.4

SECTION-III

Q.NO: 5 a) Prove $\beta(m,n) = 2\int_0^{\pi/2} \sin^{2m-1}\theta \cos^{2n-1}\theta d\theta$.   [7+7M]

b)Prove $2^{2n-1}\overline{|(n)}\left|\left(n+\frac{1}{2}\right)\right. = \overline{|(2n)}.\sqrt{\pi}$

OR

Q.NO: 6 a) Show that $\int_0^{\frac{\pi}{2}} sin^2\theta \, cos^4\theta \, d\theta = \frac{\pi}{32}$ [7+7M]

b) Prove $\Gamma(n)\Gamma(1-n) = \frac{\pi}{sinn\pi}$.

SECTION-IV

Q.NO: 7 a) Evaluate $\int_{-1}^{1}\int_{0}^{z}\int_{x-z}^{x+z} (x+y+z)dx\,dy\,dz$

b)Change the order of Integration and evaluate [7+7M]

OR

Q.NO: 8 a) Evaluate $\iint (x^2+y^2)dx\,dy$ in the positive quadrant for which $x+y\le1$ [7+7M]

b) Evaluate $\int_{0}^{1}\int_{0}^{\sqrt{1+x^2}} \frac{dydx}{1+x^2+y^2}$

SECTION –V

Q.NO: 9 Verify Green's theorem in a plane for $\int_{c}\left[(xy+y^2)dx+x^2dy\right]$ when 'c' is added by

$y = x$ and $\quad y = x^2$ [14M]

OR

Q.NO: 10 Verify stoke's theorem for $\overline{F}=(x^2-y^2)\overline{i}+2xy\overline{j}$ over the box bounded by
planes x=0,x=a ,y=0,y=b. [14M])
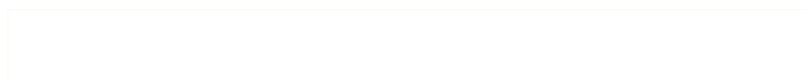
MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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UG Model question paper
Time: 3 hours   ENGG PHYSICS (R18A0012)   Max Marks: 70
BRANCH: B.TECH I - II (MECH,ANE)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

Q.NO:1 a) Deduce the conditions for under damped, over-damped and critically damped motion of the oscillator?   [7M]
       b) Define quality factor Q of a damped harmonic oscillator and obtain an expression in terms of relaxation time. ?   [7M]
OR
Q.NO: 2 a) Discuss the electrical analogy of damped harmonic motion.   [8M]
       b) Give the theory of forced vibrations   [6M]

SECTION-II

Q.NO: 3 a) Describe and explain the phenomenon of Fraunhoffer diffraction due to a single slit. Determine the positions of principle maxima and minima?   [10M]
       b) In Newton's Rings experiment, diameter of 10th dark ring due to wavelength 6000 A^0 in air is 0.5 cm. Find the radius of curvature of lens?   [4M]
OR
Q.NO: 4 a) Differentiate Fraunhoffer & Fresnel diffraction.   [4M]
       b) Explain how you determine wavelength of given source of light using plane transmission grating.   [10M]

SECTION-III

Q.NO: 5.   Explain the classification of materials based on band theory of solids   [14M]
OR
Q.NO: 6 a) Derive an an expression for density of energy states?   [8M]
       b) State & explain Bloch's theorem in band theory.   [6M]

SECTION-IV

Q.NO: 7 a) Define Electronic polarization ? Derive an expression for electronic polarization of dielectric material.   [7M]
       b) Derive clausius-mossotti relation of a polarized dielectric material.   [7M]
**OR**
Q.NO: 8 a) Define magnetic moment? Explain origin of magnetic moment at the atomic level.   [7 M]
       b) Explain domain theory of Ferro-magnetism.?   [7M]
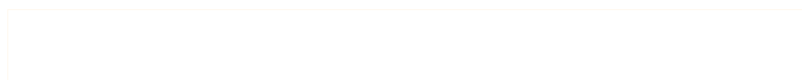
SECTION-V

Q.NO: 9 a) Explain the construction and working principle of He - Ne laser with neat diagram. [10M]

b) Write the applications of laser. [4M]

OR

Q.NO: 10   a) Explain the characteristics of lasers? [7M]

b) Differentiate between spontaneous & stimulated emission ? Derive an expression for Einstein's coefficients. [7M]
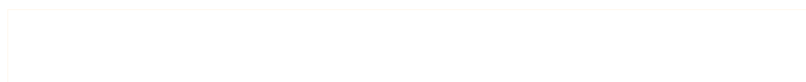
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UG Model question paper

Time: 3 hours   **ENGG PHYSICS (R18A0012)**   **Max Marks: 70**

BRANCH: B.TECH I - II (MECH,ANE)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

Q.NO. 1 a)   Solve the differential equation of damped harmonic oscillator.   [10 M]

b) Compare electrical and mechanical oscillator.   [4M]

OR

Q.NO: 2 a)   Derive an expression forced harmonic oscillator   [10 M]

b)   Differentiate between forced   and damped harmonic oscillator.   [4M]

SECTION-II

Q.NO: 3 a)   Discuss the theory of Newton's rings with necessary diagram   [10M]

b)   Write the difference between Fresnel and Fraunhoffer diffraction.   [4M]

OR

Q.NO: 4 a)   Explain construction and working principle of Michelson's interferometer.   [10M]

b) Write short notes on plane transmission grating.   [4M]

SECTION-III

Q.NO: 5 a) Write a short notes an Brillouin zones   [10 M]

b) Define and derive the expression for effective mass.   [4M]

OR

Q.NO: 6 a) Derive the expression for density of states.   [8M]

b) Obtain an expression for the Fermi energy in metals at T=0K   [6M]

SECTION-IV

Q.NO: 7 a) Derive an expression for electronic and ionic polarization of dielectric material.   [10M]

b) Derive the Classius –Mossotti relation.   [4M]

OR

Q.NO: 8 a) Differentiate Ferro and Anti ferro magnetic materials.   [6M]

b) Explain Hysteresis loop on domain theory.   [8M]

SECTION-V

Q.NO: 9 a) Derive the relation between the probabilities of spontaneous and stimulated emission   of radiation.   [6M]

b) Explain the construction and working of Ruby laser?   [8M]

OR

Q.NO: 10 a) Explain the construction and working principle of He - Ne laser with neat diagram   [8M]

b) Write the applications of laser.   [6M]
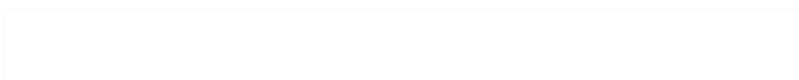
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UG Model question paper
Time: 3 hours   ENGG PHYSICS (R18A0012)   Max Marks: 70
BRANCH: B.TECH I - II (MECH,ANE)
Note: This question paper contains of 5 sections. Answer five questions, choosing one
question from each section and each question carries 14 marks

SECTION-I
Q.NO: 1 a) Differentiate between Mechanical & Electrical oscillators.   [4 M]
         b) What are damped oscillations? Solve the differential equation of a damped
            harmonic   oscillator.   [10 M]
OR
Q.NO: 2 a) Derive an expression for energy decay & power dissipation of a damped
            harmonic oscillator   [8 M]
         b) Discuss the differential equation of a forced damped oscillator & obtain its
            solution.   [6 M]
SECTION-II
Q.NO: 3 a) State and explain Huygens's principle in wave-optics   [6 M]
         b) Discuss the theory of Newton s rings with necessary diagram.   [8 M]
OR
Q.NO: 4 a) Explain the construction & working of Michelson interferometer   [10 M]
         b) Write the difference between interference and diffraction.   [4 M]
SECTION-III
Q.NO: 5 a) Derive the expression for density of states.   [10 M]
         b) Write short notes on Brillouin zones   [4 M]
OR
Q.NO: 6 a) Define and derive the expression for effective mass   [10 M]
         b) Explain the origin of energy bands in solids.   [4 M]
SECTION-IV
Q.NO: 7 a) Describe Lorentz method to calculate the internal field of a cubic structure?

         b) Define ionic polarization and derive an expression for it.   [7M]
OR
Q.NO: 8 a) Discuss about Bohr magneton related to magnetic moment of electron?   [4 M]
         b) Discuss the magnetization of ferromagnetic material by domain theory .   [10M]
SECTION-V
Q.NO: 9 a) Explain the construction and working principle of Ruby laser with neat diagram.
                                                                                         [8 M]
         b) Explain the characteristics of laser.   [6 M]
OR
Q.NO: 10 a) derive the relation between Eienstein coefficients?   [8 M]
         b) Write short note on i) lasing action ii) population inversion.   [6 M]

Time: 3 hours   OBJECT ORIENTATED PROGRAMMING (R18A0502)   Max Marks: 70

BRANCH: B.TECH I - II (COMMON TO ALL)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

Q. No. 1 a)Describe OOP concept in C++   [7M]

     b)List out operators and describe them   [7M]

OR

Q. No. 2 a)Write the structure of C++ program   [4M]

     b) Differentiate OOP and POP   [7M)

     c)What is the purpose of Namespace   [3M]

SECTION-II

Q. No. 3 a)Describe inline function.   [5M]

     b)Write about access control with examplr program each   [4M]

     c)Define friend function   [5M]

OR

Q. No. 4 a) What are default arguments   [7M]

     b)Write about static class members.   [7M]

SECTION-III

Q. No. 5 a)Describe types of constructors.   [7M]

     b) Explain Dynamic constructor with an example   [7M]

OR

Q. No.6 a)List out types of inheritance .Explain   [7M]

     b) Define destructor .Explain with an example program   [3M]

     c)Clearly explain constructor s in derived class   [4M]

SECTION-IV

Q. No. 7 a)Explain Runtime polymorphism.   [7M]

     b) Describe virtual function with an example.   [7M]

OR

Q. No. 8 a)Describe about Dynamic memory allocation with its functions   [7M]

     b) Explain about pointer and functions   [7M].

SECTION-V

Q. No. 9 a)Explain types of templates.   [7M]

     b) Describe types of Exception.   [7M].

OR

Q. No. 10 a)Expalin class templates with multiple parameters.   [5M]

     b) Clearly describe Rethrowing an exception   [5M]

     c)Write about specification exception.   [4M]
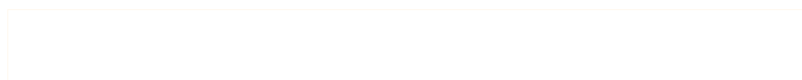
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UG Model question paper

Time: 3 hours   OBJECT ORIENTATED PROGRAMMING (R18A0502)   **Max Marks: 70**

BRANCH: B.TECH I - II (COMMON TO ALL)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

Q. No. 1.a)Explain the differences between POP and OOP.   [7M]

b)Explain the different types of data types in C++.   [7M]

OR

Q. No. 2.a)Explain the different types of operators in C++.   [7M]

b)Write a C++ program to print the Fibonacci sequence of first n terms.   [7M]

SECTION-II

Q. No. 3.a)Explain class and object with an example program   [7M]

b)Explain inline function with an example program.   [7M]

OR

Q. No. 4.a)Explain friend function with an example program.   [7M]

b)Write about static data members and static member functions.   [7M]

SECTION-III

Q. No. 5.a)Describe the different types of constructors in C++.   [7M]

b)Explain multiple inheritance with an example program.   [7M]

OR

Q. No.6.a)Explain the differences between constructors and destructors.   [7M]

b)Explain hierarchical inheritance with an example program   [7M]

SECTION-IV

Q. No. 7.a)Explain the different types of polymorphisms in C++.   [7M]

b)Explain virtual functions with an example program.   [7M]

OR

Q. No. 8.a)Describe about dynamic memory allocation with its functions.   [7M]

b)Explain operator overloading with an example program.   [7M]

SECTION-V

Q. No. 9.a)Explain the different types of templates in C++.   [7M]

b)Expalin exception handling mechanism in C++.   [7M]

OR

Q. No. 10.a)Expalin class templates with multiple parameters.   [7M]

b) Explain the different types of exceptions with an example program.   [7M]
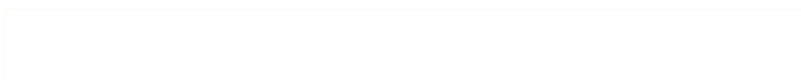
MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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UG Model question paper

Time: 3 hours   OBJECT ORIENTATED PROGRAMMING (R18A0502)   Max Marks: 70

BRANCH: B.TECH I - II (COMMON TO ALL)

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION - I

Q. No. 1 a)Explain Basic Concepts of OOP in C++.   [7M]
          b)Explain the following concepts in C++?   [7M]
                    i)typecasting   ii)reference variables.

OR

Q. No. 2 a)Write the structure of C++ program.   [4M]
          b) Differentiate OOP and POP.   [7M]
          c)What is the purpose of Namespace.   [3M]

SECTION-II

Q. No. 3 a)Explain inline function with program.   [5M]
          b)Explain objects as function arguments with program   [4M]
          c)Write a C++ program for friend function .   [5M]

OR

Q. No. 4 a) Explain array of objects with program.   [7M]
          b)Explain about static member functions with program.   [7M]

SECTION-III

Q. No. 5)Define Constructor.Explain the following Constructors with programs.   [14M]
          a)Parameterized constructor   b)Copy constructor   c)Dynamic constructor.

OR

Q. No.6 a)Explain different types of inheritance with programs .   [14M]

SECTION-IV

Q. No. 7 a)Explain this pointer with program.   [5M]
          b) Explain abstract classes with program.   [5M]
          c)Write a C++ program to overload unary operator(++)?   [4M]

OR

Q. No. 8 a)Explain about virtual base classes with program.   [5M]
          b) Write a C++ program to overload binary operator(+).   [4M]
          c)Explain pointers to derived classes with program ?   [5M]

SECTION-V

Q. No. 9 a) Explain function templates with multiple parameters.   [5M]
          b) Explain about specifying exceptions with program.   [5M]
          c)Briefly explain exception handling mechanism.   [4M]
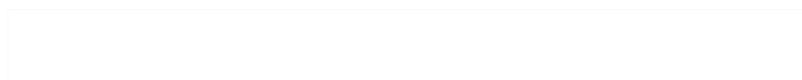
OR

Q. No. 10 a)Explain class templates with multiple parameters.　　　　　[5M]

　　　b) Clearly describe Rethrowing an exception.　　　　　[5M]

　　　c)Explain member function templates .　　　　　[4M]

Time: 3 hours   ENGG GRAPHICS (R18A0302)   Max Marks: 70
BRANCH: B.TECH I - II (MECH.ANE)

This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

Q.NO: 1 Draw an ellipse when the distance of its vertex from its directrix is 24 mm and distance of its focus from directrix is 42mm.   [14 M]

OR

Q.NO: 2 a) Construct a scale of 1:40 to read meters and decimeters and long enough to measure up to 6 meters. Mark a distance of 4.7 m on it.

  b) A 40 mm diameter circle rolls out side an arc of radius 70 mm for a circular distance of 120 mm.Trace the path of a point lying on the circumference of rolling circle, which is in contact with the arc in its initial position. Name the curve.   [14 M]

SECTION-II

Q.NO: 3 a) A point is 30 mm from the H.P. and 50 mm from the V.P. Draw its projections keeping it in all possible positions.   [4 M]

  b) A 60 mm long line AB is parallel to and 20 mm in front of the V.P. The ends A and B of the line are 10 mm and 50 mm above the H.P respectively. Draw the projectors of the line and determine its inclination with the H.P.   [10 M]

OR

Q.NO: 4 The front view and top views of an 80 mm long line PQ measures 70 mm and 60 mm, respectively. The end P is on the H.P. and the end Q is in the V.P. Draw the projections of line PQ and determine its inclinations with the H.P and the V.P.
                    [14 M]

SECTION-III

Q.NO: 5. A hexagonal plane of side 30 mm has an edge in the V.P. The surface of the plane is inclined at 45^0 to the V.P. and the edge on which it rests is inclined at 30^0 to the H.P. Draw its projections.   [14 M]

OR

Q.NO: 6 A square pyramid of base side 40 mm and axis 55 mm is resting on one of its triangular faces on the H.P. A vertical plane containing the axis is inclined at 45^0 to the V.P. Draw its projections.   [14 M]
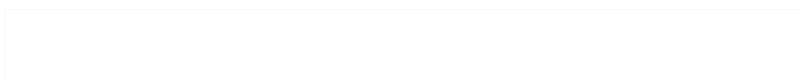
SECTION-IV

Q.NO: 7 Draw the isometric view of a hexagonal prism of base side 30 mm and axis 70mm. the prism is resting on its base on the H.P. with an edge of the base parallel to the V.P. [14 M]

OR

Q.NO: 8 A square pyramid of base side 25 mm and axis 40 mm rests centrally over a cylindrical block of base diameter 50 mm and thickness 20 mm. Draw the isometric projection of the arrangement. [14 M]

SECTION-V

Q.NO: 9 Draw the orthographic projections for the pictorial view shown in figure All dimensions are in mm [14 M]
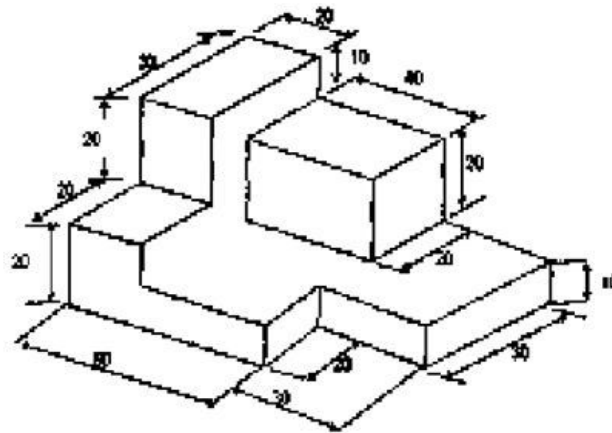
OR

Q.NO: 10 Draw the isometric view of the given orthographic projection of the object?

[14 M]
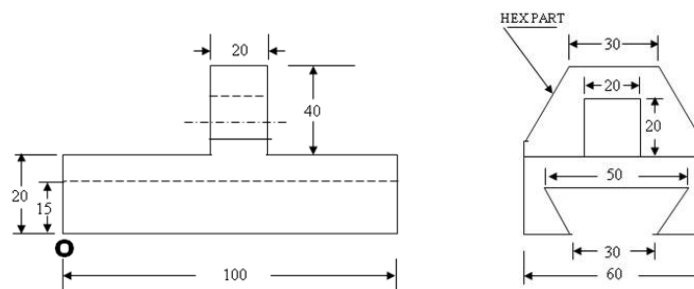
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UG Model question paper

Time: 3 hours   ENGG GRAPHICS (R18A0302)   Max Marks: 70
BRANCH: B.TECH I - II (MECH.ANE)

This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION - I

Q.NO: 1 a) Draw hexagon with a side of 40 mm.   [4M]

   b) Draw the hyperbola when the focus and the vertex are 25 mm apart.   Consider eccentricity as 3/2. Draw a tangent and normal to the curve at a point that is 35 mm from the focus.   [10M]

OR

Q.NO: 2 a) A line CD 75 mm long is parallel to VP. And perpendicular to HP. End C is 35 mm above HP. And 20 mm in front of VP. End D is above HP. Draw the projections of the line CD

   b) A straight line AB of 75 mm long, has the end A on V.P and the end B on H.P. The line is inclined at 30^0 to V.P and its front view makes an angle of 45^0 with xy. Draw the projections of the line   [6M]

SECTION- II

Q.NO: 3 A rectangular lamina of size 50 mm × 40 mm has a coaxial circular hole of 30 mm diameter. It is resting on HP with a shorter edge perpendicular to VP. The surface of the lamina is inclined at 35^0 to HP. Draw the top, and front views.

OR

Q.NO: 4 A straight line AB of 75 mm long, has the end A on V.P and the end B on H.P. The line is inclined at 30^0 to V.P and its front view makes an angle of 45^0 with xy. Draw the projections of the line and add the left side view and locate the traces.   [14M]
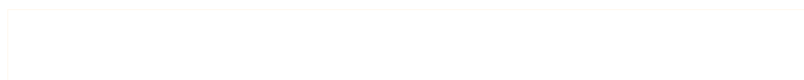
SECTION III

Q.NO: 5 A rectangular lamina of size 50 mm × 40 mm has a coaxial circular hole of 30 mm   [14M]
     diameter. It is resting on HP with a shorter edge perpendicular to VP. The surface of
   the lamina is inclined at 35^0 to HP. Draw the top, front and left side views.

OR

Q.NO: 6 a) A hexagonal prism with side of base 25 mm and 50 mm long is resting on a   [8M]
     comer of its base on HP. Draw the projections of the prism when its axis is
     making 30° with HP and parallel to VP.
    b)   Draw the projections of a right circular cone of base 40 mm diameter and height   [6M]
     60 mm when resting with its base on HP.

SECTION IV

Q.NO: 7 Using First Angle Projection, Draw the Orthographic Views of the object shown in
     below Figure.   [14M]
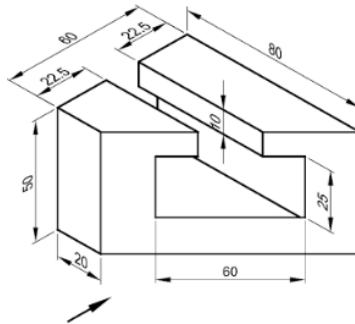
OR

Q.NO: 8 Draw three views of the following component in first angle projection. Take all
     dimensions are in mm.
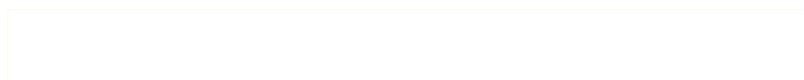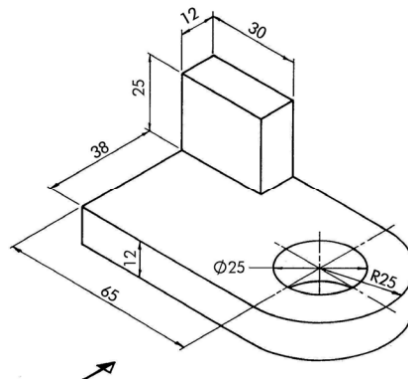
Q.NO: 9 Draw the isometric view of Figure 1.   [14 M]
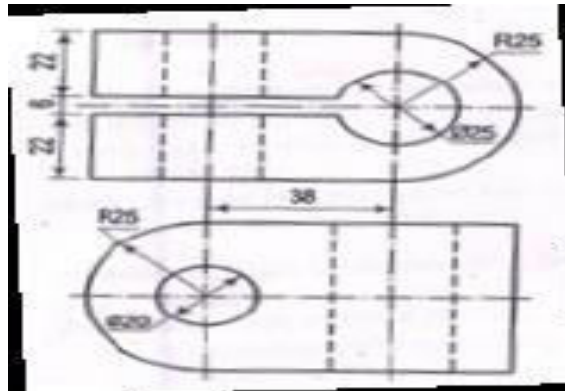
Q.NO: 10 Draw the elevation, plan and side view of the picture shown in the Figure 2. [14M]
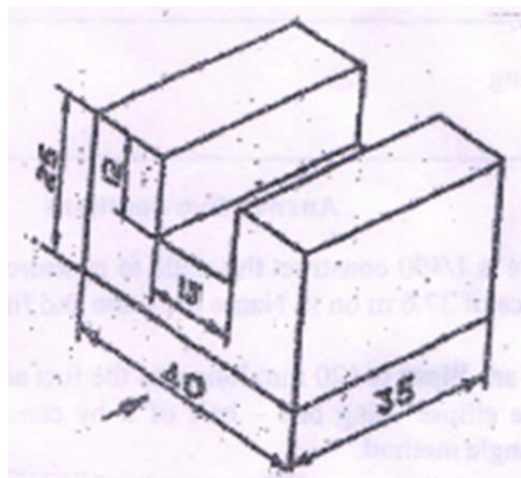
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UG Model question paper

Time: 3 hours   **ENGG GRAPHICS (R18A0302)**   **Max Marks: 70**

BRANCH: B.TECH I - II (MECH,ANE)

This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION -I

Q.NO: 1(a) Draw a plain scale of R.F 1:40 to read Metres and Decimetres and long enough to measure up to 8m. Show lengths of 4.3m and 6.2m on this scale.   [7M]

(b) Draw the hyperbola when the focus and the vertex are 25mm apart. Consider eccentricity as 3/2. Draw a tangent and normal to the curve at a point that is 35 mm from the focus.   [7M]

OR

Q.NO 2 A circle of 50mm diameter rolls on the circumference of another circle of 175mm diameter and outside it. Trace the locus of a point on the circumference of the rolling circle for one complete revolution. Name the curve. Draw a tangent and a normal to the curve at a point 125mm from the centre of the directing circle.[14M]

SECTION -II

Q.NO: 3 A 120 mm long line PQ is inclined at 45^0 to the HP and 30^0 to the VP A point m on the line is at a distance of 40 mm from p and its front view is 50 mm above the xy line and the top view is 35mm below the xy line, Draw its projection. Locate the traces.   [14M]

OR

Q.NO: 4 A regular hexagonal lamina with its edge 50 mm has its plane inclined at 45^0 to HP and lying with one of its edges in HP. The plane of one of its diagonals is inclined at 45^0 to XY . The corner nearest to VP. is 15 mm in front of it. Draw its projections.
                                                                                                [14M]

SECTION -III

Q.NO: 5 A pentagonal pyramid, side of pentagon 30mm and height 70mm is resting on HP on one of its base edges such that the triangular face containing that edge is perpendicular to HP and parallel to VP draw the projections.   [14M]

OR

Q.NO: 6 A cylinder of diameter 30mm and axis height 60 mm lying on the ground on a point of its base circle such that the axis is inclined at 45^0 to the H.P and the plane containing the axis males an angle of 30^0 with the VP. Draw the projection of the cylinder.   [14M]
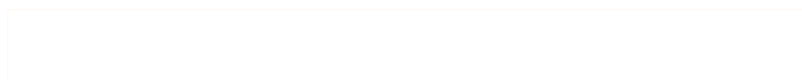
SECTION –IV

Q.NO: 7 A hexagonal prism of base 30 *mm* and height 70 *mm* is resting on its base on the HP with a side of the base perpendicular to the VP. The prism has a cylindrical hole of diameter 40mm drilled centrally such that the axis of the hole is perpendicular to the VP. Draw the development of the lateral surface of the prism.   [14M]

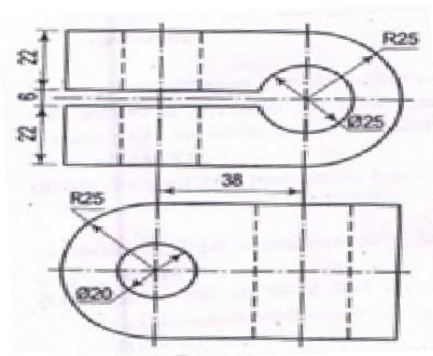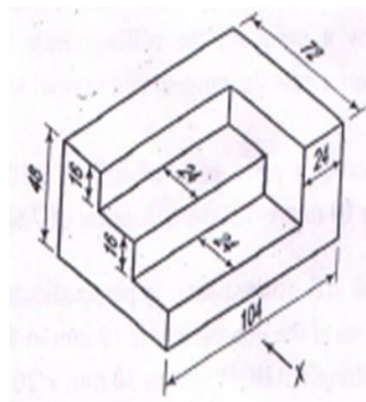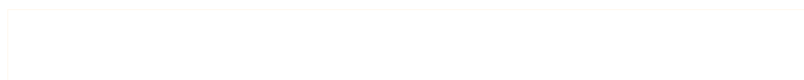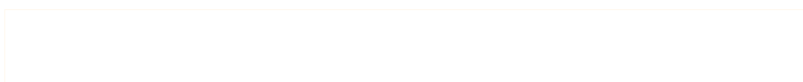**OR**

Q.NO: 8 Draw the isometric view of Figure 1.   [14M]

Figure 1

SECTION -V

Q.NO: 9 Draw the following views of the object shown pictorially in Figure 2.   [14M]

    (a)   Front view

    (b)   Top view and

    (c)   Side view

Figure 2

OR

Q.NO: 10 Draw the elevation, plan and side view of the picture shown in the Figure 3.   [14M]
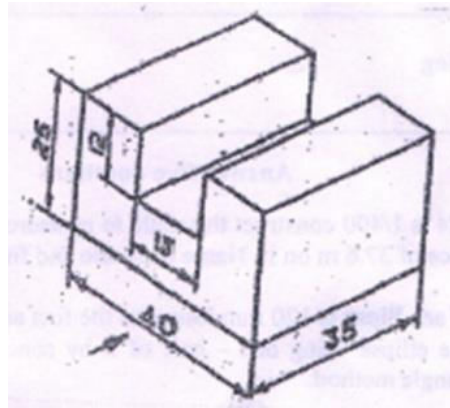
Figure 3

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A0361)MECHANICS OF FLUIDS
MODEL PAPER – I

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one   question from each section
and each question carries 14 marks.

1.   a. Two plates are placed at a distance of 0.15 mm apart. The lower plate is fixed while the upper plate having
     the surface area of 1.0 m^2 is pulled at 0.3 m/s. Find the force and the power required to maintain this speed,
     if the fluid separating them is having viscosity 1.5 poise.
     b. Derive an expression for total pressure and center of pressure for a vertically plane surface immersed in a
     liquid.

<div align="center">OR</div>

2.   Explain the working of a Bourdon tube pressure gauge using a neat sketch.

3.   a. A 40 cm diameter pipe, conveying water, branches into two pipes of diameter 30 cm and 20 cm
     respectively. If the average velocity in the 40 cm pipe is 3 m/s, find the discharge in this pipe and also
     determine the velocity in 20 cm pipe. The average velocity in 30 cm pipe is 2 m/s.
     b. The two velocity components are given in the following cases, find the third component such that they
     satisfy the continuity equation for steady, incompressible flow.
     i. $u = x^3 + y^2 + 2z^2 ; v = -x^2y - yz - xy$
     ii. $u = 2y^2, w = 2xyz$

<div align="center">OR</div>

4.   The velocity vector in a flow field is given as $V = 4x^3 i - 10x^2 yj + 2tk$. Find the velocity and acceleration of
     a fluid particle at (2,1,3) at time t = 1.

5.   a. A pipe line carrying oil of specific gravity 0.8 changes in diameter from 300 mm at a position A to 500mm at
     position B which is 5m higher level. If the pressures at A and B are 19.6 N/cm^2 and 14.9 N/cm^2 respectively for
     a discharge of 150 liters per sec. Find the loss of head and the direction of flow.

     b. What is impulse momentum equation?
     c. What are the uses of dimensional analysis? Explain in brief.

<div align="center">OR</div>

6.   What is the principle of orifice meter? Derive the expression for discharge through an orifice meter.

7.   The velocity profile in a laminar boundary layer is given by $\frac{u}{V\infty} = 2\left(\frac{y}{\delta}\right) - 2(\frac{y}{\delta})^3 + \left(\frac{y}{\delta}\right)^4$. Find the expressions
     for boundary layer thickness, shear intensity and drag force on one side of the plate.

<div align="center">OR</div>

8. A man weighing 90kgf descends to the ground from an airplane with the help of a parachute against the resistance of air. The velocity with which the parachute which is hemi – spherical in shape is 20 m/s downwards. Find the diameter of the parachute. Assume C_D = 0.5 and the density of air = 1.25 kg/m^3.

9. a) Write about three similarities between model and prototype for testing.
    b) Write a short note on model or similarity laws with their applications.

OR

10. Explain about aerodynamic forces. Derive the lift and drag for flow passing over a streamlined body.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A0361)MECHANICS OF FLUIDS
MODEL PAPER – II

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one   question from each section
   and each question carries 14 marks.

SECTION - I

1. a. Define the term Buoyancy. Explain using neat sketch, the conditions for equilibrium of a submerged body in fluid.
    b. Define Meta center and Meta centric height. Explain the analytical method for determining meta – centric height.

OR

2. The opening in a dam is 3m wide and 2m high. A vertical sluice gate is used to cover the opening. On the upstream of the gate, the liquid of specific gravity 1.5 lies up to a height of 2m above the top of the gate, whereas on the down stream side, the water is available up to a height of top of the gate. Find the resultant force acting on the gate and the position of center of pressure. Assume that the gate is hinged at the bottom.

SECTION - II

3. Derive the 3 – D continuity equation choosing a suitable flow model. Define all the symbols used while deriving it.

OR

4. a. The 2 – D stream function for a flow is $\psi = 9 + 6x - 4y + 7xy$. Find the velocity potential.
    b. Diffentiate between Eulerian and Lagrangian methods of representing fluid flow.

SECTION - III

5. a. A horizontal venturimeter with inlet and throat diameter 20 cm and 10 cm is used to measure the flow of oil of specific gravity 0.8. The discharge of oil through the venturimeter is 60 liters per sec. Find the reading of the oil – mercury differential manometer. Take C_d = 0.98
    b. A pipe of diameter 400mm carries water at a velocity of 25m/s. The pressure at the points A and B are given by 29.43 N/cm^2 and 22.563 N/cm^2 respectively, while the datum head at A and B are 28 m and 30 m respectively. Find the loss of head between A and B.

OR

6.   State Bernoulli's principle. Derive the Bernoulli's equation from Euler's equation of motion.

SECTION - IV

7. Derive Von – Karman momentum integral equation.

OR

8. Explain boundary layer separation using a neat sketch and state the methods to avoid it.

SECTION - V

9. State Bukingham pi theorem and derive the relation for lift and drag forces.

OR

10. Explain about various types of drag forces and the various techniques to reduce drag.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A0361)MECHANICS OF FLUIDS
MODEL PAPER – III

**TIME: 3 Hours**   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one   question from each section
and each question carries 14 marks.

SECTION - I

1. a. Derive an expression for Total Pressure and Center of pressure for an inclined plane surface submerged in a liquid.

    b. An inclined rectangular gate of width 5 m and depth 1.5m is installed to control the discharge of water as shown in fig. **(3.55/127 Bansal)**. The end A is hinged. Determine the force normal to the gate applied at B to open it.

OR

2. a. Water is flowing through two different pipes to which an inverted differential manometer having an oil of sp. Gr 0.8 is connected. The pressure head in the pipe A is 2m of wate, find the pressure in the pipe B for the manometer readings as shown in fig. **(2.22/54 Bansal)**

    b. A 150mm diameter vertical cylinder rotates concentrically inside another cylinder of diameter 151mm. Both the cylinders are of 250 mm height. The space between the cylinders is filled with a liquid of viscosity 10 poise. Determine the torque required to rotate the inner cylinder at 100 rpm.

SECTION - II

3.   a. What is a flow net? Describe the uses and limitations of a flow net.

    b. Check whether the flow defined by the stream function ψ = 2xy is irrotational. If so, determine the corresponding velocity potential.

OR

4. For a steady incompressible flow, check the following values of u and v are possible or not.

a. $u = 4xy + y^2, v = 6xy + 3x$
b. $u = 2x^2 + y^2, v = -4xy$

SECTION - III

5. a. What is meant by substantial derivative? Derive.

    b. Water is flowing through a pipe 5 cm diameter under a pressure of 29.43 N/cm^2 guage and with a mean velocity of 2m/s. Find the total head or total energy per unit weight of the water at a cross – section which is 5m above the datum line.

OR

6. a. Differentiate between a model and a prototype.

    b. What are the conditions to be satisfied for both to be in dynamic similarity?

    c. What are the aims and objectives of model studies?

SECTION - IV

7. a. What is Magnus effect?

   b. Find the diameter of the parachute with which a man of 80 kg descends to the ground form an airplane against the resistance of air with a velocity 25 m/s. Take C_d = 0.5 and density of air = 1.25kg/m^3.

OR

8. Define boundary layer thickness, displacement thickness, momentum thickness and energy thickness. Explain the significance of each.

SECTION - V

9. Explain the nomenclature of airfoil with neat sketch and phenomenon for generation of lift.

OR

10. Explain the phenomenon of flow separation and techniques to avoid it.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A0302)ENGINEERING MECHANICS

MODEL PAPER - I

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1   a)How will you resolve a given force into a force and a couple?
     b)   Three forces of magnitude 200 N, 500 N and 400 N are acting at the origin O(0,0,0)   and are directed from the points A(2,1,6), B(4,-2,-5) and C(-6,-4,-4) respectively to the   origin. Determine the magnitude of the resultant.
     c)   Determine and locate the resultant R of the forces and one couple acting on the beam as shown in figure
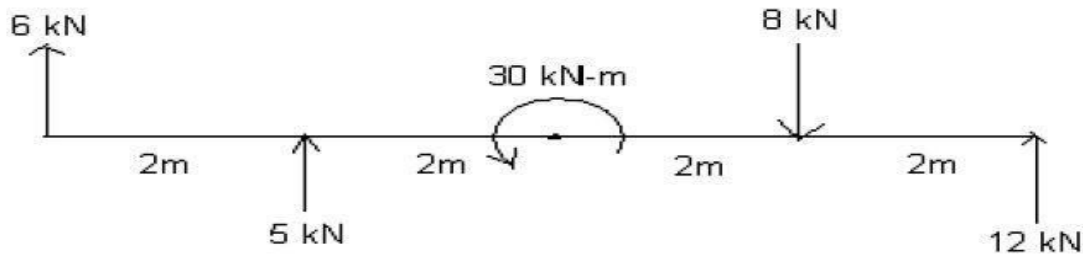
OR

2 a)Define the following: i) Rigid body
ii)Free body Diagram
   b)A roller of radius r = 0.3 m and weight Q = 2000 N is to be pulled over a curb of height h = 0.15m.by a horizontal force P applied to the end of a string wound around the circumference of the roller. Find the magnitude of P required to start the roller over the curb.   [3 M]
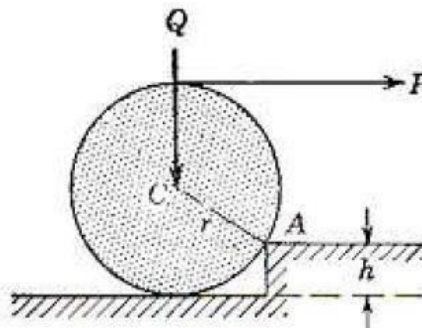
SECTION - II

3   a)A block weighing 50 N is resting on a horizontal plane. A horizontal force of 10 N is applied to start the sliding of the block. Find
   i. coefficient of friction
   ii. angle of friction
   iii. resultant force.

   b)   A square thread screw of a hand press has a mean diameter of 40 mm and pitch 5 mm. The diameter of the   wheel turning the screw is 1.2 m. If a horizontal effort of 200N is applied to the wheel, find the force exerted by the press on a cotton bale being compressed. Coefficient of friction is 0.1. Is the press self locking

   c)   Find the force that should be applied upward at an angle 30° to the horizontal on the block of weight 100 N to cause impending sliding on a surface, the coefficient of friction between the surfaces being 0.3.

OR

4   a)Explain about Screw jack? Differentiate between Screw Jack and Differential screw Jack?
   b)   Find the maximum power transmitted and initial tension in a flat belt 8 mm thick and 100 mm wide. The belt transmits power between two pulleys running at 31.67 m/s. The angle of lap of smaller pulley is 165^{0}and the coefficient of friction between the belt and pulley is 0.3. Mass of the belt is 0.9 kg per m length, and the maximum permissible stress in the belt is 2 MN/ m^2

   c) A square threaded screw jack has a pitch of 1 cm and a mean diameter of 7.5 cm. The mean diameter of the bearing surface between the cap and the screw is 9 cm. The coefficient of friction between all surfaces is 0.10. What force is required at the end of a lever 90 cm long to raise a load of 40 kN?

SECTION - III

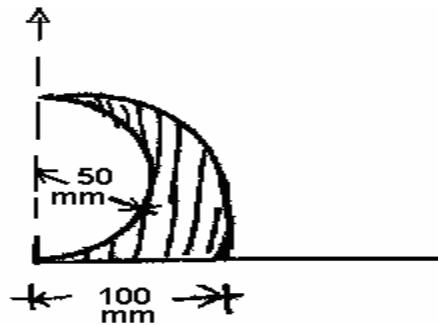5 a) Locate the centroid of the wire bent as shown in figure
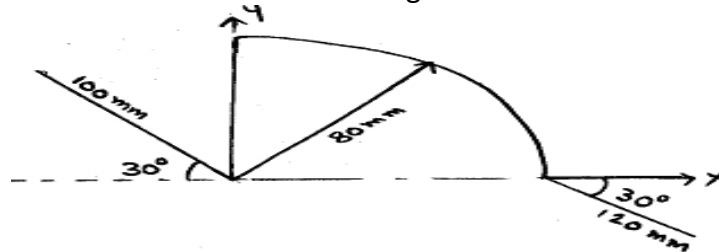
b) Find the Centroid for the shaded area about y – axis. As shown in the Figure
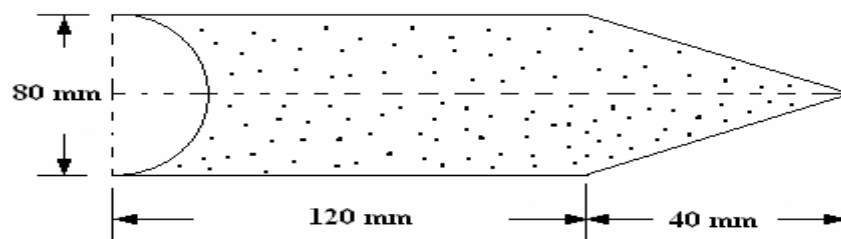
c) State and prove Pappus theorem[3]

Or

6   a) Locate the centroid of the shaded area shown in figure

   b)   Find the centroid of Quarter circle having the radius R
   c) Determine the centre of gravity of solid cone of base Radius 'R' and height 'h'

SECTION - IV

7   a)   From first principles deduce an expression to determine the Moment of Inertia of a triangle of base b and height h.
   b)   Find the moment of inertia about the horizontal centroidal axis.
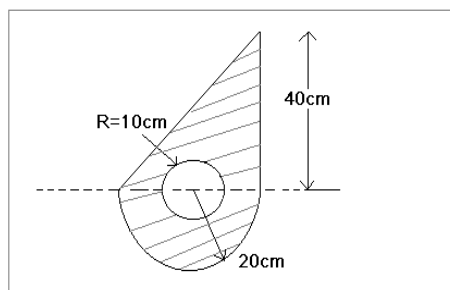
      c) Determine the mass moment of inertia of sphere about its diametrical axis 8

    a) 8) Determine moment of inertia of a quarter circle having the radius 'r'
  b)   Locate the centroid and calculate moment of inertia about horizontal and vertical axis through the centroid   as shown in figure
  c)   Find the Moment of inertia of the shaded area shown in figure about Centroidal X and Y axis. All dimensions are in cm.
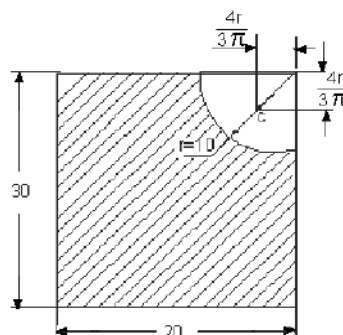
SECTION – V

9 **a)** Derive the Expression for the Equations of motion of the body when it is accelerated uniformly.

b) A particle under a constant deceleration is moving in a straight line and cover a distance of 20 m in first 2 seconds and 40 m in next 5 seconds. Calculate the distance it covers in the subsequent 3 seconds and the total distance covered before it comes to rest?

c) State and Explain D'Alemberts principle

OR

10 a) The motion of a particle in a rectilinear motion is defined by the relation $s=2t^3- 9t^2+12t-10$ Where s is metres and t in seconds i) Find the acceleration of theparticle when velocity is zero

ii)the position and total distance travelled when the acceleration is zero

b) With an initial velocity of 126 m/s, a bullet is fired upwards at an angle of elevation of 35^0 from a point on a hill and strikes the target which is 100 m lower than the point of projection. Neglecting the air resistance calculate

i) The maximum to which it will rise above the horizontal plane from which it is projected

ii)Velocity with which it will strike the target   [4M]

c) A block starts from rest from 'A'. If the coefficient of friction between all surfaces of contact is 0.3, find the distance at which the block stop on the horizontal plane. Assume the magnitude of velocity at the end of slope is same as that at the beginning of the horizontal plane   [4M]
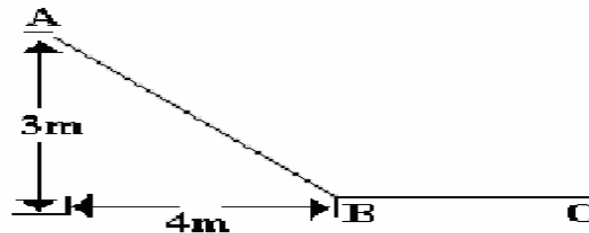
MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
Model question paper -II

(R18A0302)Engineering Mechanics

**TIME: 3 HOURS**   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one   question from each section and each question carries 14 marks.

SECTION-I

1a) State and prove Varignon's theorem.
[5M] b)Calculate the magnitude of DzPdz and the resultant of the force system shown in figure. The algebraic sum of horizontal components of all these forces is -325 kN.   [5 M]
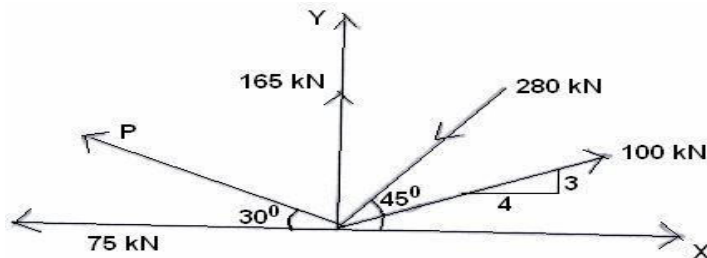

c) Three forces of magnitude 200 N, 500 N and 400 N are acting at the origin O(0,0,0) and are directed from the points A(2,1,6), B(4,-2,-5) and C(-6,-4,-4) respectively to the origin. Determine the magnitude of the resultant.   [4 M]

OR

2a)What is a Force and write the characteristics of a force   [2 M]

b) State and prove parallel axis theorem   [5 M]

c) A roller of radius r = 0.3 m. and weight Q = 2000 N is to be pulled over a curb of height h = 0.15 m. by a horizontal force P applied to the end of a string wound around the circumference of the roller (Ref. Figure 1). Find the magnitude of P required to start the roller over the curb   [7 M]
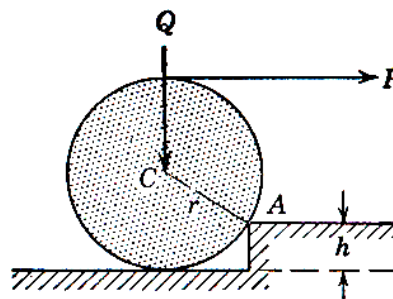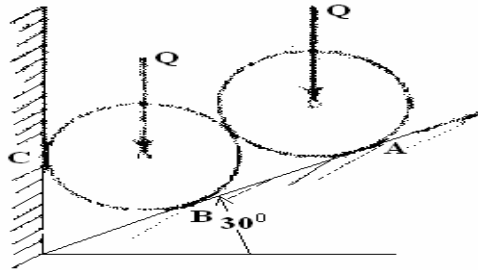

SECTION-II

3a) Two identical rollers, each of weight 100 N, are supported by an inclined plane and a vertical wall
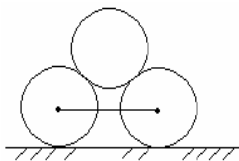
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as shown in Figure. Assuming smooth surfaces, find the reactions induced at the points of upport A, B and C.
  [5 M]

b) Two smooth cylinders of 3 m diameter and 100 N weight are separated by a chord of 4m long. They support another smooth cylinder of diameter 3m and 200N weight as shown in figure. Find the tension in the chord. [7 M]

c) Define the following i) Equilibrium ii)Free body diagram with examples [2 M]

OR

4a) State laws of Friction [2 M]

b)Explain the principles of operation of a screw-jack with a neat sketch. [4 M]

c)Two blocks weighing 50N and 80N respectively are in equilibrium in the position shown in   fig. Calculate the force P required to move the lower block ,and tension in the cable. Take coefficient of friction at all contact of friction at all contact surfaces to be 0.3 [8 M]
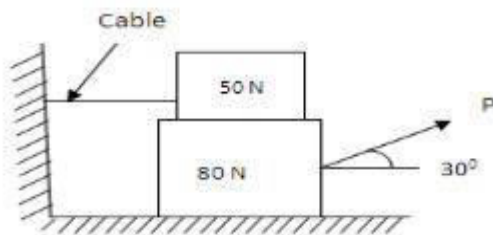
SECTION-III

5a)Write the difference between centroid and centre of gravity [2 M]

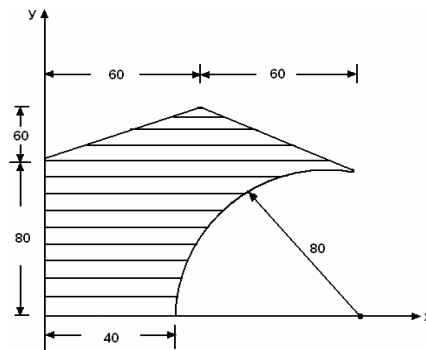b)Determine the Centroid of a parabolic spandrel $y=kx^n$ [7 M]

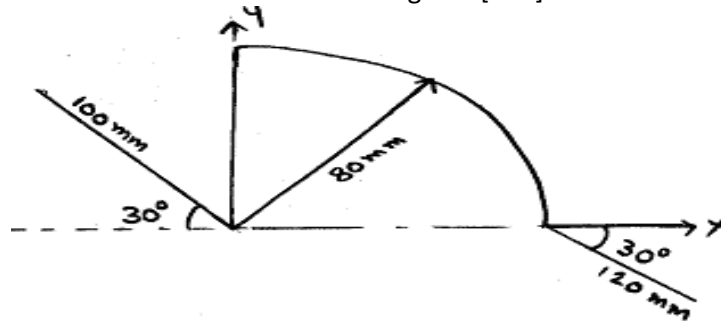c)State Theorems of pappus [5 M]

OR

6a) Find the coordinates of the centroid of the shaded area shown in figure   [6 M]

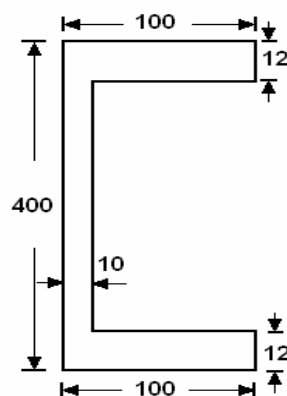b) Locate the centroid of the wire bent as shown in figure   [3 M]

c) Find the centroid of Quarter circle having the radius R   [5 M]

SECTION-IV

7a) Compute the moment of inertia of the channel section shown in figure about centroidal x, y ax [8M]

b) Derive expression for moment of inertia for a triangle about its base and centroidal axis   [6M]

OR

8a) Derive the expression for the transfer formula for mass moments of inertia   [6M]
b) Derive the expression for the mass moment of inertia of a hemi sphere   [6M
    c) Define product of inertia and how the product of inertia is zero about its axis of symmetry

SECTION-V

9) a) Derive the equations of motions when the body is moving with uniform acceleration

[5 M]

 b) A ball is thrown vertically upwards with an initial velocity of 36 m/s. After 2 seconds, another ball is thrown vertically upwards. What should be its initial velocity so that it crosses the first balk at a height of 30 m? [6M]

 c) Distinguish between kinetics and kinematics   [3M]

OR

10 a) What is D'Alembert's principle [4 M]
  b) Blocks A and B weighing 500 N and 1500 N respectively are connected by a weightless rope passing over a frictionless pulley as shown in the figure. The coefficient of friction is 0.3 on all contact surfaces. Determine:
  i) Tension in the rope.
  ii) Velocity of the system 5 sec after starting from rest.   [10M]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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II Year B. Tech, ANE-I Sem	2	1/-/-	3

(R18A0303)THERMODYNAMICS

Objectives:

- Learn about concepts and laws used in thermodynamics.
- Students acquire knowledge of various cycles.
- Students gain information about the working principle of different engines.

UNIT - I

Introduction: Basic Concepts: System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic view points, Concepts of Continuum, Thermodynamic Equilibrium, State, Property, Process, Exact & Inexact Differentials, Cycle - Reversibility - Quasi - static Process, Irreversible Process, Causes of Irreversibility - Energy in State and in Transition, Types, Displacement & Other forms of Work, Heat, Point and Path functions, Zeroth Law of Thermodynamics - Concept of Temperature - Principles of Thermometry - Reference Points - Const. Volume gas Thermometer - Scales of Temperature, Ideal Gas Scale - Joule's Experiments - First law of Thermodynamics – applied to a process and system, Corollaries , Steady Flow Energy Equation.

UNIT - II

Limitations of the First Law - Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries, PMM of Second kind, Carnot's principle, Carnot cycle and its specialties, Thermodynamic scale of Temperature, Clausius Inequality, Entropy, Principle of Entropy Increase - Energy Equation, Availability and Irreversibility - Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations - Elementary Treatment of the Third Law of Thermodynamics.

UNIT - III

Perfect Gas Laws - Equation of State, specific and Universal Gas constants - various Non-flow processes, properties, end states, Heat and Work Transfer, changes in Internal Energy - Throttling and Free Expansion Processes - Flow processes. Perfect Gas Model, derivations - Vader Waals Equation of State - Compressibility charts - variable specific Heats - Gas Tables - Phase Transformations - Triple point at critical state properties during change of phase, Dryness Fraction - Clausius - Clapeyron Equation Property tables. Mollier charts - Various Thermodynamic processes and energy Transfer - Steam Calorimetry.

UNIT - IV

Mixtures of perfect Gases - Mole Fraction, Mass friction Gravimetric and volumetric Analysis - Dalton's law of partial pressure, Avogadro's Laws of additive volumes - Mole fraction, Volume fraction and partial pressure, Equivalent Gas const. and Molecular Internal Energy. Enthalpy, specific heats. Heats and Entropy of Mixture of perfect Gases and Vapour, Atmospheric air - Psychrometric Properties and Psychrometric chart.

UNIT - V

Thermodynamic Cycles: Power cycles: Otto, Diesel, Dual Combustion cycles, Sterling Cycle, Atkinson Cycle, Lenoir Cycle - Description and representation on P-V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis - comparison of Cycles. Application of Brayton cycles in aviation.

Refrigeration Cycles: Bell-Coleman cycle - Vapour compression cycle performance Evaluation.

Text Books:
1. Engineering Thermodynamics, Special Edition - MRCET, McGrawHill Publishers-2017
2. Engineering Thermodynamics / PK Nag / TMH, 5th Edition
3. Engineering Thermodynamics / E Rathakrishnan / PHI / Second Edition / 2013

Reference Books:
1. Engineering Thermodynamics / DP Mishra / Cengage Learning / Second impression 2012
2. Thermodynamics - An Engineering Approach - Yunus Cengel & Boles / TMH
3. Thermodynamics - J.P. Holman / McGrawHill
4. Engineering thermodynamics - Jones & Dugan
5. Engineering Thermodynamics / P. Chattopadhyay / Oxford higher Education / Revised First Edition
6. Thermodynamics & Heat Engines - Yadav - Central Book Dept. Allahabad

Outcomes:
- Basic concepts can be applied by the students
- Students can correlate cycles applicable for engines.
- Students should be able to analyze the relationship between various processes and working mechanisms of the engines.

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A0303)THERMODYNAMICS
MODEL PAPER – I

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one   question from each
section and each question carries 14 marks.

SECTION - I

1) A steam turbine receives steam at 20 bar and superheated by 80 C. The exhaust pressure is

    0.10 bar and expansion takes place isentropically. Calculate

a) Heat supplied, assuming that the feed pump supplies water to the boiler at 20 bar,
b) Heat rejected,
c) Turbine work,
d) Net work,
e) Thermal efficiency, and
f) Theoretical steam consumption.

OR

2)   a)Describe diesel gas power cycle with the help of P-V and T-S diagrams. Derive an expression for its air standard efficiency

     b) A diesel engine has a clearance volume of 220 **cm3** and a bore and stroke of 15 cm and 20cm respectively. The inlet conditions are 100 KN/**m2** and 20 C. The maximum temperature of the engine is 1400 C. Calculate

 i. Ideal thermal efficiency of cycle and
 ii. m.e.p

SECTION - II

3)   a)What is critical point ? What process is possible below the critical point ?

     b)Steam initially at 1.5 Mpa, 300 C expands reversibly and adiabatically in a steam turbine to 40 C. Determine the ideal work output of the turbine per kg of steam.

OR

4) a)Explain "internal energy", "heat and work"

---

b)To a closed system 100 KJ of work is supplied. If the initial volume is 0.5 **m3** and pressure of a system changes as P=(8-4V), where P is in bar and V is in **m3**, determine the final volume and pressure of the system.

SECTION - III

5   a)Prove that at adiabatic saturation t**db =** t**wb** = t*

   b) A mixture of ideal air and water vapour at a dbt of 22 C and a total pressure of 730 mmHg abs. has a temperature of adiabatic saturation of 15 C. Calculate

i.   The specific humidity in gms per kg of dry air
ii.   The partial pressure of water vapour
iii. The relative humidity, and
iv.   Enthalpy of the mixture per kg of dry air.

OR

   6) 0.2 **m3** of air at 3 bar and 120 C is contained in a system. A reversible adiabatic expansion takes place till the pressure falls to 1.5 bar. The gas is then heated at constant pressure till enthalpy increases by 75 kJ. Calculate the work done and the index of expansion, if the above processes are replaced by a single reversible polytropic process giving the same work between the same initial and final states.

SECTION - IV

7) a) What is a PMM2 ?

  b)A heat pump operates between two identical bodies of specific heat C and T**1**. The operation of the pump cools down one of the bodies to T**2.** Show that for the operation of pump the minimum work input is given by

Wmin =C [T1/T2 + T2 – 2T1]

OR

   8) a)Show that energy of an isolated system remains unchanged ?

    b)A system comprises a stone of mass 20 kg and a drum containing 1000 kg of water. Initially the stone is 50 m above the water and the stone and water are at the same temperature. The stone is then made to fall into water. Determine change in internal energy, kinetic energy, potential energy heat transfer, and work transfer for the changes of state given below ?

i.   The stone is to just enter water.
ii.   The stone just comes to rest in drum, and
iii. The heat transferred to surroundings is such that water and stone remain in the same temperature. Assume g = 9.81 m/**s²**

SECTION – V

9) One kg of air at 27 C is heated reversibly at constant pressure until the volume is doubled and then heated reversibly at constant volume until the pressure is doubled. For a total path find work, heat transfer and changed in entropy.

OR

10) Draw T-S diagram of water and show dew point temperature, dry bulb temperature and critical temperature.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A0303)THERMODYNAMICS
MODEL PAPER – II

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one   question from each section and each question carries 14 marks.

SECTION - I

1) a) State the limitations of the first law of thermodynamics.

b)A reversible heat engine operates between 875K and 310K and deliver a reversible refrigerator operating between 310K and 255K. the engine receives 2000KJ of heat and the net work output from the arrangement equals to 350KJ. Calculate the cooling effect of refrigerator.

OR

2)   Steam at 0.8 Mpa, 250 C and flowing at the rate of 1 kg/s passes into a pipe carrying wet steam at 0.8 Mpa, 0.9 dry. After adiabatic mixing the flow rate is 2.5 kg/s. determine the condition of steam after mixing. The mixture is now expanded in a frictionless nozzle isentropically to a pressure of 0.4 Mpa. Determine the velocity of the steam leaving the nozzle. Neglect the velocity of steam in the pipe line.

SECTION - II

3)   Steam at a pressure of 15 bar and 250 C is delivered to the throttle of an engine. The steam expands to 2 bar when release occurs. The steam exhaust takes place at 1.1 bar. A performance test gave the result of the specific steam consumption of 12 kg/kwh and a mechanical efficiency of 80%. Determine

a) Ideal work or the modified Rankine engine work per kg
b) Efficiency of the modified Rankine engine or ideal thermal efficiency
c) Indicated and brake work per kg
d) Brake thermal efficiency
e) Relative efficiency on the basis of indicated work and brake work.

OR

4 (a) Derive energy equation for a closed system undergoing

i.   Isochoric process
ii.   Isothermal process
iii.   Polytropic process between state 1 to state 2.

b) When a closed system executes a certain non flow process the work and heat interactions per degree rise in temperature at each temperature attained are given by dW/dT=(4-

0.08T)KJ/KdQ/dt=1.00KJ/K. calculate for the increase (or) decrease in the internal energy of the sytem if it is to operate between the temperature limits of 200 C and 500 C.

SECTION - III

5) A rigid vessel of volume 0.86 m^3 contains 1 kg of steam at a pressure of 2 bar. Evaluate the specific volume, temperature ,dryness fraction, internal energy, enthalpy and entropy of steam.

OR

6) (a) What is heat pump? How does it differ from refrigerator? Explain the COP of both the cases.

(b) A cyclic heat engine operates between a source temperature of 800°C and a sink temperature of 30°C. What is the least rate of heat rejection per kW net output of the engine?

SECTION - IV

7) (a) Draw the phase equilibrium diagram for a pure substance on T-s plot with relevant constant property lines

(b) A vessel of 0.04 m^2 Contains a mixture of saturated water and saturated steam at a temperature of 250°C. The Mass liquid present is 9kg . Find pressure, the mass, the specific volume, the enthalpy and entropy and the internal energy

OR

8) (a) What do you understand by triple point? Give the pressure and temperature of water at its triple point.
(b) Find the enthalpy and entropy of steam when the pressure is 2 MPa and the specific volume is 0.09 m^3/kg.

SECTION - V

9) (a) Describe diesel gas power cycle with the help of P-V and T-S diagrams. Derive the expressions for its air standard efficiency and mean effective pressure.
(b) A diesel engine has a clearance volume of 220 cm3 and a bore and stroke of 15 cm and 20 cm respectively. The inlet conditions are 100 kN/m2 and 20°C. The maximum temperature of the engine is 1400°C. Calculate,
(i) Ideal thermal efficiency of cycle
(ii) Mean effective pressure.

OR

10) (a) Discuss the advantages and disadvantages of vapour absorption refrigeration system over the vapour compression system.
(b) A Bell-Coleman refrigeration cycle works between 1 bar and 6 bar. Find the C.O.P of the system and its tonnage when the air flow rate is 1 kg/s. The ambient temperature is 27°C and refrigerator temperature is 0°C.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A0303)THERMODYNAMICS
MODEL PAPER – III

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one   question from each section and each question carries 14 marks.

SECTION - I

1) (a) Distinguish between the terms change of state, path and process.
     (b) Show that energy is a property of a system. And explain with   suitable figures.

OR

  2)   The air speed of a turbo jet engine in flight is 270 m/s. Ambient air temperature is 15°C. Gas temperature at outlet of nozzle is 600°C. Corresponding enthalpy values for air and gas are respectively 26 and 912 kJ/kg. Fuel air ratio is 0.0190. Chemical energy of the fuel is 44.5 MJ/kg. Owing to incomplete combustion 5% of the chemical energy is not released in the reaction. Heat loss from the engine is 21 kJ/kg of air. Calculate the velocity of the exhaust jet

SECTION - II

3) A reversible heat engine operates between two reservoirs at temperatures of 600°C and 40°C. The engine drives a reversible refrigerator which operates between reservoirs at temperatures of 40°C and 20°C. The heat engine is 2000 kJ and the network output of the combined engine refrigerator plant is 360 kJ.

(i) Evaluate the heat transfer to the refrigerant and the net heat transfer to the reservoir at 40°C.
(ii) Reconsider (a) Given that the efficiency of the heat engine and the COP of the refrigerator are each 40% of their maximum possible values

OR

4) (a) What do you understand by triple point? Give the pressure and temperature of water at its triple point.
(b) Find the enthalpy and entropy of steam when the pressure is 2 MPa and the specific volume is 0.09 m³/kg.

SECTION - III

5) (a) Discuss the advantages and disadvantages of vapour absorption refrigeration system over the vapour compression system.
(b) A Bell-Coleman refrigeration cycle works between 1 bar and 6 bar. Find the C.O.P of the system and its tonnage when the air flow rate is 1 kg/s. The ambient temperature is 27°C and refrigerator temperature is 0°C.

OR

6)(a) Describe diesel gas power cycle with the help of P-V and T-S diagrams. Derive the expressions for its air standard efficiency and mean effective pressure.

(b) A diesel engine has a clearance volume of 220 cm3 and a bore and stroke of 15 cm and 20 cm respectively. The inlet conditions are 100 kN/m2 and 20°C. The maximum temperature of the engine is 1400°C. Calculate,

(i) Ideal thermal efficiency of cycle

(ii) Mean effective pressure.

SECTION - IV

7). (a) What is heat pump? How does it differ from refrigerator? Explain the COP of both the cases.

(b) A cyclic heat engine operates between a source temperature of 800°C and a sink temperature of 30°C. What is the least rate of heat rejection per kW net output of the engine?

OR

8) (a) Draw the phase equilibrium diagram for a pure substance on T-s plot with relevant constant property lines

(b) A vessel of 0.04 m^2 Contains a mixture of saturated water and saturated steam at a temperature of 250°C. The Mass liquid present is 9kg . Find pressure, the mass, the specific volume, the enthalpy and entropy and the internal energy.

SECTION - V

9) a) show that the Claussius statement and Kelvin Planck statement are same

b)To aclosed systems 100 kJ of work is supplied. If the initial volume is 0.5 m^3 and pressure of a system changes as P = (8-4 V), where P is in bar and V is in m^3, determine the final volume and pressure of the system.

OR

10) Steam at 0.8 MPa, 250 °C and owing at the rate of 1 kg/s passes into a pipe carrying wet steam at 0.8 MPa, 0.9 dry. After adiabatic mixing the flow rate is 2.5 kg/s. Determine the condition of steam after mixing. The mixture is now expanded in a frictionless nozzle isentropically to a pressure of 0.4 MPa. Determine the velocity of the steam leaving the nozzle. Neglect the velocity of steam in the pipe line

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A2101) INTRODUCTION TO AERONAUTICAL ENGINEERING
MODEL PAPER – I

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1. Explain the evolution of jet engines and aircrafts

        or

2. Explain the structure of magnetosphere and effects of environmental impact on spacecraft design

SECTION - II

3. Explain the various components, types and working principle of a helicopter

                                or
4. Explain with a neat sketch the working principle of a jet engine.

SECTION - III

5. Consider an aircraft flying approximately at 1500 m altitude with
a. case 1: A_a= 15m^2; c=1.6m; A=2.3m^2; l_t=1600kg.m^2; a_w=5rad^{-l}; $C_{M,ac}$=-0.07; ε=0.45; V=50 m/s; a_t= 4 rad^{-l} ;ρ=1kg/m3 . calculate is the neutral point of a/c.
b. case2: let CG is placed halfway between ac and neutral point, x_a=0.21m and $x_{a/c}$=0.132. calculate the angle of attack of the tail and lift produced by tail.

            or

6. Derive the equation of motion for pull up and pull down maneuver.

SECTION - IV

7. Discuss about the Apollo mission with its phases in mission.
            or

8. Explain about power systems and thermal control in a satellite
SECTION - V

9. Explain about drawing techniques available
            or

10. Discuss about orthographic and perspective projections and discuss their difference.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A2101) INTRODUCTION TO AERONAUTICAL ENGINEERING
MODEL PAPER – II

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one   question from each section and each question carries 14 marks.

SECTION - I

1. Discuss few points on the history of aviation

                                or

2. Explain about planetary environments within the solar system

SECTION - II

3. Derive the equation of buoyancy lift

        or

4. Derive the equation of thrust of a jet engine.

SECTION - III

5. Define the airplane geometry with a neat sketch and discuss about the two types of stability in detail.

        or

6. Derive the equation for maximum lift-to-drag ratio.

SECTION - IV

7. Discuss about the Gemini mission

        or

8. Derive the rocket thrust equation

SECTION - V

9. Explain about CAE

        or

10. Explain about- Conceptual, preliminary and detail design process.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A2101) INTRODUCTION TO AERONAUTICAL ENGINEERING
MODEL PAPER – III

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1. Explain few points on the advances took during jet engine development

    or

2. Explain the types of heat transfer methods and derive expression for equilibrium $P_{emitted}$, $P_{absorbed}$ temperature of any body at a distance d from sun.

SECTION - II

3. Explain the various types of drag with neat sketches

    or

4. Explain with a neat sketch the components & working principle of ramjet engine.

SECTION - III

5. Derive the endurance and range equation for a propeller and jet engine.

    or

6. derive the equation for trimmed angle of attack.

SECTION - IV

7. Explain in detail about mercury mission.

    or

8. Discuss about the elements of a satellite system.

SECTION - V

9. Explain about drawing techniques available

    or

10. Discuss about orthographic and perspective projections and discuss their difference.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A2102) AIRCRAFT PRODUCTION TECHNOLOGY
MODEL PAPER – I

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one   question from each section and each question carries 14 marks.

SECTION-I
1. Explain about various materials used in aircraft construction.
                                                OR
2. Explain about various manufacturing techniques used for aircraft industry.

SECTION-II
3 a) Explain about aluminum and their alloys.
   b) Give examples with specification number for five alloys
                                                OR
4. Explain about various heat treatments for titanium alloys
SECTION-III
5. Explain about the corrosion prevention and protective treatments for steels.
                                                OR

6. Explain about
i)Re-factory materials ii)Inconel iii)Monal iv)Nimonic v)Super Alloys
SECTION-IV
7. Enumerate the applications of composites.
                                                OR
8. Describe in detail about various composite materials.

SECTION-V
9. Discuss about the various aircraft engine parts construction
                                                OR

10. Explain about
i) Hydro-forming ii) Spar milling iii)Spark Erosion

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A2102) AIRCRAFT PRODUCTION TECHNOLOGY
MODEL PAPER – II

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one   question from each section and each question carries 14 marks.

SECTION-I
1. Explain about the sand casting process and discuss about the types of patterns.
OR
2. Explain about the conventional and CNC Machine importance in Aviation industry.
SECTION-II
3. Explain about the Titanium Alloys, types and their compositions with examples.
OR
4**.** Explain about
i)Annealing ii)Quenching iii)Normalizing
SECTION-III
5. Explain about Re-Factory materials in detail.
OR
6. Explain about
i) Stress Relieving ii) Stress Alleviation
SECTION-IV
7.Explain about
i) Laminated composite ii) Particulate composite iii)Fibrous composite
OR
8. Explain about
i)Types of Reinforcements ii)Volume fraction importance and ratios.
SECTION-V
9. Explain in detail
i)Integral machining ii)Spark erosion
OR
10. Explain about the blade design and manufacturing.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A2102) AIRCRAFT PRODUCTION TECHNOLOGY
MODEL PAPER – III

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1.With neat sketch of aircraft mention what materials are used for major components

OR

2.Explain about
i)Orthotropic materials ii)Isotropic materials iii)Malleability iv)Ductility & Elasticity v)Diametric materials

SECTION-II

3.Describe about Magnesium alloys types and classify them.

OR

4. Explain about Arc gas welding

SECTION-III

5.Explain the importance of following in aircraft industry
i)Nickel alloys ii)Cobalt based alloys

OR

6. Explain with neat sketch about Iron-Carbide

SECTION-IV

7. Explain about the applications of following in aircraft industry
i)CRPF ii)C-C composites

OR

8. Explain about Various types of composites with examples.

SECTION-V

9. Explain about the manufacturing methods of composites.

OR

10. Explain: i)EDM ii)Powered metal parts iii)Profiling

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A2103) AEROSPACE MATERIALS AND COMPOSITES
MODEL PAPER – I

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1.   Define impact energy. Explain the significance of notch testing in materials.

OR

2. What is work/strain hardening? How does it affect the properties of a material? Explain.

SECTION - II

3. What are the advantages and disadvantages of all α Ti alloy, combined α-β Ti alloy and non-heat treatable β Ti alloy? Explain briefly.

OR

4. How are the internal stresses relieved in Monel? What are the chemical, physical and working properties of Monel?

SECTION - III

5.   What are the factors effecting the properties of a composite? Explain in detail.

OR

6. Explain in detail, the classification of composites. Brief each of them along with their advantages, disadvantages and applications.

SECTION - IV

7.   State and explain the manufacturing methods of sandwich structures.

OR

8. How does the temperature variation affect the materials used for airplanes flying at different mach numbers? Explain.

SECTION - V

9. How did the use of composite materials grow in recent years? Elaborate in detail.

OR

10. Explain in detail the non – destructive flaw detection techniques used in aerospace industry.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A2103) AEROSPACE MATERIALS AND COMPOSITES
MODEL PAPER – II

TIME: 3 Hours   **MAX MARKS: 70**
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1. Define hardness. Explain in brief the procedures in use to test the hardness of a material.

OR

2. Explain Bauschinger effect in materials using a neat sketch.

SECTION - II

3. What is the effect of various alloying elements on steel? Explain in detail.

OR

4. Explain in brief the carburizing techniques used for surface hardening of steel.

SECTION - III

5. Define controlled anisotrophy. What are the features of fiber – reinforced polymer matrix composites leading to their broad application in aerospace industry? Explain.

OR

6. State the properties of carbon and graphite fibers.

SECTION - IV

7. Using neat sketch, explain different failure modes of a sandwich construction.

OR

8. What are the significant physical and chemical properties of a material used in construction of an airplane? Explain.

SECTION - V

9. Focus on the latest developments in materials in India.

OR

10. What are the loads taken by the tail part of an conventional airplane? What are the properties preferred by the material used for the same? Explain.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH I SEMESTER – AERONAUTICAL ENGINEERING
(R18A2103) AEROSPACE MATERIALS AND COMPOSITES
MODEL PAPER – III

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1. Define yield strength and yield point. Explain in brief the procedures used to determine yield strength of a material.

OR

2. a. Define fatigue. Explain the working of rotating cantilever fatigue testing apparatus.

   b. Explain principle of Radiography used for detecting flaws in airplane structures.

SECTION - II

3. State the properties and applications of Martensitic or maraging steels.

OR

4. Write a short notes on
c. Galvanizing
d. Sherardizing
e. Parkerizing
f. Granodizing

SECTION - III

5. Explain the properties of: Ceramic fibers, Silicon carbide fibers, HPPE Fibers.

OR

6. Write a brief note on properties of polymers used as a matrix material for composites.

SECTION - IV

7. Define shape memory alloy. How does the shape memory alloy define the future aerospace industry? Discuss in detail.

OR

8. Explain the requirements of designing composite sandwich structure.

SECTION - V

9. Define super alloy. Explain the metallurgical process of Ni based super alloy.

OR

10. Focus on the applications of super alloys in aerospace industry.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH II SEMESTER – AERONAUTICAL ENGINEERING
(R18A2104)AERODYNAMICS
MODEL PAPER – I

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1. Derive the energy equation by applying the fundamental principle to a suitable flow model.

OR

2. Using neat sketches, explain the flow behavior past stream lined bodies placed in different Mach number regimes.

SECTION - II

3. a. Define boundary condition. Explain infinity boundary condition and wall – boundary condition.
   b. Explain Rankine – oval. Derive the equation of Rankine – oval.

OR

4. A stationary circular cylinder is placed in a uniform flow stream of velocity V∞. Obtain the equation of stream line pattern around the cylinder. Also sketch the pressure distribution over the surface of the cylinder.

SECTION - III

5. a. Derive the fundamental equation of Prandtl's lifting line theory.
   b. Obtain the expressions for coefficients of lift, induced drag, effective angle of attack for an elliptical wing plan-form. Explain the symbols used clearly.

OR

6. Define vortex filament and vortex sheet. Obtain the solution for lifting – flows over 2 – D bodies using vortex panel method. State the advantages of panel method over thin airfoil theory.

SECTION - IV

7. Using a neat sketch, explain how lift is augmented by using
a. Flap systems
b. Circulation control wing

OR

8. Define critical Mach number and explain various techniques to delay Critical Mach number.

SECTION - V

9. Explain about similarities of flow to be satisfied for Model testing.
   b. Illustrate the flow over a delta wing in supersonic flow.

OR

10. Write a short note on Hotwire anemometer.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH II SEMESTER – AERONAUTICAL ENGINEERING
(R18A2104)AERODYNAMICS
MODEL PAPER – II

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1. a. Derive Momentum equation in integral form and differential form by applying the physical principle to a suitable flow model.   (10 M)

OR

2. Derive the Navier – stokes equation.

SECTION - II

3. A circular cylinder spinning about its own axis is placed in a uniform free – stream of velocity V_∞. Obtain the expression for the lift generated over the cylinder. State all the symbols used clearly.

OR

4. Consider lifting flow over a circular cylinder. The lift coefficient is given by 5. Calculate the peak pressure coefficient, location of stagnation points and the points on the cylinder where the pressure equals free stream static pressure.

SECTION - III

5. Using neat sketches, explain the effect of the presence of down wash on the local airfoil section. How the characteristics of a finite wing are different when compared to the characteristics of airfoil sections?

OR

6. Citing necessary examples, explain the effect the aspect ratio of wings on the performance parameters.

SECTION - IV

7. Using neat sketches explain the use of winglets in drag control.

OR

8. Explain briefly about multiple lifting surfaces with neat sketches.

SECTION - V

9. Describe briefly about components of wind tunnel and flow measurement devices.

OR

10. Write a short note on Laser Doppler anemometer.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH II SEMESTER – AERONAUTICAL ENGINEERING
(R18A2104)AERODYNAMICS
MODEL PAPER – III

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1. Using Buckingham's pi theorem, explain the factors on which the basic parameters of aerodynamics depend on.

OR

2. a. Explain the criterion to be established for the flows to be dynamically similar.

b. Consider an aircraft cruising at a velocity of 245.87m/s at standard altitude of 11582.4 m, where the free stream pressure and temperature are 20712.9 N/m^2 and 216.67 K, respectively. A one – fifth model of the craft is tested in a wind tunnel where the temperature is 238.88 K. Calculate the required pressure and velocity of the test air stream in the wind tunnel such that the aerodynamic coefficients measured for the wind tunnel model are same as for free flight. Assume μ and *a* are proportional to $T^{1/2}$.

SECTION - II

3. a. State Kutta condition.
   b. Derive the fundamental equation of thin airfoil theory. Explain the symbols used clearly.

OR

4. a. Define source flow and sink flow. Obtain the expression for velocity potential and stream function for the source flow. Define the strength of the source.
   b. Consider a thin flat plate at 5^0, angle of attack. Using the results of thin airfoil theory, calculate the lift coefficient, moment coefficient about the leading edge, moment coefficient about the quarter chord point and the moment coefficient about the trailing edge.

SECTION - III

5. Consider a rectangular wing with an aspect ratio of 6, an induced drag factor is given by 0.055 and a zero – lift angle of attack of -2^0. At an AoA of 3.4^0, the induced drag coefficient for this wing is 0.01. Calculate the induced drag coefficient for a similar wing (a rectangular wing with the same airfoil section) at the same angle of attack, but with an aspect ratio of 10. Assume that the induced factors for the drag and lift slope are equal to each other.

OR

6. Explain the concept of vortex trunk and vortex theory by Lanchester.

SECTION - IV

7. Explain using necessary illustrations, how swept back wings are advantageous in reducing transonic drag rise.

OR

8. Using neat sketches, explain the function of vortex lift strakes.

SECTION - V

9. Write a short note on Shadow graph flow visualization technique with neat sketches

OR

10. Discuss briefly about the wind tunnel balances to measure the forces and moments.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH II SEMESTER AERONAUTICAL ENGINEERING
(R18A0362)MECHANICS OF SOLIDS
MODEL PAPER – I

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1a) A rectangular block 250 mm × 100 mm × 80 mm is subjected to axial loads as follows:

- 480KN tensile in the direction of its length
- 900KN tensile on the 250mmx80mm faces

- 100KN compressive on the 250mmx100mm faces.

Assuming Poisson's ratio as 0.25, Find in terms of the modulus of Elasticity E of the material, the strains in the direction of each force, If E=2.0x10^{5}N/mm^2, Find the values of the modulus of rigidity and bulk modulus for the material of the block. Also, calculate the change in the volume of the block due to the applications of the loading specified in Fig.1.

OR
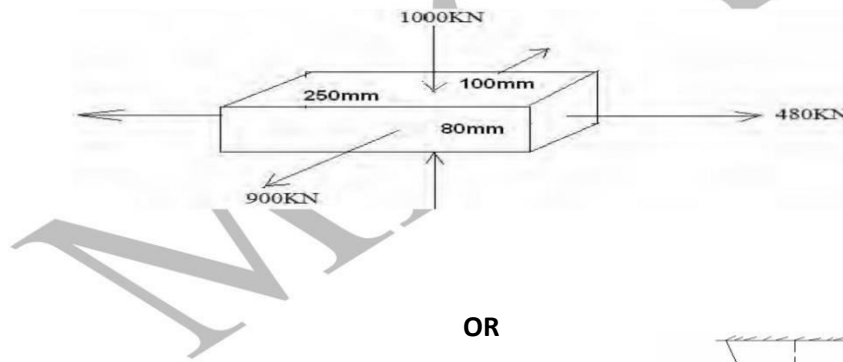
b)A solid conical bar of circular section is suspended vertically as shown inFig.2. If the length of the bar is 'l' and the weight per unit volume of the material of the bar is 'w', determine the total elongation of the bar due to its own weight.
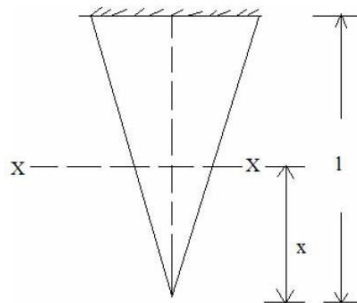
2a) Calculate the reactions at the supports A and B of the beam shown in Fig. Draw the B.M.D and S.F.D. Determine also the points of contra flexure within the span AB and show their positions on the bending moment diagram
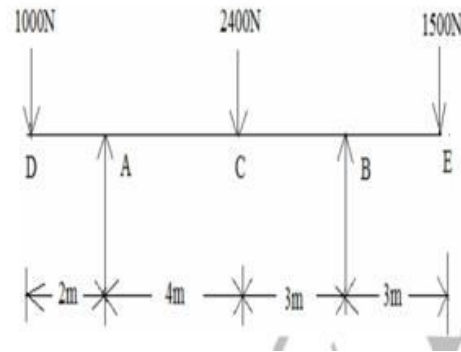

OR

b).A cantilever PQRS 7m long is fixed at P such that Pq= QR= 2m and RS=3m . It carries loads of 5,3 and 2kN at Q,R and S respectively in addition to UDL of 1kN/m run between P and Q and 2kN/m run between R and S .Draw SFD and BMD

SECTION - II

3a) A timber beam of rectangular section is simply supported at the ends and carries a point load at the center of a beam. The maximum bending stress is 12N/mm^2 and maximum shearing stress is 1 N/mm^2, find the ratio of the span to the depth as shown in fig
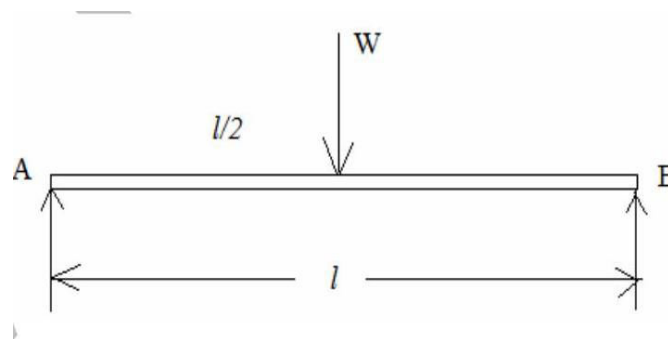
b)A cast iron beam section of T-section with a top flange 8cmX2cm thick, bottom flange

16cmX4cm thick and the web 20cm deep and 2cm thick. The beam is freely supported on a span of

5metres. If the tensile stress is not to exceed 20 MN/m^2, find the safe uniformly distributed load which the beam can carry. Find also the Maximum compressive stress.

4a) A cylindrical shell is 3 m long, 1m internal diameter and 15mm thickness. Calculate the Maximum intensity of the shear stress and also the change in dimensions of the shell if it is subjected to an internal fluid pressure of 1.5N/mm^2.

OR

b)A steel shaft transmits 105kW at 160rpm. If the shaft is 100mmin diameter, find the torque on

the shaft and the maximum shearing stress induced. Also find the twist of the shaft in a length of 6m, take C= 8X10^{4}N/mm^2

SECTION - III

5a) In a shaft tranmitting power the shearing stress at the surface of the shaft is 60N/mm^2. In addition there is a bending moment producing a bending stress of 85N/mm^2 at the surface. Find the magnitude and the directions of the principal stresses. If the shaft diameter is 75mm find the eqivalent bending moment which acting alone on the shaft would produce a strain equal to the greater principal strain. Take poisso's ratio=0.286.

OR

b)A shaft section 100mm in diameter is subjected to a bending moment of 4000n-m and a torque of 6000 N-m. Find the maximum direct stress induced on the section, and specify the position of the plane on which it acts. Find also, what stress acting alone can produce the same maximum atrain. Take poisson's ratio = 0.25.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH II SEMESTER – AERONAUTICAL ENGINEERING
(R18A0362)MECHANICS OF SOLIDS

MODEL PAPER – II

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1a) A bar of 30mm diameter is subjected to a pull of 60KN. The measured extension on a gauge length of 200mm is 0.09mm and the change in diameter is 0.0039mm. Calculate the Poisson's ratio and the values of the three moduli (E,G & K).

OR

b)A steel bar is placed between two copper bars, each having the same area and length as steel bar at 20°C, At this stage , they are rigidly connected together at both the ends. When the temperature is raised to 320°C , the length of the bars increases by 1.5mm. Determine the original length and find stresses in the bars.

Take Es=220GN/m^2 , Ec=110GN/m^2

αs=0.000012 per°C and   αc=0.0000175 per°C

2a) The following Figure 2 indicates the Shear Force diagram. Develop the loading and Bending Moment diagram for the beam.
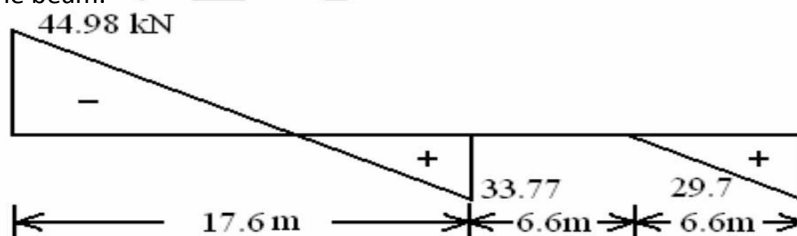
b) Analyse the beam shown in Fig. Draw S.F.D, B.M.D and Thrust Diagram
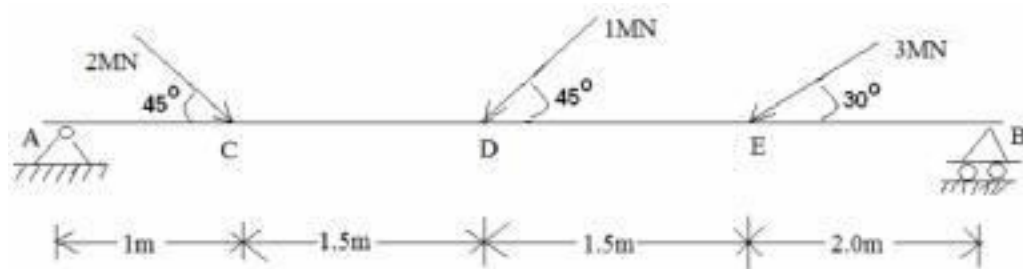
SECTION - II

3a) The shear force acting on a section of a beam is 100KN. The section of the beam is of T-shaped of dimensions 200 mm × 250 mm × 50 mm. The flange thickness and web thickness are 50 mm. Moment

of inertia about the horizontal neutral axis is $1.134 \times 10^8 mm^4$. Find the shear stress at the neutral axis and at the junction of the web and the flange.

OR

b) A cantilever of square section 200 mm × 200 mm, 2.0 m long, just fails in flexure when a load of 12KN is placed at its free end. A beam of the same material and having a rectangular cross-section 150 mm wide and 300 mm deep is simply supported over a span of 3.0 m.Calculate the minimum central concentrated load required to break the beam.

SECTION - III

4a) A bronze spherical shell is made of 1.5cm thick plate. It is subjected to an internal pressure of $1MN/m^2$. If the permissible stress in the bronze is %%MN/m^2, calculate the diameter of the spherical shell taking the efficiency as 80%.

OR

b)A solid shaft of 200mm diameter has the same cross-sectional area as that of hollow shaft of the same material with inside diameter 150mm. Find the ratio of power transmitted by the two shafts at the same speed.

SECTION - IV

5) a) An I- beam with flanges of size 200mmX 20mm and a web of 600mm X 12 mm is subjected to a bending moment of 450kN-m and a shear force of 400kN at a section. Determine the magnitude of the bending stress and shear stress at a point 200mm above the neutral axis. Find also the principal stresses at this point.

OR

b)A horizontal steel bar of 40mm diameter solid section is 2.4m long and is rigidly held at both ends so that no angular rotation occurs either axially or circumferentially at the ends. If a bracket at the centre of the span supports a vertical load of 250N at a horizontal lever arm of 0.5m, what is the maximum tensile stress in the bar.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH II SEMESTER AERONAUTICALENGINEERING
(R18A0362)MECHANICS OF SOLIDS
MODEL PAPER – III

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1a) A prismatic member of length l and unit weight w is suspended freely from its end. Determine the elongation of the member under gravity.

OR

b)A steel tube 50mm in external diameter and 3.0mm thick encloses centrally a solid copper bar of 35mm diameter. The bar and the tube are rigidly connected together at the ends at a temperature of

20^0C.Find the stress in each metal when heated to 170^0C.Find the stress in each metal when heated to 170^0C .Also find the increase in length, if the original length of the assembly is 350mm.Coefficients of expansion for steel and copper are 1.08×10^{-5} per^0 C and 1.7×10^{-5} per^0 C respectively.

Take Es $=2.0 \times 10^5$N/mm^2, Ec $=1.0 \times 10^5$N/mm^2.

SECTION - II

2a) A Beam of length 6.0m is simply supported at the ends and carries a u.d.l of intensity 1.5KN/m run and three concentrated loads of 1KN, 2KN and 3KN acting at a distance of 1.5m, 3.0m and 4.5m respectively from left end. Draw the S.F.D and B.M.D and also determine the maximum bending moment.

OR

b)The intensity of loading on a simply supported beam of 5.0m span increases uniformly from 8KN/m at one end to 16KN/m at the other end as shown in Fig.1. Find the position and magnitude of the maximum bending moment. Also draw S.F.D and B.M.D.
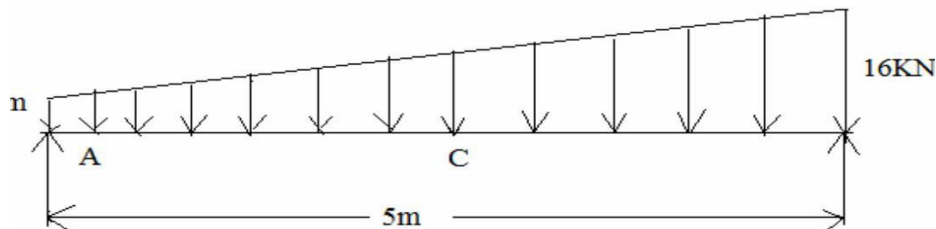
SECTION - III

3a) A circular beam of 100mm diameter is subjected to a shear force of 5KN. Calculate:

---

i)Average shear stress,
ii)Maximum shear stress, &

iii)Shear Stress at a distance of 40mm from N.A.

b)Derive an expression for the shear stress at any point in a circular section of a beam, which is subjected to a shear force 'F'.

OR

c)A beam consists of a symmetrical rolled steel joist. The beam is simply supported at its ends and carries a point load at the centre of the span. If the maximum stress due to bending is 140MPa, find the ratio of depth of the beam to span on order that the central deflection nay not exceed 1/480 of the span. Take E= 200GPa.

SECTION - IV

4a) A boiler shell is to made of 15mm thick plate having a limiting tensile stress of 120MN/m^2. If the longitudinal and circumferential efficiencies are 70% and 30% respectively , determine what maximum diameter of the shell would be allowed for a maximum pressure of 2MN/m^2.

OR

b) A hollow shaft of diameter ratio 3/5 is required to transmit 450kW at 120 rpm with a uniform twisting moment. The shearing stress in the shaft must not exceed 60 N/mm^2 and the twist in a length of 2.5 m must not exceed 1°. Calculate the minimum external diameter of the shaft satisfying these conditions. Take the modulus of rigidity C= 8X10^4 N/mm^2

SECTION - V

5a)A simply supported beam of rectangular section is 200mm wide and 300mm deep.It supports a uniformly distributed load of 6 kN/m over an effective length of 4m. Calculate the magnitude and direction of the principal stresses at a point located 0.5m from the left support and 50mm above the neutral axis.

OR

b) At a certain point in a strained material the principal stresses are 100 N/mm^2 and 40N/mm^2 both tensile. Find the normal, tangential and resultant stresses across a plane through the point at 48° to the major principal plane, using Mohr's circle of stress.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH II SEMESTER – AERONAUTICAL ENGINEERING
(R18A2105)AIR BREATHING PROPULSION
MODEL PAPER – I

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1. Derive the expression for installed and uninstalled thrust for the aircraft.

OR

2. Explain the turbojet engine operation, advantages and disadvantages with a neat sketch.

SECTION - II

3. Derive an equation for thermal efficiency of a brayton cycle.

OR

4. State and explain four fundamental laws frequently used in dealing with the problems and operation of rotating components of gas turbine engines.

SECTION - III

5. Explain different types of inlets with neat sketches.

OR

6. Explain the various types of thrust revering and vectoring mechanisms employed in modern aircraft.

SECTION - IV

7. Draw the velocity triangles at the inlet and outlet of the rotor and derive an expression for the work done per stage.

OR

8. Draw compressor map and explain compressor operation through different variations of parameters

SECTION - IV

9. Explain the relevance of turbine inlet temperature for the gas turbine operation. Discuss various turbine blade cooling methods used with neat sketches.

OR

10. Explain the parameters that define the engine control system limits for a gas turbine engine. State the steps involved in matching the component performance of a single shaft turbo-jet Engine.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH II SEMESTER – AERONAUTICAL ENGINEERING
(R18A2105)AIR BREATHING PROPULSION
MODEL PAPER – II

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one   question from each
section and each question carries 14 marks.

SECTION - I

1. Explain the various components of turbofan engine with a neat sketch, and discuss its advantages and
    disadvantages.

OR

2. Explain the terms with graphs if required
    A. SFC   B. Specific thrust   C. Jet exit velocity   D. Total efficiency   E. Exit pressure

SECTION - II

3. Explain the principle of operation of a compressor. Differentiate between isentropic and polytropic
    stage efficiencies.

OR

4. What are the steps involved in the parametric cycle analysis for a turbojet engine.

SECTION - III

5. Explain the various types of drag associated with inlets? State different types of air intakes used in gas
    turbine engines and their applications.

OR

6. Explain the aerodynamics and thermodynamics of internal compression supersonic air intake. Provide
    on example of such supersonic air intake.

SECTION - IV

7. Derive the expression Euler's equation for pump and turbine.

OR

8. Explain the terms:
    A. Degree of reaction   B. Stage loading   C. Work done factor   D. Flow Coefficient
        E. Solidity

SECTION - V

9. Explain the significance of component matching for a jet engine. What are the steps in matching
    procedure of a single shaft gas turbine engine.

OR

10. Differentiate between Engine performance analysis and parametric cycle analysis. What is the relevance
    compressor operating line?

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH II SEMESTER – AERONAUTICAL ENGINEERING
(R18A2105)AIR BREATHING PROPULSION
MODEL PAPER – III

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1. Explain the working principle of ramjet engine with a neat sketch, and discuss their applications, advantages and disadvantages.

OR

2. Explain the terms:
   a. Overall efficiency   b. Propulsive efficiency   c. Take off thrust   d. Propulsive efficiency

SECTION - II

3. Derive an expression for the installed thrust of a gas turbine engine. What are the different types of drags associated with engine mounted under the wings?

OR

4. Discuss relative merits and de-merits of turbojet and ramjet engines

SECTION - III

5. Explain the main burner components and their function with neat diagrams.

OR

6. Discuss the functions of nozzle and its performance during back pressure control in a gas turbine engine

SECTION - IV

7. Discuss the cascade, through-flow and 3D flow analysis types with neat sketches

OR

8. Write short notes on
   i. Rotating Stall   ii. Surging   iii. Chocking   iv. Work done factor v. Degree of reaction

SECTION - V

9. What are the dimensionless and corrected parameters used in engine performance analysis. Explain their need.

OR

10. Write short notes on with neat diagrams
i.   Turbine performance maps ii. Compressor operating line

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH II SEMESTER – AERONAUTICAL ENGINEERING
(R18A2106) AIRCRAFT PERFORMANCE
MODEL PAPER – I

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1) Explain the factors to be considered in the estimation of performance of an aircraft and how the estimation is carried out

OR

2) Describe the mission of a military aircraft with the required sketches

SECTION - II

3) Derive an expression for range and endurance for aircraft with thrust producing engines with the necessary equations

OR

4) Explain the cruising method of constant angle of attack and constant mach number and explain about the effect of alternative fuel flow laws

SECTION - III

5) Explain the equations of motion of an aircraft with thrust producing engines in a climb .Derive the expressions for climb gradient and climb rate

OR

6) (a)Describe the phases of descending flight through a diagram and

(b) Discuss the various criteria that govern the manner in which the aircraft is flown in each phase

SECTION - IV

7) (a) Derive the equation for turn radius and turn rate of pull up maneuver.

(b)An F-22 is performing a 5-g pull up at 10,000 ft and 500 kn true airspeed what is the turn rate and turn radius

OR

8)   (a)Explain about the transport aircraft maneuver performance and military aircraft maneuver performance

(b) Determine the load factor, bank angle turn radius for an aircraft in a level turn at a true speed of 120km and a turn rate of 15deg/s

SECTION - V

9) Explain the process of take –off with the help of a diagram and discuss how take-off distances are estimated

OR

10) Discuss the space available and space required for take – off performance with required sketches

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH II SEMESTER – AERONAUTICAL ENGINEERING
(R18A2106)AIRCRAFT PERFORMANCE
MODEL PAPER – II

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1) For international standard atmosphere , explain variation of temperature , pressure variation with altitude with the help of neat and proper diagram .Also define lapse rate ,stratosphere and troposphere

OR

2) Explain minimum drag speed , minimum power speed and describe their importance in aircraft performance studies

SECTION - II

3) Derive Breguet range equation and discuss about the constant altitude , constant mach number

OR

4) Discuss the comparison of cruise methods and explain through diagrams how range function and endurance function vary with relative speed

SECTION - III

5) Derive the expression for rate of climb and also explain the graphical approach

OR

6) (a) An aircraft with wing loading of 1500N/sqm is gliding from an altitude of 4 km. What is the glide angle corresponding to minimum rate of descent. If zero lift drag coefficient is 0.2? what is the equilibrium glide velocity associated with the descent
(b) Write shortly about the climbing flight and also write short notes on weight estimation of the aircraft

SECTION - IV

7) What are the reasons for the maneuver performance of an aircraft to be limited by the structural strength of the airframe? Discuss the main elements of a typical maneuver envelope with the help of a schematic diagram.

OR

8) Describe the equations of motion of an aircraft undergoing lateral maneuver or level turn and derive an expression for radius of turn. Discuss with the help of a diagram the maneuver boundaries for turning performance

SECTION - V

9) Explain the process of landing with the help of a diagram and discuss the estimation of the landing distances

OR

10)   Define the performance classes used to classify aircraft in meeting the requirements of certificate of airworthiness. what are the issues relating to discontinued landing

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
II B.TECH II SEMESTER – AERONAUTICAL ENGINEERING
(R18A2106)AIRCRAFT PERFORMANCE
MODEL PAPER – III

TIME: 3 Hours   **MAX MARKS: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1) (a)Explain about the off standard and design atmosphere (b)Explain about the pressure height relation ship

OR

2) Derive the equations of motion for steady level flight

SECTION - II

3) (a)Explain about the air data computers with the required sketches
   (b)Define range, endurance, the drag force, the side force and the overall drag force D

OR

4) (a)Explain about the cruising performance with the comparison of three cruise technique methods
   (b) Estimate the maximum range at 30,000ft for the gulfstream IV. Also calculate the flight velocity to obtain this range. The maximum usable fuel weight is 29,500 lb .The thrust specific fuel consumption of the Rolls Royce Tay turbofan at 30,000 ft is 0.69 lb of fuel consumed per hour per pound of thrust (example 5.19 aircraft performance J.D ANDERSON)

SECTION - III

5) Derive the expression for maximum turn radius and maximum turn rate

OR

6) Derive the expression for rate of climb and also explain the graphical approach

SECTION - IV

7) Explain about the V-n diagram with neat sketch.

OR

8) Derive the equation for turn radius and turn rate of pull down maneuver.

SECTION - V

9) (a) Explain the effect on the take-off distances of the flight variables
   (b)Explain about the landing performance with neat sketch

OR

10) (a)Explain baulked landing   (b) Discuss air safety procedures and requirements on landing performance

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
MODEL QUESTION PAPER-I
Probability and Statistics

Time: 3 hours   Max Marks: 70
Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1a) A random variable has the following probability function

x	0	1	2	3	4	5	6	7
P(x)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2$+K

   Find i)k   ii)P(X≤6)   iii) P(X>6)   iv)) find'c' if P(X≤c)>1/2   [7M]

b) A sample if 4 items is selected at random from a box containing 12 items of which 5 are
   defective. Find the expected number E of defective items.   [7M]

OR

2) For the following bivariate (two dimensional) probability distribution of X and Y find
   i) P (X≤ 2,Y=2) ii) F_X(2) iii) P(Y=3) iv) P(X<3,Y≤ 4)   v) F_Y(3)   [14M]

X/Y	1	2	3	4
1	0.1	0	0.2	0.1
2	0.05	0.12	0.08	0.01
3	0.1	0.05	0.1	0.09

SECTION-II

3) The average number of phone calls /minute coming into a switch board between 2pm
   and 4pm is 2.5.Determine the probability the probability that one particular minute
   there will be i) 4 or fewer ii) more than 6 calls   [14M]

OR

4) Suppose the weights of 800 male students are normally distributed with 28.8kg and SD of
   2.06 kg. Find the number of students whose weights are
   i) Between 28.4 kg and 30.4kg ii) more than 31.3 kg   [14M]

SECTION-III

5a) Find the Karl-Pearson's coefficient of correlation for the paired data:

wages	100	101	102	100	99	97	98	96	95	102
Cost of living	98	99	99	95	92	95	94	90	91	97

[7M]

  b) If θ is the angle between two regression lines and S.D of Y is twice the S.D of X and
   r =1.25, find tanθ .   [7M]
OR

6) The heights of mothers and daughters are given in the following table. From the two tables of regression estimate average height of daughter when the height of the mother is 64.5 inches

Height of mother	62	63	64	64	65	66	68	70
Height of daughter	64	65	61	69	67	68	71	65

[14M]

SECTION-IV

7a) A sample of size 64 and mean70 were taken from a population whose standard deviation

is 10.Construct 95% confidence interval for the mean. [7M]

b) Write about (i) Null hypothesis (ii) Type I and Type II errors

(iii) Alternative hypothesis. [7M]

OR

8a) In a study of automobile insurance a random sample of 80 body repair costs had a mean of

Rs.472.36 and S.D of Rs.62.35. If x is used as point estimate to the true average repair costs,

with what confidence we can assert that the maximum error doesn't exceed Rs.10 [7M]

b) Explain the procedure for Testing of Hypothesis. [7M]

SECTION-V

9) A survey of 320 families with 4children each revealed the following distribution. [14M]

No# of boys	5	4	3	2	1	0
No# of girls	0	1	2	3	4	5
No# of families	14	56	110	88	40	12

Is this result consistent with the hypothesis that male and female births are equally popular?

OR

10) The following are the average weekly losses of worker hours due to accidents in

10   industrial plants before and after a certain safety programme was put into operation:

Before	45	73	46	124	33	57	83	34	26	17
After	36	60	44	119	35	51	77	29	24	11

Test whether the safety programme is effective in reducing the number of accidents at 5%LOS. [14M]

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous Institution - UGC, Govt. of India)
MODEL QUESTION PAPER-II

Probability and Statistics

TIME: 3hours   **Max. Marks: 70**

NOTE: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

1 a) If the p.d.f of a r.v x is given by $f(x) = \begin{cases} k(1-x^2), & 0 < x < 1 \\ 0, & otherwise \end{cases}$

find   i) k and ii) the cumulative distribution function of x.   [7M]

   b) Write the definitions of (i)Random variable (ii)Discrete random variable (iii) Continuous random variable and (iv)Probability Distribution function.   [7M]

OR

2) A random sample with replacement of size 2 is taken from S = {1,2,3}. Let the random variable X denote the sum of the two numbers taken: (i) Write the probability distribution of X
(ii) Find the mean
(iii) Find the variance.   [14M]

SECTION-II

3. A sales tax officer has reported that the average sales of the 500   businesses that he has to deal with during a year is Rs.36,000 with a standard deviation of Rs.10,000. Assuming that the sales in these businesses are normally distributed ,find :
 i) The number of business as the sales of which are greater than Rs.40,000
 ii) The percentage of business sales of which are likely to range between Rs.30,000 and Rs.40,000[14M]

OR

4. If 2% of light bulbs are defective, find
(i) atleast one is defective
(ii) exactly 7 are defective
(iii) p(1<x<8) in a sample of 100
(iv) atmost one is defective   [14M]

SECTION-III

5 a) Fit a straight line Y=a_0+a_1X for the following data and estimate the value of Y when X = *25*   [7M]

X	0	5	10	15	20
Y	7	11	16	20	26

  b) Show that the maximum value of rank correlation coefficient is 1   [7M]

OR

6a) The marks obtained by 10 students in mathematics and statistics are given below. Find the rank correlation coefficient between the two subjects

Marks in mathematics	25	28	30	32	35	36	38	42	45	39
Marks in Statistics	20	26	29	30	25	18	26	35	46	35

[7M]

b) Find the Correlation coefficient if $b_{xy} = 0.85$, $b_{yx} = 0.89$. [7M]

SECTION-IV

7.a) Samples of size 2 are taken from the population 1,2,3,4,5,6 with replacement. Find
(i) The mean of the population
(ii) Standard deviation of population
(iii) The mean of the sampling distribution of means
(iv) The standard deviation of the sampling distribution of means [12M]
b) What is a statistic? Give an example [2M]

OR

8. a) Write about null hypothesis and testing of null hypothesis. [4M]
   b) 20 people were attacked by a disease and only 18 survived. Will you reject the hypothesis that the survival rate if attacked by this disease is 85% in favour of the hypothesis that is more at 5% level. [10M]

SECTION-V

9. In an investigation on the machine performance the following results are obtained:

	No# of units inspected	No# of defectives
Machine 1	375	17
Machine 2	450	22

Test whether there is any significant performance of two machines at 5%LOS [14M]

OR

10. The following is the distribution of the daily number power failures reported in a city

No# of power failures	0	1	2	3	4	5	6	7	8	9
No# 0f days	9	43	64	62	42	36	22	14	6	2

Test the goodness of fit of Poisson distribution at 5% LOS [14M]

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
MODEL QUESTION PAPER-III
Probability and Statistics

Time: 3 hours   **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1 a) If F(x) is the distribution function of x is given by $F(X) = \begin{cases} 0 & if\ x \leq 1 \\ k(x-1)^4 & if\ 1 < x \leq 3 \\ 1 & if\ x > 3 \end{cases}$

   Determine   i) f(x)   ii) k   iii)mean   [10M]

b)Define (i) Probability mass function (ii) Probability density function .   [4M]

OR

2 a) Two random variables x and y have the joint density function

$$f_{xy}(x,y) = \begin{cases} x^2 + \frac{xy}{3}, & 0 \leq x \leq 1, 0 \leq y \leq 2 \\ 0, & otherwise \end{cases}$$

   Show that x and y are not independent . Find the conditional density function . check whether it is valid or not.   [7M]

b) The joint density function of w and z is given by

$$f_{wz}(wz) = \begin{cases} bwz, & 1 \leq w \leq 3\ , 2 \leq z \leq 4 \\ 0, & otherwise \end{cases}$$

   Find b and marginal density function.   [7M]

SECTION-II

3a) Average number of accidents on any day on a national highway is 1.8 .Determine the probability that the number of accidents are   i) atleast one ii) atmost one iii) exactly one.   [7M]

b) Fit a binomial distribution to the following data   [7M]

x	0	1	2	3	4	5
f	38	144	342	287	164	25

OR

4) In a normal distribution,7% of the items are under 35 and 89% are under 63.Determine the mean and variance of the distribution.   [14M]

SECTION-III

5) Obtain the rank correlation coefficient for the following data   [14M]

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	44	81	60	68	48	50	70

OR

6) A panel of two judges P and Q graded seven dramatic performances by independently awarding marks as follows:

Performance	1	2	3	4	5	6	7
Marks by P	46	42	44	40	43	41	45
Marks by Q	40	38	36	35	39	37	41

The eight performance, which judge Q would not attend, was awarded 37 marks by judge P. If judge Q had also been present, how many marks would be expected to have been awarded by him to the eighth performance. [14M]

SECTION-IV

7a) A population consists of 5,10,14,18,13,24.Consider all possible samples of size 2 which can be drawn without replacement from the population. Find
i)The mean of the population
ii) Standard deviation of the population
 iii) The mean of the sampling distribution of means
 iv) Standard deviation of the sampling distribution of means [10M]
b) Write short notes on Type I and Type II error. [4M]

OR

8 a) A random sample of size 16 values from a normal population showed a mean of 53 and a sum of squares of deviations from the mean equals to 150. Can this sample be regarded as taken from the population having 56 as mean ? Obtain 95% confidence limits of the mean of the population .[10M]
 b) Write step procedure for difference of means of two independent samples. [4M]

SECTION-V

9 a) Explain χ^2 test for independence of attributes. [4M]

  b) The measurements of the output of two units have given the following results. Assuming that both Samples have been obtained from the normal distribution at 10% LOS. Test whether the two Populations have the same variance.

Unit –A	14.1	10.1	14.7	13.7	14.0
Unit -B	14.0	14.5	13.7	12.7	14.1

[10M]

OR

10) The heights of 10 males of a given locality are found to be 70,67,62,68,61,68,70,64,64,66 inches .
     Is it reasonable to believe that the average height is greater than 64 inches .Test at 5% LOS. [14M]

OPEN ELECTIVE - I

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
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MODEL QUESTION PAPER-I
INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE -I)

Time: 3 hours   **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION - I

1. M and N filed for patent application with provisional specification on the same date for the same invention. After that 'M' filed complete specification much earlier to 'N' but both filed within time allowed. Examine the status of patent application filed by both 'M' and 'N'.

OR

2. State and explain the development of laws on Intellectual property and the benefits on such protection.

SECTION - II

3. What is 'mark' ? What are the various steps for registration of Trademark?

OR

4. What do you mean by infringement of Trademark and discuss the remedies available for infringement.

SECTION - III

5. Can the inventor of new process of bypass surgery claim a patent for new surgical method, invented by him?

OR

6. A foreign applicant of a convention country applies for patent without sufficient description of the invention. The controller accepts the application and grants patent. Decide

SECTION - IV

7. Explain the grounds for refusal of registration of a trademark

OR

8. Discuss the powers and functions of Registrar of Trademarks.

SECTION - V

9. 'A' is registered proprietor of trademark 'M–SEAL'. 'B' adapted and used mark 'SM-SEAL' with all essential characters of trademark 'M-SEAL'. Can 'B' be restrained from using the Mark ? Decide.

OR

10. Registrable and non-registrable marks

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MODEL QUESTION PAPER-II
INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE -I)

Time: 3 hours   **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I
1. **Discuss** whether the following items would be protectable as trademarks, copyrights, patents, or trade secrets:

   a) 'Freeze You' as the name of a new type of ice cream
   b) a company's plans for its future business operations and possible mergers
   c) a new type of rose
   d) a new slogan to be used by Burger King

OR

2. **Explain** about patent? **Explain** about different types of Intellectual property??

SECTION-II
3. **Discuss** about the methods of preparing the Trademark application?

OR

4. **Explain** Infringement of Trademarks? **Explain** about Inter partes and inter partes proceedings? What is the role of Inter partes?

SECTION-III
5. **Explain** the process of the Patent Application?

OR

6. **Write** about the need of patent searching? Explain?

SECTION-IV
7. **Write** about the need of patent searching? Explain?

OR

8. **Describe** the determination of trade secret status?

SECTION-V
9. **Discuss** about intellectual property audits?

OR

10. **Discuss** about international developments in trade secrets law?

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MODEL QUESTION PAPER-III
INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE -I)

Time: 3 hours   **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1. **Explain** the functions of INTA, WIPO?

OR

2. **Describe** why Trade Secrets are necessary? How do they function?

SECTION-II

3. **Discuss** about the advantages of Trademark use and compliance policies?

OR

4. **Explain** the Post registration procedures?

SECTION-III

5. **Discuss** about new developments in copyright law? What are they?

OR

6. **Differentiate** Contributory Infringement and Vicarious Infringement?

SECTION-IV

7. **Discuss** about trade secret litigation?

OR

8. **Explain** about the remedies for misappropriation in Trade Secrets?

SECTION-V

9. **Discuss** about European patent organization and what are its duties?

OR

10. **Discuss** about patent cooperation treaty?