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

MECHANICAL 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

(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.
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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

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE STRUCTURE

I Year B. Tech – I Semester (Non - Circuit Branches)

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	-	-	-	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 (Non - Circuit Branches)

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**

II Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0302	Engineering Mechanics	3	-	-	3	30	70
2	R18A0303	Thermodynamics	3	-	-	3	30	70
3	R18A0304	Fluid Mechanics & Hydraulic Machines	2	1	-	3	30	70
4	R18A0305	Materials Engineering	3	-	-	3	30	70
5	R18A0306	Machine Drawing	3	-	-	3	30	70
6	R18A0307	Kinematics of Machinery	3	-	-	3	30	70
7	R18A0381	Fluid Mechanics & Hydraulic Machinery Lab.	-	-	3	1.5	30	70
8	R18A0382	Materials Engineering Lab.	-	-	3	1.5	30	70
9*	R18A0014	Environmental Science	2	-	-	-	100	-
TOTAL			**19**	**1**	**6**	**21**	**340**	**560**

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

II Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0308	Applied Thermodynamics	3	-	-	3	30	70
2	R18A0309	Strength of Materials	3	-	-	3	30	70
3	R18A0310	Dynamics of Machinery	2	1	-	3	30	70
4	R18A0311	Manufacturing Processes	3	-	-	3	30	70
5	R18A0024	Probability & Statistics	3	-	-	3	30	70
6		**OPEN ELECTIVE 1**	3	-	-	3	30	70
7	R18A0383	Strength of Materials Lab	-	-	3	1.5	30	70
8	R18A0384	Manufacturing Processes Lab.	-	-	3	1.5	30	70
9*	R18A0005	Foreign Language(German)	2	-	-	-	100	-
		TOTAL	**19**	**1**	**6**	**21**	**340**	**560**

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

OPEN ELECTIVE 1	
R18A0051	Intellectual Property Rights
R18A0451	Digital Electronics
R18A0552	Introduction to Data Structures

R18A0251	Elements of Electrical Engineering
R18A0352	Green Energy Systems

III Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0313	Manufacturing Technology	3	-	-	3	30	70
2	R18A0314	Managerial Economics & Financial Analysis	2	1	-	3	30	70
3	R18A0315	Internal Combustion Engines	3	-	-	3	30	70
4	R18A0316	Robotics	3	-	-	3	30	70
5	R18A0317 R18A0318 R18A0319	**PROFESSIONAL ELECTIVE 1** Alternative Fuels for IC Engines Vehicular Pollution and Control Jet propulsion & Rocket Engines	3	-	-	3	30	70
6		**OPEN ELECTIVE -2**	3	-	-	3	30	70
7	R18A0385	Thermal Engineering Lab.	-	-	3	1.5	30	70
8	R18A0386	Manufacturing Technology Lab.	-	-	3	1.5	30	70
9*	R18A0007	Constitution of India	2	-	-	-	100	-
		TOTAL	**19**	**1**	**6**	**21**	**340**	**560**

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

OPEN ELECTIVE 2	
R18A0354	Nanotechnology
R18A0551	Database Systems
R18A1252	Introduction to Analytics
R18A0452	Industrial Electronics
R18A0453	Communication Networks

III Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0320	Heat Transfer	2	1	-	3	30	70
2	R18A0321	Instrumentation and Control Systems	3	-	-	3	30	70
3	R18A0322	Design of Machine Elements	3	-	-	3	30	70
4	R18A0323 R18A0324 R18A0325	**PROFESSIONAL ELECTIVE 2** Mechatronic Systems Composite Materials Tribology	3	-	-	3	30	70
5		**OPEN ELECTIVE 3**	3	-	-	3	30	70
6	R18A0387	Instrumentation and Control Systems Lab.	-	-	3	1.5	30	70
7	R18A0388	Heat Transfer Lab.	-	-	3	1.5	30	70
8	R18A0394	Mini Project (Summer Internship)	-	-	3	3	30	70
9*	R18A0006	Technical Communication & Soft Skills	2	-	-	-	100	-
TOTAL			**16**	**1**	**9**	**21**	**340**	**560**

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

OPEN ELECTIVE 3	
R18A0052	Enterprise Resource Planning
R18A0353	Operations Research
R18A1251	Software Project Management
R18A0554	Game Programming
R18A0454	Robotics Engineering

IV Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0326	Automation in Manufacturing	3	-	-	3	30	70
2	R18A0327	Refrigeration & Air Conditioning	2	1	-	3	30	70
3	R18A0328	CAD/CAM	3	-	-	3	30	70
4	R18A0329	Finite Element Analysis	3	-	-	3	30	70
5	R18A0330 R18A0331 R18A0332	**PROFESSIONAL ELECTIVE 3** Renewable Energy Sources Process Planning and Cost Estimation Maintenance & Safety Engineering	3	-	-	3	30	70
6	R18A0389	CAD/CAM Lab.	-	-	3	1.5	30	70
7	R18A0390	Production Drawing Practice Lab.	-	-	3	1.5	30	70
8	R18A0395	Project-I (Project or Summer Internship)	-	-	3	3	30	70
TOTAL			**14**	**1**	**9**	**21**	**240**	**560**

IV Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0333	Automobile Engineering	3	-	-	3	30	70
2	R18A0334 R18A0335 R18A0336	**PROFESSIONAL ELECTIVE 4** Plant Layout & Material Handling Total Quality Management Technology Management	3	-	-	3	30	70
3	R18A0337 R18A0338 R18A0339	**PROFESSIONAL ELECTIVE 5** Production Planning and Control Energy Conservation and Management Power Plant Engineering	3	-	-	3	30	70
4	R18A0396	Project -II	-	-	6	6	60	140
TOTAL			**9**	-	**6**	**15**	**150**	**350**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM -MECH **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.

Course 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

Course 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 –MECH	L	T/P/D	C
	3	1/-/-	4

(R18A0021) MATHEMATICS -I

Course Objectives:

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 - MECH

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 - MECH

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

(R18A0261) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Course 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.

Course 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

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- MECH

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

(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.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- MECH	L	T/P/D	C
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(R18A0083)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

B. TECH- I YEAR- I SEM-MECH

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(R18A0083)IT WORKSHOP LAB

Course 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

Course 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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B. TECH- I YEAR- I SEM-MECH	L	T/P/D	C
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(R18A0581) PROGRAMMING FOR PROBLEM SOLVING LAB

Course 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.

Course 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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B. TECH- I YEAR- I SEM-MECH	L	T/P/D	C
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(R18A0289) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

Course 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

Course 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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B. TECH- I YEAR- I SEM-MECH

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(R18A0003) HUMAN VALUES AND SOCIETAL PERSPECTIVES
(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.

Course 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. AI Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

Course 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-MECH

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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.

Course 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

Course 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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B. TECH- I YEAR- II SEM-MECH

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(R18A0022)MATHEMATICS-II

Course 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 $1/3^{rd}$ and Simpson's $3/8^{th}$ 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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B.TECH- I- YEAR- II- SEM –MECH	L	T/P/D	C
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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 –MECH

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(R18A0502)OBJECT ORIENTED PROGRAMMING

COURSE 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 –MECH	L	T/P/D	C
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(R18A0301) ENGINEERING GRAPHICS

Course Objectives:

- Learn to sketch and take field dimensions.
- Learn to take data and transform it into graphic drawings.
- 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.

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.

Course Outcomes:

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

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B.TECH- I YEAR – II- SEM - MECH

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(R18A0082) ENGINEERING PHYSICS / CHEMISTRY LAB

(Any 8 experiments compulsory)

COURSE 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.**

COURSE 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.)

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B.TECH- I YEAR – II- SEM - MECH	L	T/P/D	C
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(R18A0082) ENGINEERING CHEMISTRY LAB

(Any Eight Experiment Compulsory)

COURSE 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.

COURSE 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 - MECH	L	T/P/D	C
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(R18A0582)OBJECT ORIENTED PROGRAMMING LAB

COURSE 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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B.TECH- I YEAR – II- SEM - MECH

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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.

COURSE 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.

COURSE 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.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B.Tech MECH-I SEM

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

(R18A0302) ENGINEERING MECHANICS

Course objectives:

- The Student is to develop the capacity to predict the effects of force and motion while carrying out the creative design functions of engineering.
- To help the student develop this ability to visualize, which is so vital to problem formulation.
- Maximum progress is when the principles and heir limitations are learned together within the context of engineering applications.

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

Unit – III

Centroids and Centers of Gravity: Introduction – Centroids and Centre of gravity of simple figures (from basic 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 of inertia - 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 - mass moment of inertia of composite bodies.

Unit – V

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

Kinetics of particles: Translation -Analysis as a Particle and Analysis as a Rigid Body in Translation – Equations of plane motion - Angular motion

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

Course outcomes:

- This capacity requires more than a mere knowledge of the physical and mathematical principles of mechanics
- Ability to visualize physical configurations in terms of real materials, actual

constraints ,and the practical limitations which govern the behavior of machines and structures

- Indeed, the construction of a meaningful mathematical model is often a more important experience than its solution

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II Year B.Tech MECH-I SEM

	L	T/P/D	C
(R18A0303) THERMODYNAMICS	**3**	**0**	**3**

Course Objectives:

- To understand the concepts of Energy in general and Heat and Work in particular
- To understand the fundamentals of quantification and grade of energy.
- To apply the concepts of thermodynamics to basic energy systems.
- Improvement of efficiency processes.

UNIT-I

INTRODUCTION:

Basic Concepts: System & Control volume, Property, State & Process, Exact & Inexact differentials, Work – Thermodynamic definition of work; examples, Displacement work, electrical, magnetic, gravitational, spring and shaft work: Point & Path functions. – Temperature, thermal equilibrium – Zeroth law, Temperature scales, constant volume gas thermometer; Definition of heat; heat and work interaction in systems – First law for cyclic and non – cyclic processes, various modes of energy, Demonstration energy is a property; Internal energy and Enthalpy - Steady Flow Energy Equation.

UNIT-II

Limitations of the First Law, second law, Definition of direct and reverse heat engines; Definitions of thermal efficiency and COP; Kelvin planck and Clausius statements; Definition of reversible process; Carnot cycle; Absolute temperature scale; Clausius Inequality**,** Entropy, Demonstration that entropy is a property; Principle of Entropy Increase; Irreversibility and availability, Availability functions for systems and control

volumes undergoing different processes, Lost work, Exergy balance equation and Exergy analysis.

UNIT-III

Definition of pure substance, Ideal gases and ideal gas mixtures, Real gases and real gas mixtures, compressibility charts – properties of two phase systems – constant temperature and constant pressure heating of water; definitions of saturated states; p-V-T- surface, Illustration of processes in T-S coordinates use of steam tables and R134a tables; saturation tables; superheated tables; Identification of states & determination of properties, Determination of entropy from steam tables Mollier charts.

UNIT-IV

Mixtures of perfect Gases: Mole fraction, mass fraction, Gravimetric and volumetric analysis –Daltons law of partial pressure - Evaluation of entropy for ideal gases and gas mixtures undergoing various processes Definition of isentropic efficiency for compressors, turbines and nozzles.

UNIT-V

Thermodynamic Cycles: Otto cycle, Diesel Cycle, and Dual Combustion cycle – Description and representation on P-v and T-S diagram, thermal efficiency. Basic Rankine cycle, Basic Brayton cycle; Basic Vapour compression cycle and comparison with Carnot cycle.

TEXT BOOKS:

1. Engineering Thermodynamics, Special Edition. MRCET, McGrahill Publishers.
2. Engineering Thermodynamics / PK Nag /TMH, III Edition
3. Thermodynamics – J.P.Holman / McGrawHill

REFERENCE BOOKS:

1. Engineering Thermodynamics – Jones & Dugan
2. Thermodynamics – An Engineering Approach – Yunus Cengel & Boles /TMH
3. An introduction to Thermodynamics / YVC Rao / New Age
4. Engineering Thermodynamics – K. Ramakrishna / Anuradha Publisher

Course outcomes:

- Learner should be able to demonstrate understanding of basic concepts of thermodynamics.
- To differentiate between quality and quantity of energy, heat and work, enthalpy and entropy, etc.
- To Analyze basic power cycles, Apply the laws of thermodynamics to various real life systems .

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II Year B. Tech, ME-I Sem **L P C**

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(R18A0304) FLUID MECHANICS AND HYDRAULIC MACHINERY

Course Objectives:

- To understand fluid statics and fluid dynamics.
- To understand application of mass, momentum and energy equation in fluid flow.
- To learn various flow measurement techniques.

UNIT-I

Fluid Statics : Dimensions and units: physical properties of fluids- specific gravity, viscosity surface tension- vapor pressure and their influence on fluid motion- atmospheric gauge and vacuum pressure – measurement of pressure- Piezometer, U-tube and differential manometers.

Fluid Kinematics : Stream line, path line and streak lines and stream tube, classification of flows-steady & unsteady, uniform, non uniform, laminar, turbulent, rotational, and irrotational flows-equation of continuity for one dimensional flow.

UNIT-II

Fluid dynamics : Surface and body forces –Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend Closed conduit flow: Reynold's experiment- Darcy Weisbach equation- Minor losses in pipes- pipes in series and pipes in parallel- total energy line-hydraulic gradient line. Measurement of flow: pitot tube, venturimeter, and orifice meter, Flow nozzle.

UNIT-III

Basics of Turbo Machinery : Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency, flow over radial vanes.

Hydroelectric power stations : Elements of hydro electric power station-types.

UNIT-IV

Hydraulic Turbines : Classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies , hydraulic design –draft tube theory: functions and efficiency. Performance of hydraulic turbines : Geometric similarity, Unit and specific quantities, Specific speed of turbine, characteristic curves, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer.

UNIT-V

Centrifugal Pumps: Classification, working, work done – manomertic head- losses and efficiencies specific speed- pumps in series and parallel-performance characteristic curves, NPSH.

Reciprocating Pumps : Working, Discharge, slip, indicator diagrams.

TEXT BOOKS:

1. Hydraulics, fluid mechanics and Hydraulic machinery MODI and SETH.
2. Fluid Mechanics and Hydraulic Machines by Rajput.
3. Fluid Mechanics and Machinery by D. Rama Durgaiah, New Age International

REFERENCE BOOKS:

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria & Sons.
2. Hydraulic Machines by Banga & Sharma, Khanna Publishers.
3. Instrumentation for Engineering Measurements by James W. Dally, William E. Riley , Wiley & Sons Inc. 2004 (Chapter 12 – Fluid Flow Measurements).

Course OUTCOMES:

- Student will be able to understand properties of fluids and classification of flows.
- Formulate and solve equations of the control volume for fluid flow systems, calculate resistance to flow of incompressible fluids through closed conduits and over surfaces.
- Apply fundamentals of compressible fluid flows to relevant syste

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II Year B. Tech, ME-I Sem

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(R18A0305) MATERIALS ENGINEERING

Course Objectives:

- To understand various mechanical properties of materials.
- To understand how and why the properties of materials are controlled by its structure at the microscopic and macroscopic levels.
- To understand how and why the structure and composition of a material may be controlled by processing.

UNIT-I

Structure of Materials : Structure of atom – Atomic models – Bonding in solids – Bonding forces and energies – Ionic, Covalent, metallic and van der Waals Bond - Crystal structure - Unit Cell – Bravais lattice – BCC – FCC – HCP - Interstitial sites – NaCl crystal – CsCl crystal – Perovskite structure – Diamond structure – Graphite – Crystal directions and planes.

UNIT-II

Structure of Metals and Alloys - Imperfection in crystals – Point defects – Dislocations – Slip plane – Movement of dislocations – Planar defects and grain boundaries – solid solutions – Hume Rothery rule – Phase diagram – Lever rule – Gibb's phase rule – Phase diagram for binary alloys – Eutectic – Peritectic – Eutectoid – Zone refining.

UNIT-III

Heat Treatment Methods: Annealing, hardening, tempering, normalizing, surface hardening

Ferrous and Non Ferrous Alloys: Allotropy and phase change of pure iron – Classification of steels and cast iron – iron – carbon equilibrium diagram – Microstructure of iron and steel - Ferrous alloys and their applications –Heat treatment - Factors affecting conductivity of a metal – Electrical Resistivity in alloys – Thermal conductivity of metals and alloys – Silver, Copper and aluminum – High Resistivity alloys – nichrome, manganin, constantan and kanthal and their composition and applications – Super hard materials - Tungsten carbide and Boron nitrides.

UNIT-IV

Ceramic and Composite Materials : Advanced Ceramic Materials - Crystal Structures - Silicate Ceramics - Glasses – Glass Ceramics – Functional properties and applications of ceramic materials – Classification of composites - Fiber reinforced materials – Law of mixtures – Continuous fibers – discontinuous fibers – Particle-reinforced materials – Cermets – Dispersion strengthened materials – Laminates - Application of composites in electrical and mechanical components – nuclear industry.

UNIT-V

Polymer Materials: Classification of polymer – Mechanisms of polymerisation - Some commercially important individual polymer – Thermoplastics - Elastomers – Thermosets – Engineering plastics - Liquid crystal polymers - Conductive polymers – High Performance fibers - Biomedical applications – Photonic polymers.

TEXT BOOKS:

1. Material Science by Dr. Kodgire, Everest publications,Pune.
2. V.Raghavan, Material Science and Engineering, Prentice –Hall of India Pvt. Ltd., 2007
3. Sidney H. Avner, Introduction to physical metallurgy, Tata Mc-Graw-Hill, Inc. 1997.

REFERENCE BOOKS:

1. Donald R. Askeland, Pradeep P. Phule, The Science and Engineering of Materials 4th Edition,Thomson/Brooks/Cole,2003.
2. William F.Smith, Structural Properties of Engineering Alloys, Tata Mc-Graw-Hill, Inc., 1993.

3. Kingery. W.D., Bowen H.K. and Uhlmann D.R., Introduction to Ceramics, 2nd Edition,
John Wiley & Sons, New York, 1976.

Course OUTCOMES:

- Acquire knowledge and hands-on competence in applying the concepts of material science in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering.
- Identify, analysis, and solve mechanical engineering problems useful to the society

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II Year B. Tech, ME-ISem

(R18A0306) MACHINE DRAWING

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Course Objectives:

- To visualize an object and convert it into a drawing.
- To gain knowledge of conventional representation of various machining and mechanical details as per IS.
- To understand the design a system ,component or process to meet desired needs within, realistic constraints such as economic, environmental, safety &sustainability etc.., to represent a part drawing and assembly drawings.

MACHINE DRAWING CONVENTIONS:

1.Need for drawing conventions –Introduction to IS conventions.
2. Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears.
3. Methods of dimensioning, general rules for sizes and placement of dimensions for holes, canters curved and tapered features.
4.Title boxes, their size, location and details -common abbreviations & their liberal usage
5.Types of Drawings –working drawings for machine parts.

I. DRAWING OF MACHINE ELEMENTS AND SIMPLE PARTS:
Selection of Views, additional views for the following machine elements and parts with everydrawing proportion.
a) Screwed fasteners: Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.
b) Keys, Cottersand Pin joints:
i)Saddle keys, sunk keys
ii)Cotter joint with sleeve, cotter joint with socket &spigot ends, cotter joint with a gib.
iii)knuckle joint
c) Riveted joints for plates
d) Shaft couplings:
i)Rigid couplings-sleeve or muff couplings, Flanged couplings
ii)Flexible couplings-Bushed pin type flanged coupling, compression coupling
iii)Dis-engaging couplings-claw coupling, cone coupling
iv)Non-Aligned couplings-Universal coupling(Hooke's Joint),Oldham coupling, cushion coupling&spigot and socket pipe joint.
e) Journal, pivot and collar and foot step bearings.

II. ASSEMBLY DRAWINGS:
Drawings of assembled views for the part drawings ofthe following using conventions and easydrawing proportions.
a) Engine parts –stuffing box, cross head, Eccentric, Petrol Engine connecting rod.
b) Other machine parts -Screws jack, Machine Vice, Plummer block, Tailstock.
c) Valves:spring loaded safety valve, feed check valve .
NOTE: First angle projection to be adopted. The student should be able to provide working drawings of actual parts.

TEXT BOOKS:
1. Machine Drawing –K.L.Narayana, P.Kannaiah&K.VenkataReddy / New Age/ Publishers
2. Machine Drawing –Dhawan, S.Chand Publications
3. Machine Drawing By Siddeswar.N&Kannaiah.P and V.V.S Sastry.
REFERENCE BOOKS:
1. Machine Drawing –P.S.Gill.
2. Machine Drawing –Luzzader
3. Machine Drawing –Rajput

Course OUTCOMES:
- Student will be able to understand different types of fasteners and draft various types of joints, locking arrangements.
- Draw details and assembly of mechanical systems, Read and interpret a given drawing
- Create 2-D and 3-D models using any standard CAD software with manufacturing considerations

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-I Sem

L	T/P/D	C
3	0	3

(R18A0307) KINEMATICS OF MACHINERY

Course Objectives:

- To understand the kinematics and rigid- body dynamics of kinematically driven machine
  Components
- To understand the motion of linked mechanisms in terms of the displacement, velocity
  And acceleration at any point in a rigid link
- To be able to design some linkage mechanisms and cam systems to generate specified
  Output motion

- To understand the kinematics of gear trains

UNIT-I

Classification of mechanisms- Basic kinematic concepts and definitions- Degree of freedom, mobility- Grashof's law, Kinematic inversions of four bar chain and slider crank chains- Limit positions- Mechanical advantage- Transmission angle- Description of some common mechanisms- Quick Return Motion Mechanism, straight line generators- Universal Joint- Rocker mechanism

UNIT- II

Displacement, velocity and acceleration analysis of simple mechanisms, graphical velocity analysis using instantaneous centers, velocity and acceleration analysis using loop closure equations- kinematic analysis of simple mechanis

UNIT- III

Classification of cams and followers- Terminology and definitions- Displacement diagrams- Uniform velocity, parabolic, simple harmonic and cycloidal motions- derivatives of follower motions- specified contour cams- circular and tangent cams- disc cam profile synthesis for roller and flat face followers**.**

UNIT - IV

Involute and cycloidal gear profiles, gear parameters, fundamental law of gearing and conjugate action, spur gear contact ratio and interference/undercutting- helical, bevel, worm, rack & pinion gears, epicyclic and regular gear train kinematics

UNIT -V

Surface contacts- sliding and rolling friction- friction drives- bearings and lubrication friction clutches- belt and rope drives- friction in brakes

Course Outcomes:

- After completing this course, the students can design various types of linkage mechanisms for obtaining specific motion and analyse them for optimal functioning

Text Books:

1. Thomas Bevan, Theory of Machines, 3rd edition, CBS Publishers & Distributors, 2005.

2. CleghornW.L. , Mechanisms of Machines, Oxford University Press, 2005.

3. Theory of Machines ,R.S.Khurmi&J.K.Guptha

Reference Books:

1. Robert L. Norton, Kinematics and Dynamics of Machinery, Tata McGrawHill, 2009.

2. Ghosh A. and Mallick A.K, Affiliated East-West Pvt. Ltd, New Delhi, 1988.

3. Theory of Machines, S.S.Rattan

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ME - II Sem

L	P	C
0	3	1.5

(R18A0381) FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

Course Objectives:

- Student able to learn about different measuring devices, working Principles and their performances
- To calculate c_d, c_c, c_v and Coefficient of impact of various hydraulic systems
- Student able to learn about different characteristics of Turbines.

List of Experiments

1. Impact of jets on Vanes.
2. Performance Test on Pelton Wheel.

3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Performance Test on Single Stage Centrifugal Pump.
6. Performance Test on Multi Stage Centrifugal Pump.
7. Performance Test on Reciprocating Pump.
8. Calibration of Venturimeter.
9. Calibration of Orifice meter.
10. Determination of friction factor and loss of head for a given pipe line.
11. Bernoulli's theorem apparatus.

Note: Total 10 experiments are to be conducted.

Course OUTCOMES:

- Students exposure to study various operating characteristics of Centrifugal pump and Reciprocating pump.
- Students exposure to study various operating characteristics of Kaplan, Francis and Pelton Wheel Turbines.
- Get Exposure to verification of Bernoulli's Theorem.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ME - I Sem

L	P	C
0	3	1.5

(R18A0382) MATERIALS ENGINEERING LAB

Course Objectives:

- This course deals with composition of metals, mechanical properties depending upon their micro structure
- Heat treatment methods and their effect on micro structure of materials.
- Able to know about Micro Structure of pure metals

(A) METALLURGY LAB:

1. Preparation of specimen by mounting powder
2. Microstructural study of pure metals Cu and Al.
3. Microstructural study of Microstructure of Low carbon, Medium carbon & High carbon steels.

4. Microstructural study of Cast Iron (Grey cast Iron & White cast Iron).
5. Microstructural study of Non-Ferrous Metals.
6. Microstructural study of Non-Ferrous alloys.
7. Microstructural study of Heat treated steels.
8. Hardenability of steels by Jominy End Quench Test.
9. To find out the hardness of various treated and untreated steels.
10. Study of the Composite Material with the help of UTM.
11. Study of Microstructure of Composite Material subjected to Tensile testing.
12. Join the sheets using Ultrasonic Joining process.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ME - I Sem

L	P	C
2	0	0

(R18A0014) Environmental Science

Course OUTCOMES:

1. Determine the Natural resources on which the structure of development is raised for sustainability of the society through equitable maintenance of natural resources.
2. Illustrate about biodiversity that raises an appreciation and deeper understanding of species, ecosystems and also the interconnectedness of the living world and thereby avoids the mismanagement, misuse and destruction of biodiversity.
3. Summarize a methodology for identification, assessment and quantification of global environmental issues in order to create awareness about the international conventions for mitigating global environmental problems.

4. Sustainable development that aims to meet raising human needs of the present and future generations through preserving the environment.
5. Outline green environmental issue provides an opportunity to overcome the current global environmental issues by implementing modern techniques like CDM, green building, green computing etc.

UNIT-I

ECOSYSTEM: introduction, definition:Scope and Importance of environmental studies. Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Biogeochemical cycles, Bioaccumulation, Biomagnifications.

UNIT-II

NATURAL RESOURCES: Classification of Resources, water resources: us eand over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Forest resources, Energy resources: renewable and non renewable energy sources.

UNIT-III

BIODIVERSITY: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife: co-existence and conflicts; conservation of biodiversity: InSitu and Ex-situ conservation.

UNIT-IV

ENVIRONMENTAL POLLUTION: Environmental Pollution: Air Pollution: types of pollutants. Water pollution: Sources and types of pollution, Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and
Health hazards, standards, composition and characteristics of e-Waste and its management. Global Environmental Problems: Ozone depletion and Ozone depleting substances (ODS).

UNIT-V

ENVIRONMENTAL POLICY & LEGISLATION: International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol,Legal aspects Air Act-1981,Water Act, Forest Act, Wild life Act, Towards Sustainable Future: Concept of Sustainable Development, Environmental Education, urbanization ,Urban Sprawl. Concept of Green Building.

TEXT BOOKS:

1.Erach Bharucha (2005)., Textbook of Environmental Studies for Undergraduate Courses, Hyderabad, Universities Press.

REFERENCE BOOKS:

1.Anubha Kaushik(2006).,Perspectives in Environmental Science, 3rd Edition, New Delhi, New age international.
2.Textbook of Environmental Studies by OVK Reddy

COURSE OUCOMES:

Upon successful completion of the course, the student should be familiar with and be able to:

1.Explain the natural resources and their management.
2.Understanding the Classification and functioning of Ecosystems.
3. Remembering the Importance of biodiversity and its conservation.
4. Understanding the problems related to environmental pollution and management.
5. Apply the role of information technology, Analyze social issues and Acts associated with Environment.

MALLAREDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

L	P	C
3	0	3

(R18A0308) APPLIED THERMODYNAMICS

Course Objectives:

- To learn about of I law for reacting systems and heating value of fuels
- To learn about gas and vapor cycles and their first law and second law efficiencies
- To understand about the properties of dry and wet air and the principles of psychrometry
- To learn about gas dynamics of air flow and steam through nozzles
- To learn the about reciprocating compressors with and without inter cooling
- To analyze the performance of steam turbines

UNIT-I

Introduction to solid, liquid and gaseous fuels – Stoichiometry, exhaust gas analysis- First law analysis of combustion reactions- Heat calculations using enthalpy tables- Adiabatic flame temperature- Chemical equilibrium and equilibrium composition calculations using free energy.

Rankine cycle with superheat, reheat and regeneration, Classification of boilers, Accessories and mountings, Draught systems

UNIT-II

Basics of compressible flow. Stagnation properties, Isentropic flow of a perfect gas through a nozzle, choked flow, subsonic and supersonic flows- normal shocksFlow of steam through nozzle, super saturation- compressible flow in diffusers, efficiency of nozzle and diffuser.

Steam Turbines: classifications , working principles of Impulse and Reaction turbines, Degree of reaction. Analysis of steam turbines, velocity and pressure compounding of steam turbines

UNIT-III

Reciprocating compressors, staging of reciprocating compressors, optimal stage pressure ratio, effect of inter cooling, minimum work for multistage reciprocating compressors.

Rotary compressors: classifications, working principles of axial, centrifugal, roots, vanes, and Lyshlom blowers.

Condensers: classifications , working principles of jet and surface condensers.

UNIT -IV

Gas Turbines :Brayton cycle, effect of reheat, regeneration and inter cooling-closed and semi closed cycles-merits and demerits-combustion chambers of Gas turbines.

Jetpropulsion and Rocet engines: principle of operation-classifications working principles-T-Sdiagrams-thurst power and propulsion efficiency.

UNIT-V

Pschyrometry : Properties of dry and wet air, use of pschyrometric chart, processes involving heating/cooling and humidification/dehumidification, dew point, refrigerants and their properties. Vapor compression refrigeration cycles, Bell Column cycle Vapor Compression Refrigeration ,and Vapor Absorption Refrigeration systems.

Course Outcomes:

- After completing this course, the students will get a good understanding of various practical power cycles and heat pump cycles.
- They will be able to analyze energy conversion in various thermal devices such ascombustors, air coolers, nozzles, diffusers, steam turbines and reciprocating compressors
- They will be able to understand phenomena occurring in high speed compressible flows

Text Books :

1.Sonntag, R. E, Borgnakke, C. and Van Wylen, G. J., 2003, 6th Edition, Fundamentals of Thermodynamics, John Wiley and Sons.

2. Jones, J. B. and Duggan, R. E., 1996, Engineering Thermodynamics, Prentice-Hall of India

Reference Books :

1. Moran, M. J. and Shapiro, H. N., 1999, Fundamentals of Engineering Thermodynamics, John Wiley and Sons.
2. Nag, P.K, 1995, Engineering Thermodynamics, Tata McGraw-Hill Publishing Co. Ltd

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ,ME-I Sem

L	T/P/D	C
3	0	3

(R18A0309) STRENGTH OF MATERIALS

Course Objectives:

- The objective of this subject is to provide the basic concepts of mechanical behavior of the different materials
- Student able to know about different loads.
- Student able to learn about different stresses and strains.

UNIT-I

Simple Stresses & Strains : Elasticity and plasticity – Types of stresses & strains–Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio & volumetric strain – Elastic moduli & the relationship between

them – Bars of varying section – composite bars – Temperature stresses. Strain energy – Resilience – Gradual, sudden, impact and shock loadings.

UNIT-II

Shear Force and Bending Moment Diagrams: Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, u.d.l., uniformly varying loads and combination of these loads – Point of contra flexure.

UNIT-III

Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/y = E/R Neutral axis – Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I,T,Angle and Channel sections.

Shear Stresses: Derivation of formula – Shear stress distribution across various beams sections like rectangular, circular, triangular, I, T angle sections.

UNIT-IV

Analysis of Pin-Jointed Plane Frames : Determination of Forces in members of plane, pin jointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever & simply–supported trusses-by method of joints, method of sections

Deflection of Beams: Bending into a circular arc – slope, deflection and radius of curvature –Differential equation for the elastic line of a beam – Double integration and Macaulay's methods –Determination of slope and deflection for cantilever and simply supported beams subjected to point loads,- U.D.L uniformly varying load. Mohr's theorems.

UNIT-V

Torsion of Circular Shafts: Theory of pure torsion, Derivation of torsion equations: T/J=q/r=Nθ/L- Assumptions made in theory of pure torsion-Torsional moment of resistance – Polar section modulus – Power transmitted by shafts

Thin Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders.

TEXT BOOKS:

1.Strength of Materials by R.K. Bansal ,Laxmi Publications 2010.
2. Strength of materials by Sadhu Singh.Khanna Publications.
3. Strength of Materials by S.Timshenko

REFERENCE BOOKS:

1. Strength of Materials -By Jindal, Umesh Publications.
2. Strength of materials by Bhavikatti, Lakshmi publications.
3. Mechanics of Structures Vol-III, by S.B.Junnarkar.

Course OUTCOMES:

- The student shall be able utilize the mechanics of solids in day –to -day life for design
- simple structures and for other limited applications

. Student gets the exposure of SFD and BMD.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

L	T/P/D	C
2	1	3

(R18A0310) DYNAMICS OF MACHINERY

Course Objectives:

- The objective of this subject is to provide basic concepts of links and their relative motion and forces in different mechanisms.
- Able to learn about Static and Dynamic Force Analysis of Planar Mechanisms.
- Able to learn about Clutches ,Brakes and Dynamometers .

UNIT-I

Precession: Gyroscopes, effect of precession motion on the stability of moving vehicles such as motor car, motor cycle, aero planes and ships.

UNIT-II

Static and Dynamic Force Analysis of Planar Mechanisms: Introduction -Free Body Diagrams – Conditions for equilibrium – Two, Three and Four Members – Inertia forces and D'Alembert's Principle – planar rotation about a fixed centre.

Friction in Machine Elements: Inclined plane-Friction of screw and nuts – Pivot and collars-uniform pressure, uniform wear-friction circle and friction axis: lubricated surfaces-boundary friction-film lubrication.

UNIT–III

Clutches: Friction clutches- Single Disc or plate clutch, Multiple Disc Clutch, Cone Clutch, Centrifugal Clutch.

Brakes and Dynamometers: Simple block brakes, internal expanding brake, band brake of vehicle. Dynamometers – absorption and transmission types. General description and methods of operations.

Turning Moment Diagram and Fly Wheels: Turning moment – Inertia Torque connecting rod angular velocity and acceleration, crank effort and torque diagrams – Fluctuation of energy – Fly wheels and their design.

UNIT–IV

Balancing: Balancing of rotating masses Single and multiple – single and different planes. Balancing of Reciprocating Masses- Primary, Secondary, and higher balancing of reciprocating masses. Analytical and graphical methods. Unbalanced forces and couples – examination of 'V' multi cylinder in line and radial engines for primary and secondary balancing, locomotive balancing.

Vibration: Free Vibration of mass attached to vertical spring – Simple problems on forced damped vibration, Vibration Isolation & Transmissibility Whirling of shafts, critical speeds, torsional vibrations, two and three rotor systems.

UNIT–V

Governers : Watt, Porter and Proell governors. Spring loaded governors – Hartnell and hartung with auxiliary springs. Sensitiveness, isochronism and hunting.

TEXT BOOKS:

1. Theory of Machines / Thomas Bevan / CBS Publishers
2. Theory of Machines / Jagadish Lal & J.M.Shah / Metropolitan.
3. Theory of machines / Khurmi/S.Chand Publications

REFERENCE BOOKS:

1. Theory of Machines / Shiegly / MGH Publishers
2. Mechanism and Machine Theory / JS Rao and RV Dukkipati / New Age International Publishers
3. Theory of Machines / S.S Ratan/ Mc. Graw Hill Publi*sh*ers

Course OUTCOMES:

- The student will learn about the kinematics and dynamic analysis of machine elements
- Student gets the exposure of linkages, cams, and gears, within the general machine design context
- Student gets the exposure of different governors.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem	**L**	**T/P/D**	**C**
(R18A0311) MANUFACTURING PROCESSES	**3**	**0**	**3**

Course Objectives:

To motivate and challenge students to understand and develop an appreciation of the processes in correlation with material properties which change the shape, size and form of the raw materials into the desirable product by conventional or unconventional manufacturing methods

UNIT-I:

Conventional Manufacturing processes: Casting and moulding: Metal casting processes and equipment, Heat transfer and solidification, shrinkage, riser design, casting defects and residual stresses.

Introduction to bulk and sheet metal forming, plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk forming(forging, rolling, extrusion, drawing) and sheet forming (shearing, deep drawing, bending) principles of powder metallurgy

UNIT-II:

Metal cutting: Single and multi-point cutting; Orthogonal cutting, various force components: Chip formation, Tool wear and tool life, Surface finish and integrity, Machinability, Cutting tool materials, Cutting fluids, Coating; Turning, Drilling, Milling and finishing processes

UNIT-III:

Introduction to CNC machining, Joining/fastening processes, Physics of welding, brazing and soldering; design considerations in welding, Solid and liquid state joining processes; Adhesive bonding.

UNIT-IV:

Unconventional Machining Processes: Abrasive Jet Machining, Water Jet Machining, Abrasive Water Jet Machining, Ultrasonic Machining, principles and process parameters

Electrical Discharge Machining, principle and processes parameters, MRR, surface finish, tool wear, dielectric, power and control circuits, wire EDM; Electro-chemical machining (ECM), etchant & maskant, process parameters, MRR and surface finish.

Laser Beam Machining (LBM), Plasma Arc Machining (PAM) and Electron Beam Machining

UNIT-V:

Additive manufacturing: Introduction to Prototyping, Traditional Prototyping vs Rapid Prototyping (RP), Classification of Rapid Manufacturing Processes, material and technological aspects, applications, limitations and comparison of various manufacturing processes.

Photo polymerization (stereolithography (SL)), Powder Bed Fusion (Selective Laser Sintering, SLS), Electron Beam Melting (EBM), Fused Deposition Modeling (FDM), 3D Printing, Laminated Object Manufacturing (LOM), Laser Engineered Net Shaping (LENS) and Direct Metal Deposition (DMD).

Course Outcomes:

Upon completion of this course, students will be able to understand the different conventional and unconventional manufacturing methods employed for making different products

Text Books:

1. Kalpakjian and Schmid, Manufacturing processes for engineering materials (5th Edition)-

Pearson India, 2014

2. Mikell P. Groover, Fundamentals of Modern Manufacturing: Materials, Processes, and

Systems

3. Degarmo, Black &Kohser, Materials and Processes in Manufacturing

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

L	T/P/D	C
2	1	3

(R18A0024) Probability and statistics

Course 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: **Complex Functions, Differentiation and Integration**

Complex functions and its representation on Argand plane, Concepts of limit Continuity, Differentiability, Analyticity, Cauchy-Riemann conditions, Harmonic functions, Milne-Thompson method. Cauchy's integral theorem - Cauchy's integral formula - Generalized integral formula.

UNIT – II: Power series expansions of complex functions and contour Integration

Radius of convergence - Expansion in Taylor's series, Maclaurin's series and Laurent series (without proof). Singular point - Isolated singular point - pole of order m - essential singularity. Residue, Evaluation of residue by formula and by Laurent series, Residue theorem, Bilinear transformation.

UNIT – III: Random Variables and Probability Distributions

Random variables - Discrete and Continuous. Probability distribution function, mass function and density function of probability distribution.

Binomial distribution - properties, mean and variance, Poisson distribution - properties, mean and variance and Normal distribution - properties, mean and variance

UNIT –IV: Sampling Distributions and Statistical Inferences

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.

Large sample Tests: Test of significance - Large sample test for single mean, difference of means, single proportion, difference of proportions.

Unit-V: Small samples

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.

Suggested Text/Reference Books

i)B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.

ii) Engineering Mathematics – III by T.K.V Iyenger, B.Krishna Gandhi and Others, S Chand Publishers.

iii) Probability and Statistics by T.K.V Iyenger ,B.Krishna Gandhi and Others, S Chand Publishers.

iv) Fundamental of Statistics by S.C. Gupta ,7^{th} Edition,2016.

Course Outcomes:

The students will learn:

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 ME - II Sem	**L**	**P**	**C**
(R18A0383) STRENGTH OF MATERIALS LAB	**0**	**3**	**1.5**

Course Objectives:

- Student able to learn about different Strengths
- It deals with the different tests of materials

List of Experiments

1. Tension test
2. Deflection test on Cantilever beam
3. Deflection test on simply supported beam
4. Torsion test
5. Spring test
6. Izod Impact test
7. Shear test
8. Tensile test on composite materials using UTM
9. Charpy impact test on metal specimen
10. Flexural strength of a beam
11. Fatigue Testing machine
12. Compressive Test on Cube

Course OUTCOMES:

- Students can understand different tension tests of different material.
- He can able to draw Stress Strain diagrams.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ME - II Sem

L	P	C
0	3	1.5

(R18A0384) Manufacturing Processes Lab

Course Objectives:

- Student Get Exposed to Different Types of Patterns in a Foundry Shop
- Students will do lap joint & but joint experiments in welding
- To learn the operation of hydraulic press

List of Experiments

1. METAL CASTING LAB :

1.1. Pattern Design and making - for one casting drawing.
1.2. Sand properties testing - Exercise -for strengths, and permeability – 1
1.3. Moulding Melting and Casting - 1 Exercise

2. WELDING LAB:

2.1 ARC Welding Lap & Butt Joint - 2 Exercises
2.2 Spot Welding - 1 Exercise
2.3. TIG Welding - 1 Exercise
2.4. Plasma welding and Brazing - 2 Exercises
(Water Plasma Device)

3. MECHANICAL PRESS WORKING :

3.1. Blanking & Piercing operation and study of simple, compound and progressive press tool.
3.2. Hydraulic Press: Deep drawing and extrusion operation.

4. PROCESSING OF PLASTICS

4.1. Injection Moulding
4.2. Blow Moulding

Note: Total 10 experiments are to be conducted.

Course OUTCOMES:

- Students Will get expertise in Plasma Arc Welding
- To learn and do various experiments in polymer processing machines
- Will get exposure to spot welding and their applications.

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	L	P	C
II Year B. Tech ME - II Sem	**2**	**0**	**0**

(R18A0005) GERMAN

(Mandatory Course)

TOPICS

UNIT 1 : BASICS OF DEUTSCH

1.1 INTRODUCTION

(GERMAN COUNTRY, LANGUAGE & CULTURE)

1.2 SALUTATIONS

1.3 ALPHABET

1.4 NUMBERS (0-30)

1.5 DAYS OF THE WEEK AND MONTHS OF THE YEAR

VOCABULARY

UNIT 2 : GETTING CLOSER WITH DEUTSCH

2.1 FAMILY

2.2 SEASONS & WEATHER

2.3 TIME, DIRECTIONS, COUNTRIES AND NATIONALITIES

2.4 COLOURS & SHAPES

2.5 SUBJECT PRONOUNS

VOCABULARY

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

VOCABULARY

UNIT 4 : GRAMMAR

4.1 NOUN

4.2 ADJECTIVE

4.3 VERBS

4.4 CONJUGATION

4.5 TIPS TO LEARN GERMAN SYSTEMATIC AND EASY VOCABULARY

UNIT 5 : ASSIGNMENTS - DIALOGUE WRITING

5.1 INTRODUCE ONESELF (REPEAT)

5.2 INTRODUCE OTHERS (FAMILY MEMBERS)

5.3 AT THE RESTAURANT

5.4 AT THE RAILWAY STATION

5.5 AT THE COLLEGE / UNIVERSITY

VERB CONJUGATION (SOLVED)

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.

SECTION-I

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]

OR

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)

SECTION-II

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?

OR

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 grow.
ii. A gentleman opens the door for a lady.
iii. He loves to read in the library.
iv. He slept.
v. He kept 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]

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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
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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 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 $\frac{\partial(x, y, z)}{\partial(u, v, w)}$. [7M]

b) Expand $x^2y + 3y - 2$ 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 $(D^2 - 2D + 1)y = x^2e^{3x} - \sin 2x + 3$. [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 $1\frac{1}{2}$

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 $\frac{5s-2}{s^2(s+2)(s-1)}$ [4M]

b) Find $L\{\int_0^t te^{-t}\sin 4t dt\}$ [6M]

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

OR

Q.NO: 10 a) Find the Laplace transform of $e^{3t} - 2e^{-2t} + \sin 2t + \cos 3t + \sinh t - 2\cosh 3t + 8$ [4M]

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

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

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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 $\frac{\partial(x,y)}{\partial(r,\theta)} \cdot \frac{\partial(r,\theta)}{\partial(x,y)} = 1$ [10M]

SECTION-III

Q. No. 5 a) Solve $\left(1+e^{\frac{x}{y}}\right)dx + e^{\frac{x}{y}}\left(1-\frac{x}{y}\right)dy = 0$ [7M]

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

OR

Q. No.6 Solve $(D^2+1)\ x = t\cos 2t$ 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 $y'' + 2y' - 3y = \sin t$ using laplace transform given that $y = \frac{dy}{dt} = 0$ when $t = 0$ [10M]

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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 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 A^4 [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 = a^3 [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 $x^2p^2 + xpq = z^2$ [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]

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 about the types of network elements. [7M]

b) Explain about the types of sources. [7M]

OR

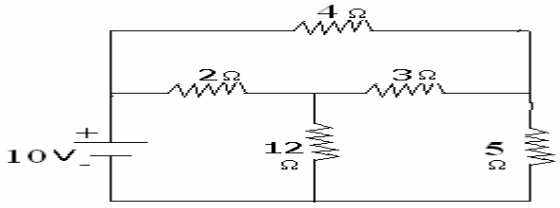
Q.NO: 2. a) State and explain Kirchhoff's laws with an example. [7M]

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]

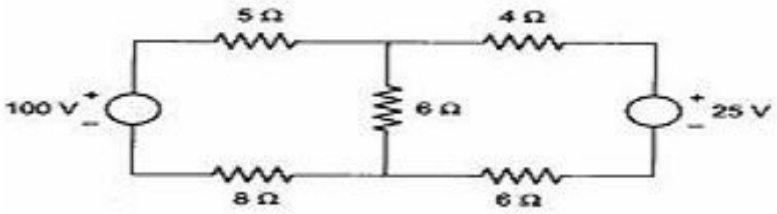


OR

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

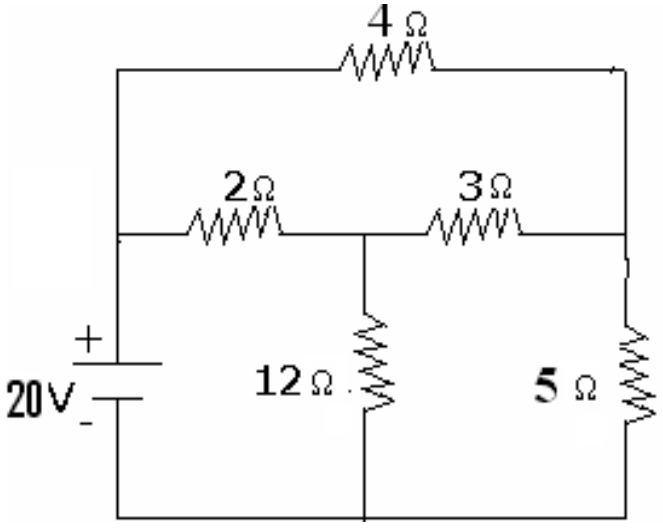
Q.NO: 2. a)Explain about passive elements in detail. [9M]

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]

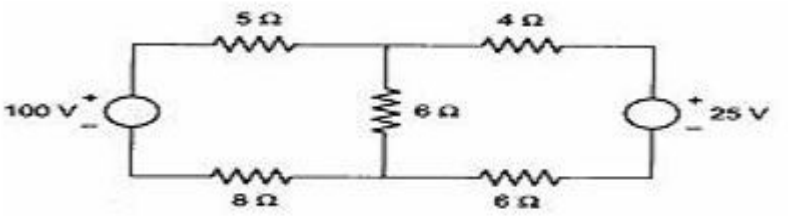
b) Find the current supplied by 10 V battery by using Star – Delta transformation for the following network. [7M]



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

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

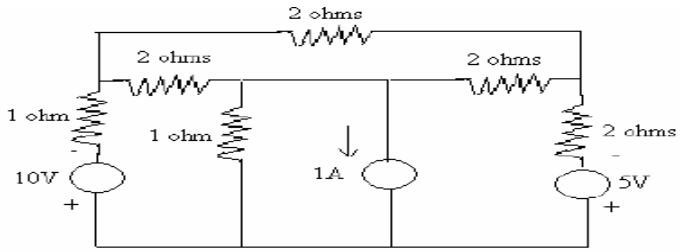
Q.NO: 1. a) Explain Active & Passive elements in detail. [7M]
b) Explain types of sources. [7M]

OR

Q.NO: 2. a) Explain about the source transformation technique. [7M]
b) Explain about resistor and derive necessary equations. [7M]

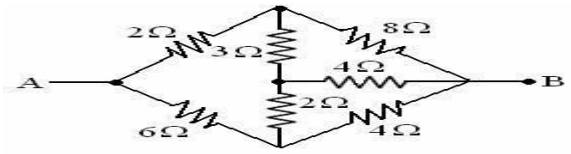
SECTION-II

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]

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 about the types of elements with an example. [7M]

b) Explain about the source transformation. [7M]

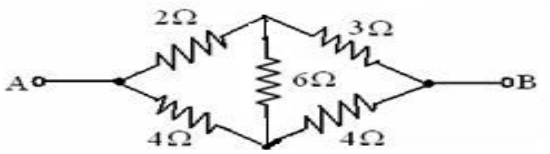
OR

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]

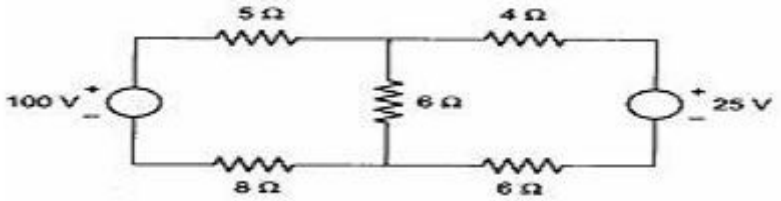
b) Determine the equivalent resistance across AB terminals. [7M]



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]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
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

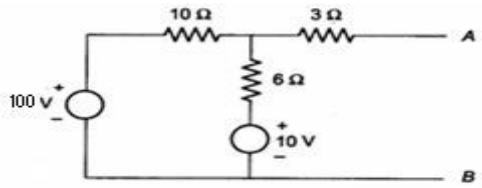
Q.NO: 3 .a) Explain about the mesh analysis with an example. [7M]

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]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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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 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
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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
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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

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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 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
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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

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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 $\int_0^\infty e^{-x^2}dx = \frac{\sqrt{\pi}}{2}$ 、

b) If m and n are +ve integers, then Prove that $\beta(m,n) = \frac{(m-1)!(n-1)!}{(m+n-1)!}$ [7+7M]

SECTION-IV

Q.NO: 7 a) Change the order of integration and evaluate $= \int_0^a \int_{x/a}^{\sqrt{x/a}} (x^2+y^2)\,dx\,dy$

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 $\int_0^1 \int_{x^2}^{2-x} xydxdy$ and hence evaluate the double integral.

b) Evaluate the integral by changing to polar co-ordinates $\int_0^a \int_0^{\sqrt{a^2-y^2}} (x^2+y^2)dx\,dy$ [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 $\int\int_s \bar{F}.\bar{n}ds$ where $\bar{F} = 2x^2y\bar{i} - y^2\bar{j} + 4xz^2\bar{k}$ 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

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SECTION-I

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]

OR

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]

SECTION-II

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]

OR

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]

SECTION-III

Q.NO: 5 a) Show that $\overline{|(n)} = \int_0^1 \left(\log 1/x\right)^{n-1} dx, n > 0$

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 $\int_0^1 x^m \left(\log x\right)^n dx = \frac{(-1)^n\, n!}{(m+1)^{n+1}}$

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 $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$

b)*Evaluate* $\int_0^{\pi/4}\int_0^{a\sin\theta} \frac{r\,dr\,d\theta}{\sqrt{a^2-r^2}}$ [7+7M]

SECTION-V

Q.NO: 9 a) If =(5xy-6x^2) $\bar{i}$ +(2y-4x) $\bar{j}$, evaluate $\int_C \bar{F}\cdot d\bar{r}$ along the curve C in xy-plane y=x^{3}from (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
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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

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 $2^{2n-1}\sqrt{(n)}\sqrt{\left(n+\frac{1}{2}\right)} = \sqrt{(2n)}.\sqrt{\pi}$

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 $x+y\le 1$ [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 $y = x^2$ [14M]

OR

Q.NO: 10 Verify stoke's theorem for $\overline{F} = (x^2-y^2)\bar{i}+2xy\,\bar{j}$ 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]

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) 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]

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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)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]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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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 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

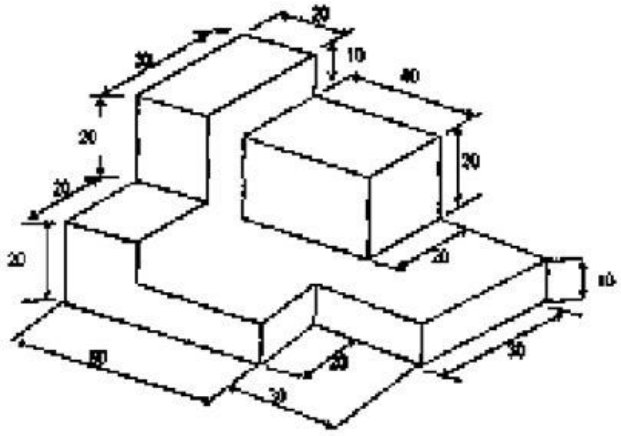
Q.NO: 7 Draw the isometric view of a hexagonal prism of base side 30 mm and axis 70mm. the prism is resting on its base on the H.P. with an edge of the base parallel to the V.P. [14 M]

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

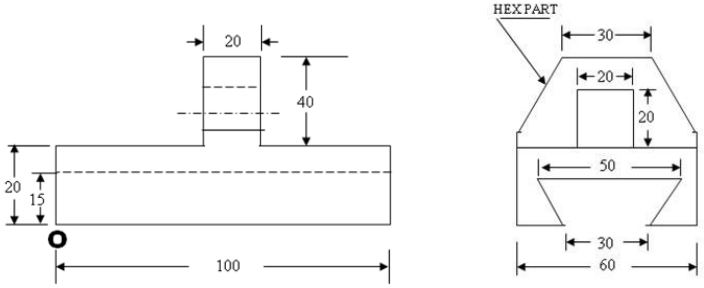
Q.NO: 9 Draw the orthographic projections for the pictorial view shown in figure All dimensions are in mm [14 M]



OR

Q.NO: 10 Draw the isometric view of the given orthographic projection of the object?

[14 M]



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

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 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. [14M]

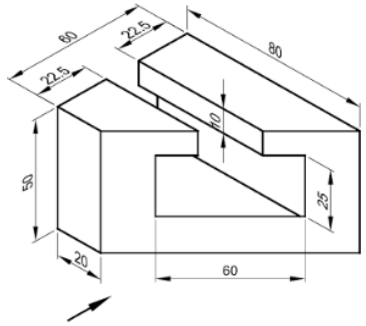
OR

Q.NO: 6 a) A hexagonal prism with side of base 25 mm and 50 mm long is resting on a comer of its base on HP. Draw the projections of the prism when its axis is making 30° with HP and parallel to VP. [8M]

b) Draw the projections of a right circular cone of base 40 mm diameter and height 60 mm when resting with its base on HP. [6M]

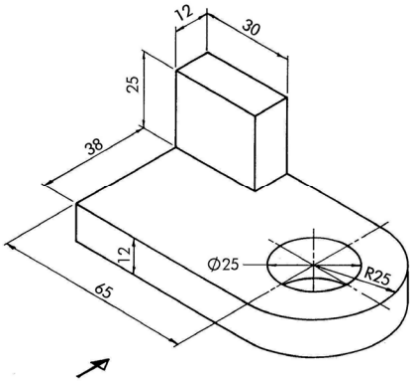
SECTION IV

Q.NO: 7 Using First Angle Projection, Draw the Orthographic Views of the object shown in below Figure. [14M]

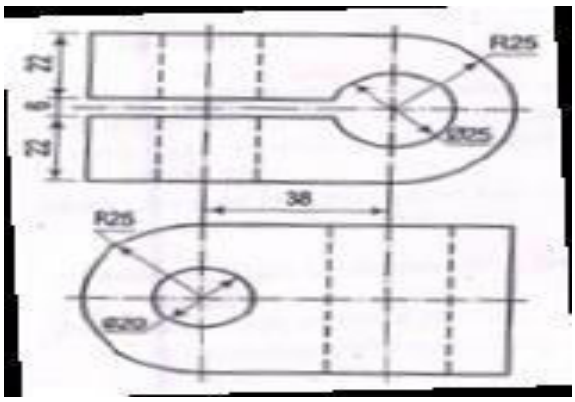


OR

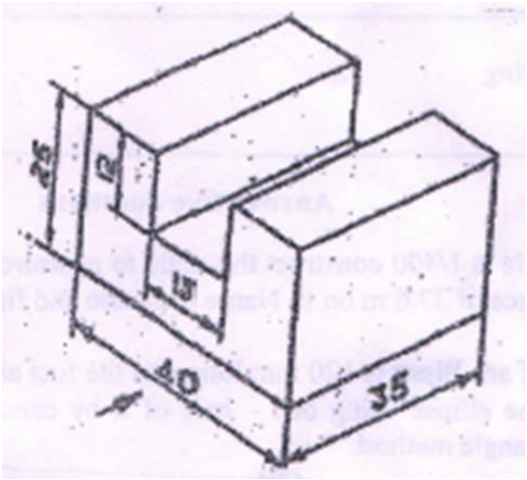
Q.NO: 8 Draw three views of the following component in first angle projection. Take all dimensions are in mm.



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 upto 8*m*. Show lengths of 4.3*m* and 6.2*m* on this scale. [7M]

(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. [7M]

OR

Q.NO 2 A circle of 50*mm* diameter rolls on the circumference of another circle of 175*mm* 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 125*mm* 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 35*mm* 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 30*mm* and height 70*mm* 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 30*mm* 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 40*mm* 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]

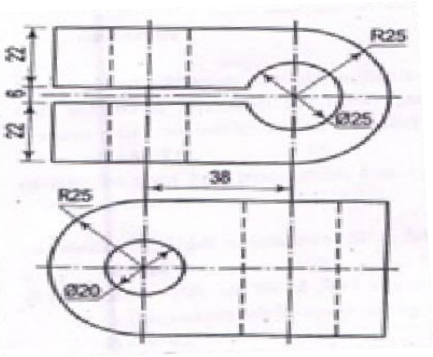

Figure 1

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

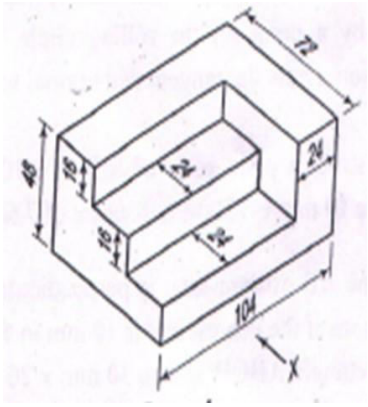

Figure 2

OR

Q.NO: 10 Draw the elevation, plan and side view of the picture shown in the Figure 3. [14M]

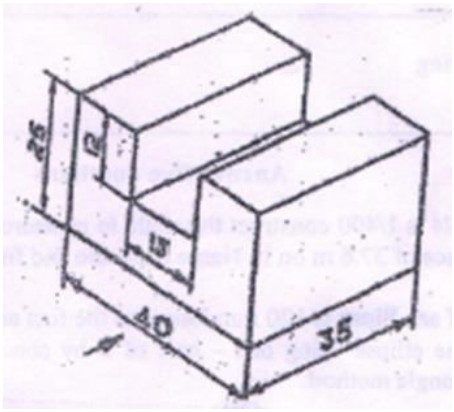

Figure 3

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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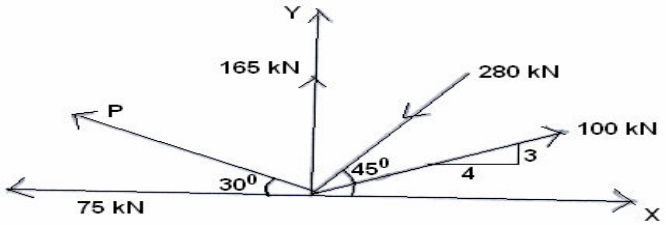
(R18A0302) Engineering Mechanics
MODEL PAPER 1

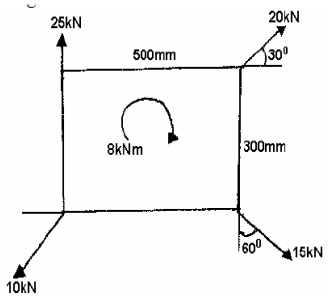
Answer the following Questions **Time: 3 hours** **70Marks**

SECTION I

1. a) State and prove parallelogram law of forces.
   b) Calculate the magnitude of "P" and the resultant of the force system shown in figure. The algebraic sum of horizontal components of all these forces is -325 kN.

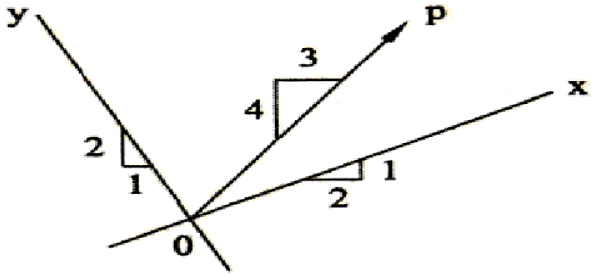


   c). Determine the magnitude, direction and position of the resultant of the system of forces as shown in figure.[2]



OR

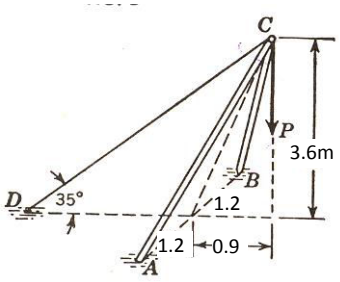
2. a) What do you mean by coplanar concurrent force system? Explain with suitable example.
   b) If the X component is as shown in figure of P is 893 N, determine P and its Y component.



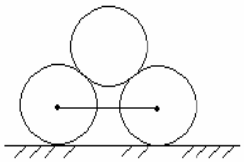
   c) State and prove Varignon's Theorem

SECTION II

3. a) Calculate the tension T in the guy wire CD and the compression S in each strut of the shear leg derrick shown in Fig. if the vertical load P = 100 kN [3]



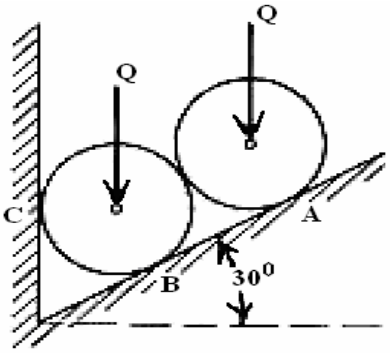
b) Two smooth cylinders of 3 m diameter and 100 N weight are separated by a chord of 4m long. They support another smooth cylinder of diameter 3m and 200N weight as shown in figure. Find the tension in the chord.[4]



c) Explain the principles of operation of a screw-jack with a neat sketch.

OR

4. a) Define free body diagram, Transmissibility of a force and resultant of a force.
   b) Two identical rollers, each of weight 100 N, are supported by an inclined plane and a vertical wall as shown in figure. Assuming smooth surfaces, find the reactions induced at the points of support A, B and C

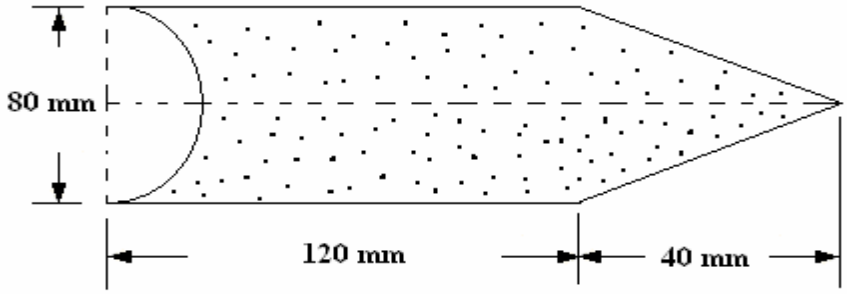


c) Outside diameter of a square threaded spindle of a screw Jack is 40mm. The screw pitch is 10mm. If the coefficient of friction between the screw and the nut is 0.15, neglecting friction between the nut and collar, determine

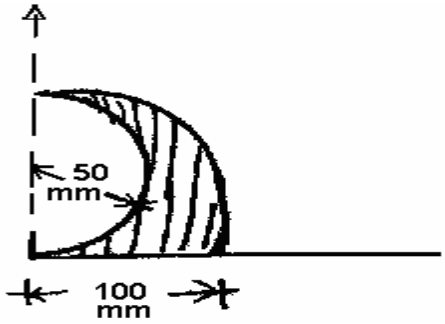
i) Force required to be applied at the screw to raise a load of 2000N
ii) The efficiency of screw jack
iii) Force required to be applied at pitch radius to lower the same load of 2000N and
iv) Efficiency while lowering the load.
v) What should be the pitch for the maximum efficiency of the screw? and
vi) What should be the value of the maximum efficiency

SECTION III

5. a) Find the Centroid of plane area shown in figure



b) Locate the centroid of the shaded area shown in figure

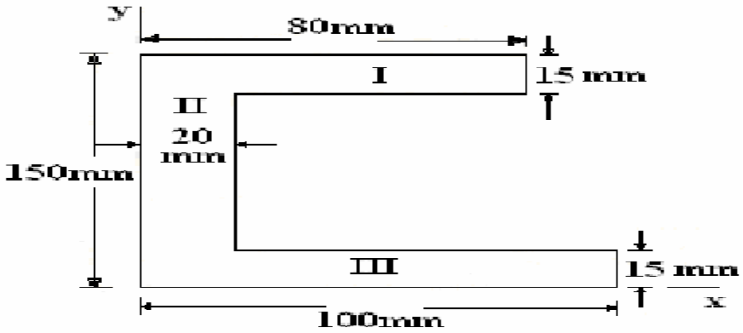


c) State and prove Pappus theorem

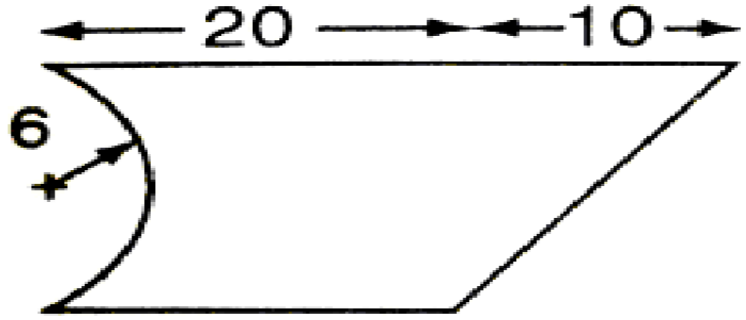
OR

6. a. Determine the Centroid of a parabolic spandrel $y = kx^n$

b. Find the centroid of the plane lamina shown in figure



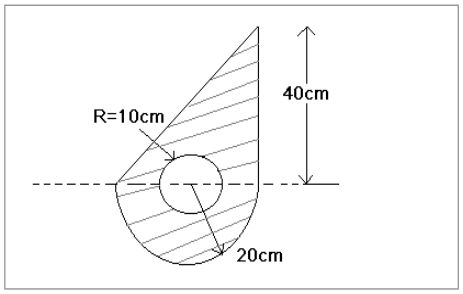
c) Locate the centroid as shown in figure (in mm)



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'.

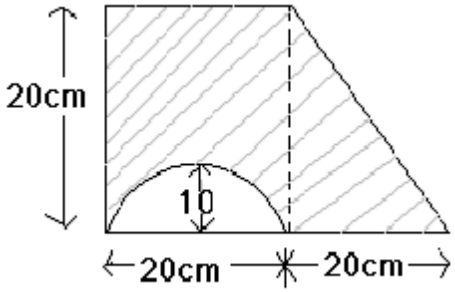
b**)** Find the moment of inertia about the horizontal centroidal axis



c. Derive the Expression for mass moment of Inertia of Sphere about diametrical axis

OR

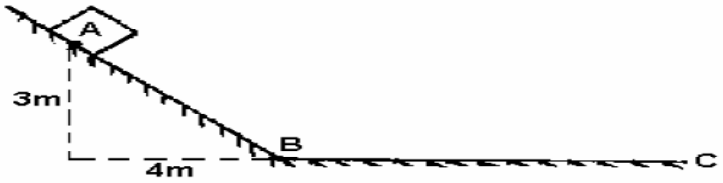
8. a) Define mass moment of inertia and explain Transfer formula for mass moment of inertia
   b.) Find the moment of inertia for the shaded area parallel to x – axis. As shown



b) Derive the expression of mass moment of inertia for a rectangular plate of dimensions Length= a, breadth =b, and thickness = t about the centroidal axis

SECTION IV

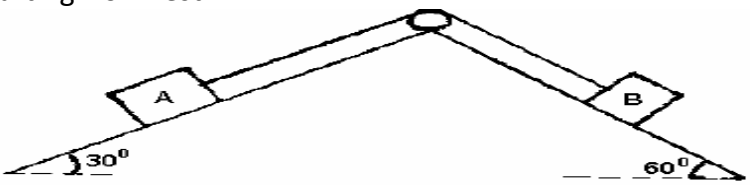
9. a) Derive equations of motion when the body is accelerated uniformly
   b) A small block starts from rest at point 'A' and slides down the inclined plane as shown in figure.
   What distance along the horizontal plane will it travel before coming to rest? The coefficient of
   kinetic friction between the block and plane is 0.3. The initial velocity with which it starts to move along BC is of the same magnitude as that gained in sliding from A to B



OR

10. a) A balloon is rising with a constant velocity of 5 m/s. A stone is released from within it with an upward velocity of 10 m/s relative to that of the balloon. Determine:
    i) When the stone will return to the balloon
    ii) The velocity of the stone when it returns to the balloon and
    iii) The distance moved by the balloon during this time.
    b) Explain the terms: i) Displacement ii) Velocity iii) Acceleration
    c) 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.



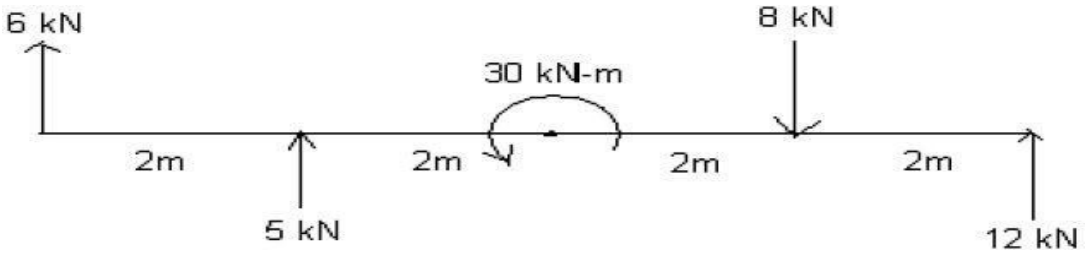
MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
(R18A0302) Engineering Mechanics
MODEL PAPER 2

Answer the following Questions **Time: 3 hours** **70Marks**

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

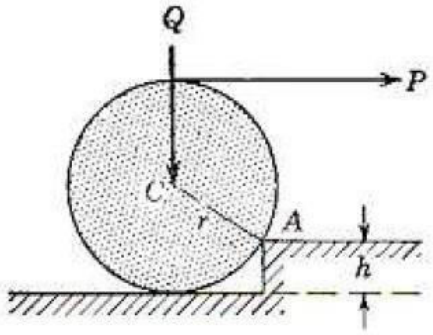
SECTION-I

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



O
R

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.{As shown in the Figure }



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

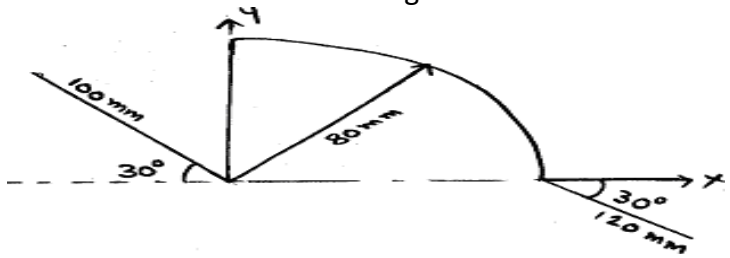
   c) Find the force that should be applied upward at an angle 30^{O} to the horizontal on the block of weight 100 N to cause impending sliding on a surface, the coefficient of friction between the surfaces being 0.3.

OR

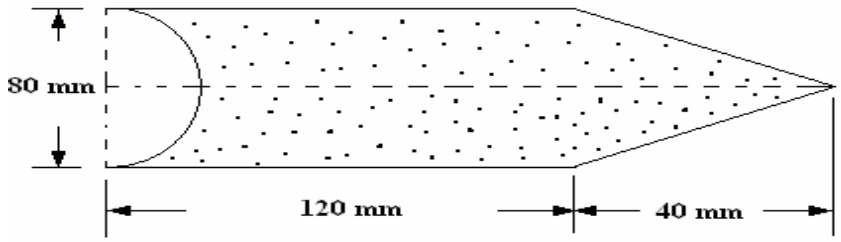
4. a)Explain about Screw jack? Differentiate between Screw Jack and Differential screw Jack?
   b) Find the maximum power transmitted and initial tension in a flat belt 8 mm thick and 100 mm wide. The belt transmits power between two pulleys running at 31.67 m/s. The angle of lap of smaller pulley is 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



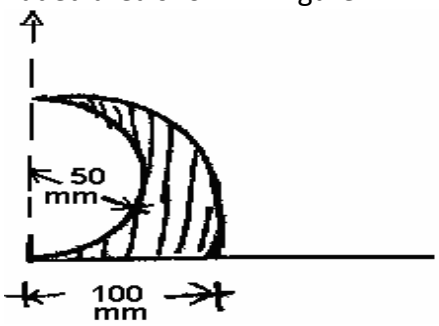
   b) Find the Centroid for the shaded area about y – axis. As shown in the Figure



   c) State and prove Pappus theorem[3]

OR

6. a)Locate the centroid of the shaded area shown in figure



a.

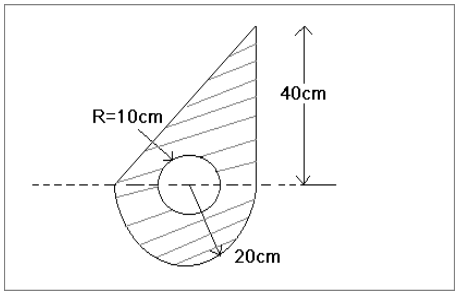
b) Find the centroid of Quarter circle having the radius R

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.



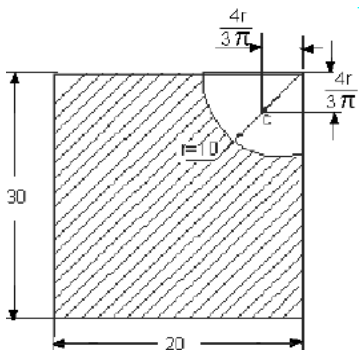
c) Determine the mass moment of inertia of sphere about its diametrical axis

OR

8. a) 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

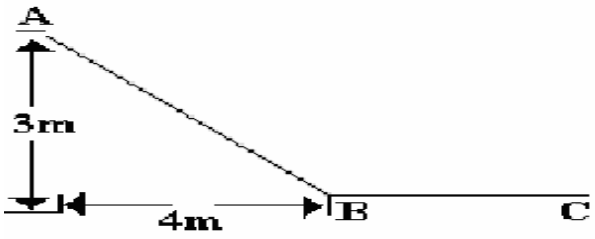
10. a) The motion of a particle in a rectilinear motion is defined by the relation $s=2t^3-9t^2+12t-10$ Where s is metres and t in seconds i) Find the acceleration of theparticle when velocity is zero

    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

    a. The maximum to which it will rise above the horizontal plane from which it is projected
    b. Velocity with which it will strike the target

    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 stops 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



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
(R18A0302) Engineering Mechanics
MODEL PAPER 3

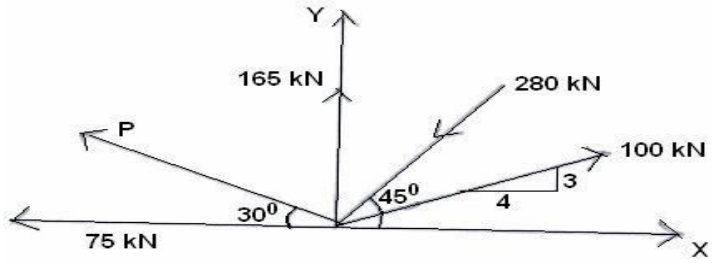
Answer the following Questions **Time: 3 hours** **70Marks**

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 and prove Varignon's theorem.

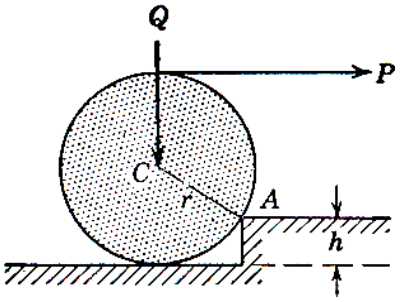
   b) Calculate the magnitude of "P" and the resultant of the force system shown in figure. The algebraic sum of horizontal components of all these forces is -325 kN.



1. 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.

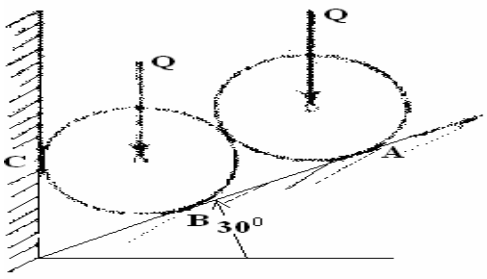
OR

2. a)What is a Force and write the characteristics of a force
   b)State and prove parallel axis theorem
   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
      a. circumference of the roller (Ref. Figure 1). Find the magnitude of P required to start the roller over the curb

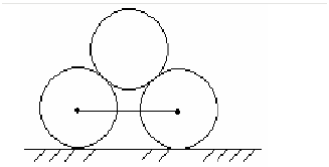


SECTION-II

3. a) Two identical rollers, each of weight 100 N, are supported by an inclined plane and a vertical wall as shown in Figure. Assuming smooth surfaces, find the reactions induced at the points of upport A, B and C.

a. 

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.



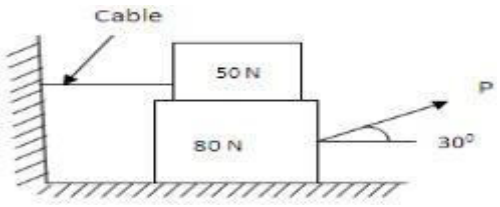
c. Define the following i) Equilibrium ii)Free body diagram with examples

OR

4. a) State laws of Friction

b) Explain the principles of operation of a screw-jack with a neat sketch.

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

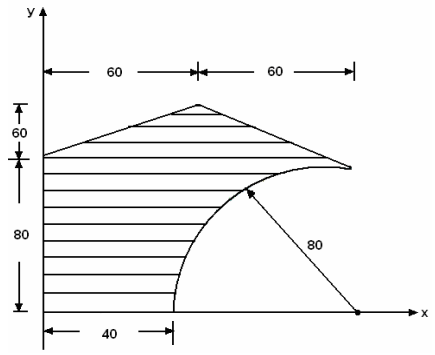


SECTION-III

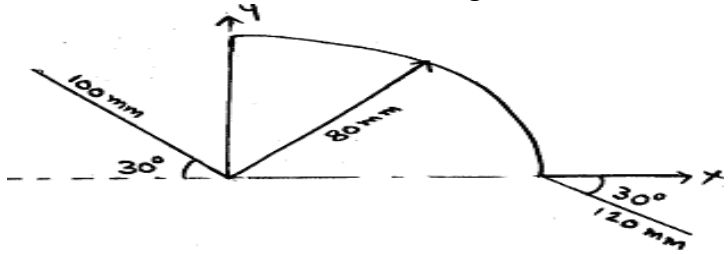
5. a)Write the difference between centroid and centre of gravity
b) Determine the Centroid of a parabolic spandrel $y=kx^n$
c) State Theorems of pappus

OR

6. a) Find the coordinates of the centroid of the shaded area shown in figure

i. 

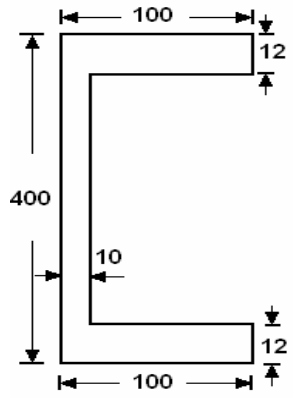
b. Locate the centroid of the wire bent as shown in figure

1. 

c. Find the centroid of Quarter circle having the radius R

SECTION-IV

7. a) Compute the moment of inertia of the channel section shown in figure about centroidal x, y axes

i. 

b) Derive expression for moment of inertia for a triangle about its base and centroidal axis

8. a) Derive the expression for the transfer formula for mass moments of inertia
b)Derive the expression for the mass moment of inertia of a hemi sphere

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

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?

c) Distinguish between kinetics and kinematics

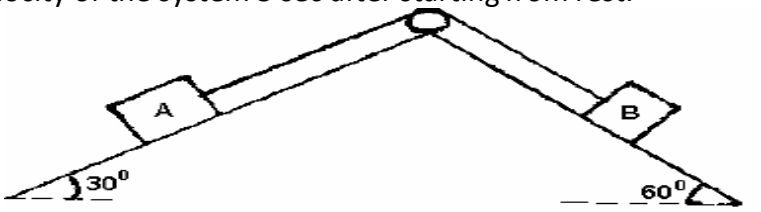
OR

10. a) What is D'Alembert's principle [4 MARKS]

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
(Autonomous Institution – UGC, Govt. of India)

(R18A0303) Thermodynamics

MODEL PAPER 1

Answer the following Questions **Time: 3 hours** **70Marks**

i. Answer only one question among the two questions in choice.
ii. Each question answer (irrespective of the bits) carries 14M.

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**w**b** = 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

$$W_{min} = C [T1/T2 + T2 - 2T1]$$

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
(Autonomous Institution – UGC, Govt. of India)

(R18A0303) Thermodynamics

MODEL PAPER 2

Answer the following Questions **Time: 3 hours** **70Marks**

Answer only one question among the two questions in choice.

i. Each question answer (irrespective of the bits) carries 14M.

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

6. (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

7. (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

8. (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

9. (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
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(R18A0303) Thermodynamics

MODEL PAPER 3

Answer the following Questions **Time: 3 hours** **70Marks**

i. Answer only one question among the two questions in choice.
ii. Each question answer (irrespective of the bits) carries 14M.

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 m^3/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
(Autonomous Institution – UGC, Govt. of India)

(R18A0304) Fluid Mechanics & Hydraulic Machines

MODEL PAPER 1

Answer the following Questions **Time: 3 hours** **70Marks**

SECTION I

1. a) Differentiate between simple and differential type of manometers.

b) A rectangular plate of size 25cm x 50cm and weighing 25kg (f) slides down 30^0 inclined surfaces at a uniform velocity of 2m/sec. If the uniform 2mm gap between the plate and inclined surface is filled with oil. Determine the viscosity of oil?

OR

2. a) What is the pressure within a droplet of water 0.5mm in diameter at 200C, if the pressure outside the droplet is standard atmospheric pressure of 1.03Kg (f)/cm^2. Given σ = 0.0075 Kg(f)/m for water at 200^0C.

b) Define specific gravity & specific weight. State Newton's law of viscosity.

SECTION II

3. a) State and derive Bernoulli's theorem, mentioning clearly assumptions underlying it.

b) A bend in pipe line conveying water gradually reduces from 0.6 to 0.3mts diameter and deflects the through angle of 60^0. At the large end the gauge pressure is 171.675KN/m^2.Determine the magnitude and direction of force exerted on bend when there is no flow.

OR

4. a) Write Eulers equation of motion along a stream line and itegrate it to obtain Bernoulli's equation.

b) The water is flowing through a pipe having diameters 40 cm and 20 cm at sections 1 and 2 respectively. The rate of flow through a pipe is 40 litres/s. the section 1 is 6m above the datum line and section 2 is 3m above the datum. Find the intensity of pressure at section 2, if the pressure at section is 1 is 29.43 N/cm^2

SECTION III

5. a) Explain the measurement of flow using a pitot tube

b) A venturimeter has its axis vertical, the inlet and throat diameters being 150mm and 75mm respectively. The throat is 225 mm above inlet and cd=0.96 petrol of specific gravity 0.78. Flows up through the water meter at a rate 0f 0.029m^3 /sec. Find the pressure difference between inlet and throat .

OR

6. A jet of water having a velocity of 30m/s strikes a curved vane, which is moving with a velocity of 15m/s. The jet makes an angle of 30 0 with the direction of motion of vane at inlet and leaves at angle of 120 0 to the direction of motion of vane at outlet. Calculate: (i) vane angles, if water enters and leaves the vanes without shock, (ii) work done per second per unit weight of water striking per second.

SECTION IV

7. a) Derive an expression for the force exerted by fluid on moving flat plate.

b) A Pelton wheel is to be designed for the following specifications. Power= 735.75 kW S.P head= 200m, Speed=800rpm, overall efficiency=0.86 and jet diameter is not to exceed one-tenth the wheel diameter. Determine: (i) Wheel diameter, (ii) the no of jets required and (iii) diameter of the jet. Take Cv=0.98 and speed ratio=0.45

OR

8. a) What is cavitation ? How can it be avoided in reaction turbine

b) What is the basis of selection of a turbine at a particular place?

SECTION V

9. a) Define a centrifugal pump. Explain the working of a single stage centrifugal pump with neat sketches.

b) What is the importance of Indicator Diagram ?

OR

10. a) A 4 stage centrifugal pump has 4 identical impellers, keyed to the same shaft. The shaft is running at 400rpm and the total manometric head developed by the multistage pump is 40m. The discharge through the pump is $0.2 m^3/s$. The vanes of each impeller are having outlet angle as 45^0. If the width and diameter of each impeller at outlet is 5cm and 60cm respectively, find the manometric efficiency.

b) State and explain NPSH.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)

(R18A0304) Fluid Mechanics & Hydraulic Machines

MODEL PAPER 2

Answer the following Questions **Time: 3 hours** **70Marks**

SECTION I

1. a) Differentiate between i.) Absolute and gauge pressure, ii.) simple manometers and differential manometers, and iii.) Piezometer and pressure gauge.
   b) Two large vertical plane parallel surfaces are 5 mm apart and the space between them is filled with a fluid. A thin plate of 12.5 cm square falls freely between the planes along the central plane and reaches a steady velocity of 2 m/s. Determine the weight of the plate if the viscosity of the fluid filling the space is 0.02 Ns/m .

OR

2. a) Two large planes are parallel to each other and are inclined at 30° to the horizontal with the space between them filled with a fluid of viscosity 20 cp. A small thin plate of 0.125 m square slides parallel and midway between the planes and reaches a constant velocity of 2 m/s. The weight of the plate is 1 N. Determine the distance between the plates.
   b) Derive expressions from basics for the pressure inside a droplet and a free jet.

SECTION II

3. a) What is meant by one-dimensional, two-dimensional and three- dimensional flows?
   b) Distinguish between: i) Steady flow and un-steady flow ii) Uniform and non-uniform flow iii) Compressible and incompressible flow iv) Laminar and turbulent flow

OR

4. a) A bend in pipeline conveying water gradually reduces from 60 cm to 30 cm diameter and defects the flow through angel of 60°. At the larger end the gage pressure is 1.75 kg/cm2 . Determine the magnitude and direction of the force exerted on the bend, when flow is 876 liters per sec.
   b) Define compressible & in compressible fluids.

SECTION III

5. a) Derive the expression for the force exerted by a water jet on a plate moving in the same direction of the jet with a velocity less than that of the jet.
   b) A blade turns the jet of diameter 3 cm at a velocity of 20 m/s by 60°. Determine the force exerted by the blade on the fluid.

OR

6. A horizontal venturimeter with inlet diameter 20 cm and throat diameter 10 cm is used to measure the flow of water. The pressure at inlet is 17.658 N/cm2 and the vacuum pressure at the throat is 30 cm of mercury. Find the discharge of water through venturimeter. Take Cd=0.98. b) Explain various minor losses in pipes.

SECTION IV

7. a) What do you understand by the characteristics curves of turbine? Name and explain the important characteristics curves of a turbine.
   b) What is meant by 'cavitation'? What is Thoma's cavitation factor and what is its significance for water turbines?

OR

8. A francis turbine with an overall efficiency of 70% is required to produce 147.15 kW. It is working under a head of 8m. The peripheral velocity=0.30$\sqrt{2gh}$ and the radial velocity of flow at inlet is 0.96$\sqrt{2gh}$. The wheel runs at 200 rpm and the hydraulic losses in the turbine are 20% of the available energy. Assume radial discharge, determine: (i) the guide blade angle, (ii) the wheel vane angle at inlet (iii) the diameter of wheel at inlet and (iv) width of wheel at inlet.

SECTION V

9. a) The diameter of an impeller of a centrifugal pump at inlet and outlet are 30 cm and 60 cm respectively. Determine the minimum starting speed of the pump, if it works against a head of 30 m.
   b) Explain the performance of a centrifugal pump using performance characteristic curves

OR

10. A single-acting reciprocating pump has a plunger of diameter 250 mm and stroke of 350 mm. if the speed of the pump is 60 rpm and it deliver 16.5 lps of water against a suction head of 5 m and a delivery head of 20 m. Determine the theoretical discharge, coefficient of discharge, the slip, the percentage of slip and the power required to drive the pump.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)

(R18A0304) Fluid Mechanics & Hydraulic Machines

MODEL PAPER 3

Answer the following Questions **Time: 3 hours** **70Marks**

SECTION I

1. a) Explain different types of differential manometers with the help of neat diagram.
   b) A single column vertical manometer is connected to a pipe containing oil of specific gravity 0.9. The area of the reservoir is 80 times the area of the manometer tube. The reservoir contains mercury of sp. gr. 13.6. The level of mercury in the reservoir is at a height of 30 cm below the center of the pipe and difference of mercury levels in the reservoir in the right limb is 50 cm. find the pressure in the pipe.

OR

2. a) Distinguish between manometers and mechanical gauges. What are the different types of mechanical pressure gauges?
   b) A 40cm diameter pipe, conveying water, branches into two pipes of diameters 30cm and 20cm respectively. If the average velocity in the 40cm diameter pipe is 3m/s. Find the discharge in this pipe. Also determine the velocity in 20cm pipe if the average velocity in 30 cm pipe is 3 m/s .

SECTION II

3. a) Write Eulers equation of motion along a stream line and itegrate it to obtain Bernoulli's equation.
   b) The water is flowing through a pipe having diameters 40 cm and 20 cm at sections 1 and 2 respectively. The rate of flow through a pipe is 40 litres/s. the section 1 is 6m above the datum line and section 2 is 3m above the datum. Find the intensity of pressure at section 2, if the pressure at section is 1 is 29.43 N/cm^2

OR

4. A 30cm diameter pipe carries water under a head of 15 m with a velocity of 4m/s. if the axis of the pipe turns through 45^0 find the magnitude and the direction of the resultant force at the bend.

SECTION III

5. a) Obtain an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet.
   b) A jet of water of diameter 100 mm moving with a velocity of 35 m/s strikes a curved fixed symmetrical plate at the center. Find the force exerted by the jet of water in the

direction of the jet, if the jet is deflected through an angle of 120° at the outlet of the curved plate.

OR

6. a) Explain major and minor losses in the pipes.
   b) Calculate the rate of flow of water through a pipe of diameter 300 mm, when the difference of pressure heads between the two ends of a pipe 400 m apart is 5m of water. Take the value of f= 0.009.

SECTION IV

7. a) What are unit quantities? Define the unit quantities for turbine.
   b) By means of a neat sketch explain the governing mechanism of Francis turbine.

OR

8. a) What is meant by flow duration curve and power duration curve? How do you differentiate these? How would you construct such curves?

   b) Explain how hydropower plants are classified.

SECTION V

9. a) What is a reciprocating pump? Describe the principle and working of a reciprocating pump with a neat sketch.
   b) Design a pelton wheel for a head of 80m and speed of 300 rpm. The Pelton Wheel develops 103kW SP. Take Cv=0.98, speed ratio=0.45 and overall efficiency=0.80.

OR

10. A centrifugal pump is running at 1000 rpm. The outlet vane angle of the impeller is 30^0 and velocity of flow at outlet is 3m/s. The pump is working against a total head of 30m and the discharge through the pump is $0.3m^3/s$. If the manometric efficiency of the pump is 75%, determine (i) the diameter of the impeller and (ii) the width of the impeller at outlet.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

(R18A0305) MATERIALS ENGINEERING

MODEL PAPER 1

Answer the following Questions **Time: 3 hours** **70Marks**

SECTION I

1. a) Discuss the effect of grain boundaries on the properties of metal/alloys?
   b) What is ASTM grain size number? Calculate the number of grains per square millimeter when number of equivalent grains observed at 200x was 62.

OR

2. Explain different methods for grain size measurements?

SECTION II

3. a) Explain the governing rules for the formation of substitutional solid solutions.
   b) Differentiate between intermetallic compounds and intermediate alloy phases.

OR

4. a) Draw Cu – Ni phase diagram. Label all points, lines and areas. Explain the cooling behavior of 60 Ni -40 Cu alloy from liquid state to room temperature
   b) Differentiate between congruent melting compound and interstitial solid solution

SECTION III

5. a) List the different experimental methods for construction of a phase diagram and Explain any one of them.

   b) What are the invariant reactions in iron- iron carbide equilibrium diagram?

   Explain them.

OR

6. a) One solid phase on heating through an invariant temperature becomes two solid phases. What is the invariant reaction?
   a. b) Define, a phase, a component and degree of freedom, invariant reaction

SECTION IV

7. a) What are tool steels? Classify them, and mention their applications.
   b) Discuss the properties and applications of

   i) Hadfield Manganese steels
   ii) White cast iron

OR

8. a) state and describe various factors effecting the properties of cast iron
   b) What is CEV? What is its significance?

SECTION V

9. Compare and contrast a) Age hardening and Tempering. b) Lower bainite and Tempered marten site. (Tempered at 100^{0} C)

OR

10. a) Define hardening? What are its objectives?
    b) Steel is made hard by quenching list, at least, three requirements that must be met to justify this statement.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

(R18A0305) MATERIALS ENGINEERING

MODEL PAPER 2

Answer the following Questions **Time: 3 hours** **70Marks**

SECTION I

1. a) Define grain and grain boundary? What are the characteristics of grain boundary? What is its importance?
   b) What is a grain size? Describe the methods for determination of grain size?

OR

2. a)Explain electron cloud. What is role of electron cloud in metallic bond?
   b) Describe the binding of atoms in metals**.**

SECTION II

3. Write short notes n the following
   a) Intermediate alloy phases?
   b) Intermediate compounds?

OR

4. Write short notes on the following
   a) Necessity of alloying?
   b) Electron compounds

SECTION III

5. a) what is the role of size factor effect in changing the nature of equilibrium diagram
   b) What is mean t miscibility gap**?**

OR

6. a) What is phase rule? What is the difference between the normal and the phase for metal systems?
   b) Differentiate between equilibrium diagram and phase diagram?

SECTION IV

7. Distinguish between White cast iron and grey cast iron.
   a) Describe how does the strength of the cast iron vary with the matrix?
   b) Describe how does the ductility vary with the shape of the graphite in cast iron?

OR

8. Explain the following
   a) Hadfield's manganese steel
   b) Tool steels

c) Grey cast iron

SECTION V

9. a) Describe how an I-T diagram is determined experimentally.
   a) b) Explain two different methods of obtaining a spheroid zed cementite structure

OR

10. Explain the important characteristics of the martensite?

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

(R18A0305) MATERIALS ENGINEERING

MODEL PAPER 3

Answer the following Questions **Time: 3 hours** **70Marks**

SECTION I

1. a) what are the two kinds of solid materials? Glass is not considering as true solid. Why?
   b) How is metallic bond similar to both ionic and covalent bond?
   c) Ionic solids are bad conductors of electricity but an aqueous or fused solution of them conducts electricity. Why?

OR

2. Write a short note on
   a) Metallic bonding
   b) Space lattice and unit cell
   c) Coordination number and atomic packing factor
   d) Crystal structure

SECTION II

3. a) Which is the most important of the Home Ruthery rules?
   b) What is diferenence between random ordered solid solutions? What is the role of energy of like bonds and unlike bonds in them?

OR

4. Write short notes on the following

   a) Necessity of alloying?
   b) Electron compounds

SECTION III

5. a) What is phase rule? What is the difference between the normal and the phase for metal systems?
   b) Differentiate between equilibrium diagram and phase diagram?

OR

6. a) Discuss various methods used for drawing phase diagrams.

   b) Explain complete mutual solubility can occur between the two components of

substitutional solid solutions but not for an interstitial solid solution

SECTION IV

7. Distinguish between

a) Describe how does the strength of the cast iron vary with the matrix?
b) Describe how does the ductility vary with the shape of the graphite in cast iron?
c) White cast iron and grey cast iron

OR

8. Explain the following

a) Hadfield's manganese steel b) Tool steels c) Grey cast iron

SECTION V

9. a)What is the purpose of adding head to Brass?
b)What is the most important property of copper?
c) What type of alloys are included under the classification bronzes?

OR

10. a) what are ceramic materials? Why are they so important?
b) Discuss the mechanical behaviour of ceramic materials.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
(R18A0306) Machine Drawing
MODEL PAPER 1

Answer the following Questions **Time: 3 hours** **70 Marks**

Note: (i) PART-A: Answer any **TWO** of the following questions.
PART-B is compulsory**. ii.** Assume proportionate dimensions wherever necessary

SECTION – A **(14M*2=28 Marks)**

1.(a)Sketch a metric'V'thread.(b)Sketch Woodruff key(c)Flat rivet thead.

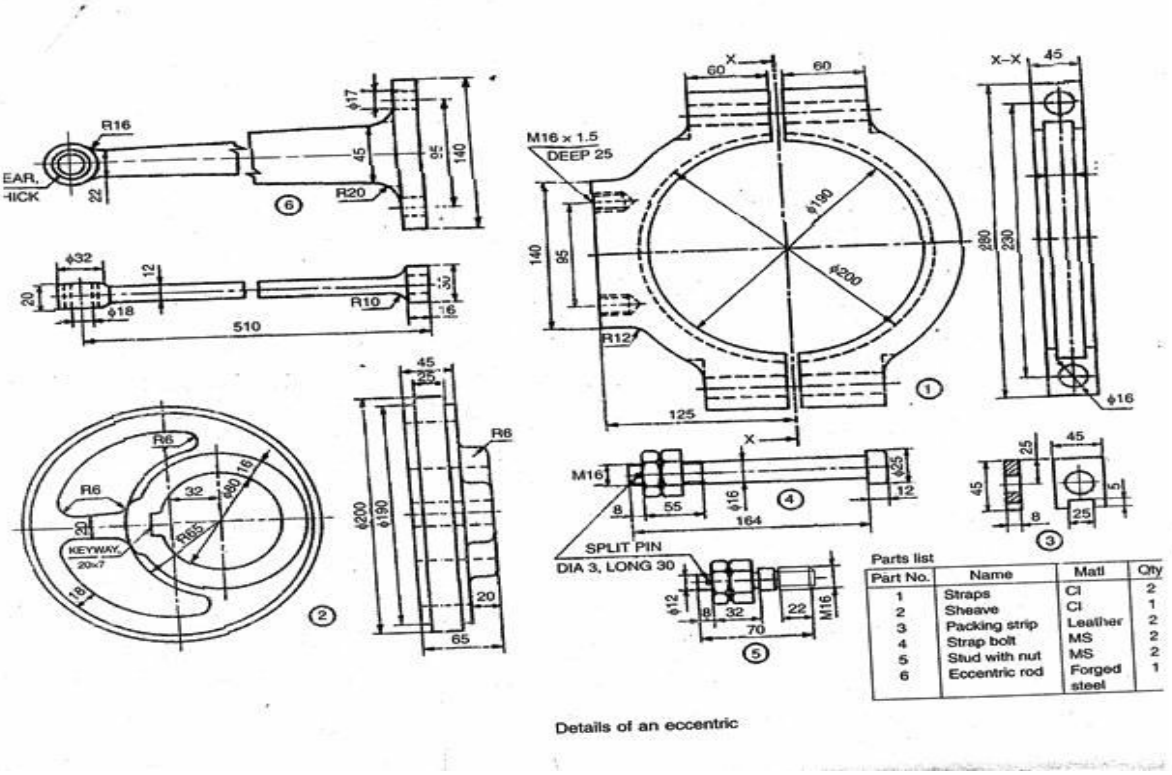
(b)Sleeve and Cotter joint to connect two rods of 25mm diameter

2.Draw the Double riveted double strap zigzag butt joint to connect two10mm plates.

3.Universal coupling to connect two shafts of 40mm each.

SECTION-B(Compulsory Question) **(42Marks)**

4.The part drawings of an ECCENTRIC are enclosed in the sketch. Assumable the parts and draw.(a)Half sectional front view with top half in section and(b)Left side view.



Parts list

Part No.	Name	Matl	Qty
1	Straps	CI	2
2	Sheave	CI	1
3	Packing strip	Leather	2
4	Strap bolt	MS	2
5	Stud with nut	MS	2
6	Eccentric rod	Forged steel	1

Details of an eccentric

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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(R18A0306) Machine Drawing

MODEL PAPER 2

Answer the following Questions Time: 3 hours 70 Marks

Note: (i) PART-A: Answer any **TWO** of the following questions.
PART-B is compulsory**. ii.** Assume proportionate dimensions wherever necessary

SECTION – A (14M*2=28 Marks)

Note: i. Answer all questions from Section-A and Section-B
ii. Assume proportionate dimensions wherever necessary
iii. Choose suitable scale and indicate proportions for free hand sketches

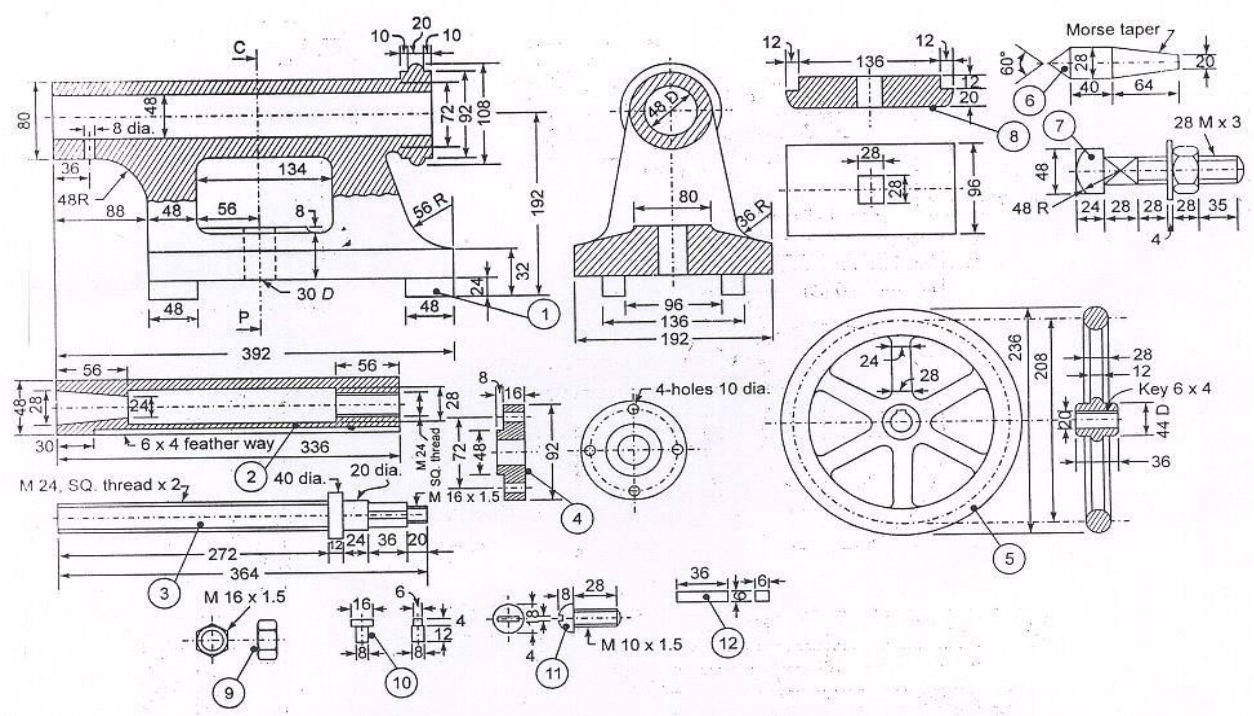
Section - A (14*2=28 Marks)

1. Sketch the conventional representation of the following
   a) Building materials b) Packing and insulating materials
2. Sketch the following
   a) Square thread b) Whitworth thread
3. Sketch a solid coupling for 30mm diameter of shaft

Section-B (1*42=42 Marks)

5. The details of a tail stock as shown in fig 2. Draw the following views
   i) Front view in full section ii) Top view lower half in section

Fig.2 Details of tail stock



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

(R18A0306) Machine Drawing

MODEL PAPER 3

Answer the following Questions **Time: 3 hours** 70Marks

Note : i. Answer all questions from Section-A and Section-B
ii. Assume proportionate dimensions wherever necessary
iii. Choose suitable scale and indicate proportions for free hand sketches

SECTION - A (14*2=28Marks)

1. Sketch the conventional representation of the following
   a) Metals b) Glass
2. Sketch with free hand, sectional front view of square headed bolt of diameter 30mm and indicate proportionate dimensions.
3. Sketch a muff coupling for 25mm diameter of shaft

SECTION-B (1*42=42MARKS)

4. The details of screw jack as shown in fig.2. Draw the following assembled views
   i) Half sectional view from the front ii) view from above

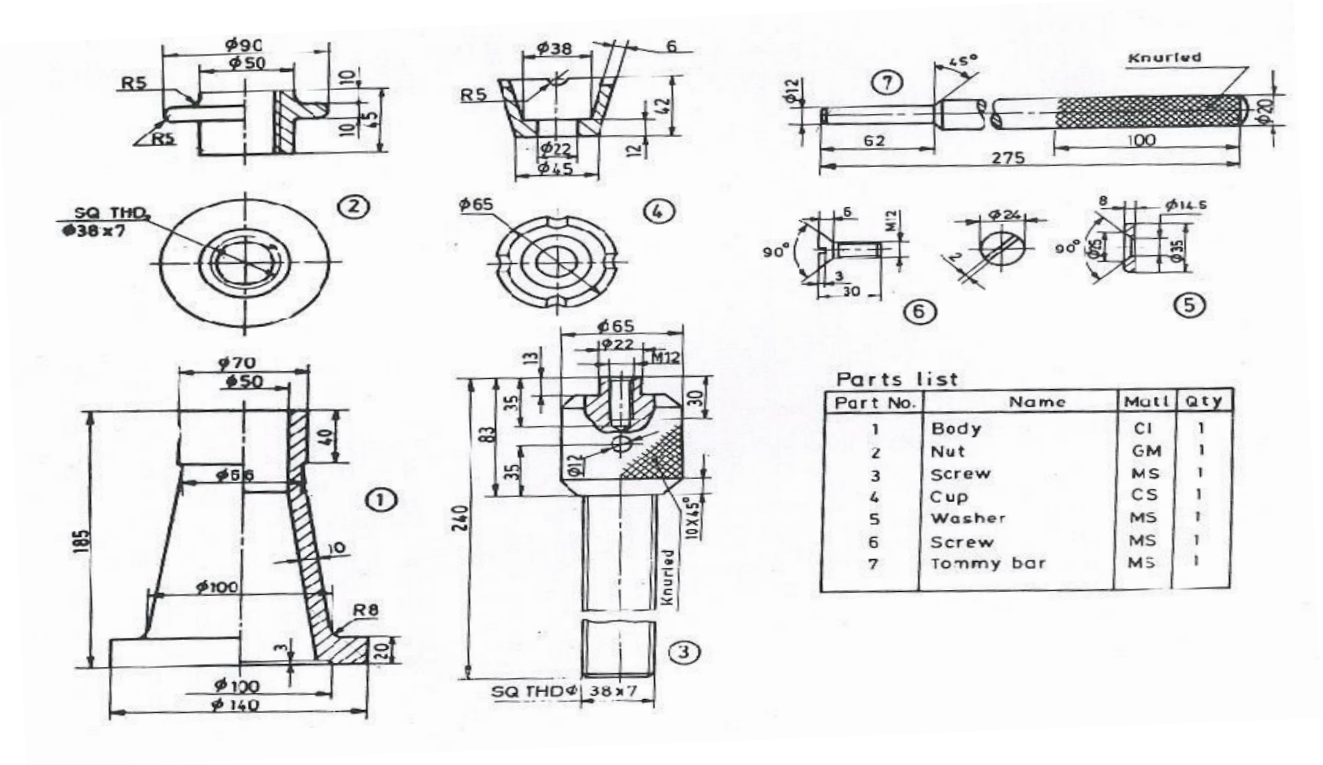


Fig.2 Details of Screw Jack

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
(R18A0307) Kinematics of Machinery
MODEL PAPER 1

Answer the following Questions Time: 3 hours 70Marks

SECTION - I

1. a) Explain first inversion of Double Slider crank chain.
   b) Explain third inversion of double slider crank chain.

OR

2. a) Explain the offset slider crank mechanism.
   b) Explain Straight line mechanism with neat sketch

SECTION – II

3. Explain Ackermans steering gear mechanism with neat sketch

OR

4. a) Explain with neat sketch about Hart mechanism?
   b) Explain with neat sketch of correct steering mechanism?

SECTION – III

5. Derive expression for velocity and acceleration of piston in reciprocating steam engine mechanism with neat sketch?

OR

6. A link AB of a four bar linkage ABCD revolves uniformly at 120rpm in a clockwise direction. Given AB=75mm, BC=175mm, CD=150mm,DA=100mm and angle BAD equal to 90°.AD is fixed link. Using graphical approach, find the angular accelerations of links BC and CD and acceleration of point E on the link BC, if EC = 150mm.

SECTION – IV

7. Following is the data for a circular arc cam working with a flat faced reciprocating follower : Minimum radius of the cam = 30 mm; Total angle of cam action = 120°; Radius of the circular arc= 80 mm; Nose radius = 10 mm. a) Find the distance of the centre of nose circle from the cam axis b) Draw the profile of the cam to full scale; c) Find the angle through which the cam turns when the point of contact moves from the junction of minimum radius arc and circular arc to the junction of nose radius arc and circular arc; and d) Find the velocity and acceleration of the follower when the cam has turned through an angle of θ= 20°. The angle θis measured from the point where the follower just starts moving away from the cam. The angular velocity of the cam is 10 rad/s

OR

8. Derive the expressions for displacement, velocity and acceleration for a circular arc cam operating a flat-faced follower a) when the contact is on the circular flank, and b) when the contact is on circular nose

SECTION – V

9. a) A pinion of 20 involute teeth and 125 mm pitch circle diameter drives a rack. The addendum of both pinion and rack is 6.25 mm. What is the least pressure angle which can be used to avoid interference? With this pressure angle, find the length of the arc of contact and the minimum number of teeth in contact at a time.
   b) Write short notes on helical and bevel gears.

OR

10. In a reverted epicyclic train, the arm F carries two wheels A and D and a compound wheel B-C.Wheel A meshes with wheel B and Wheel D meshes with wheel C. The number of teeth on wheel A, D and C are 80, 48, and 72. Find the speed and direction of wheel D, when wheel A is fixed and arm F makes 200 rpm clockwise.

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
(R18A0307) Kinematics of Machinery
MODEL PAPER 2

Answer the following Questions **Time: 3 hours** **70Marks**

SECTION - I

1. a) Sketch and explain any Oldham's coupling and oscillating cylinder engine.
   b) Sketch and explain whit worth quick return motion mechanism

OR

2. Sketch and explain the various inversions of a four bar chain.

SECTION – II

3. a) Explain why two Hooke's joints are used to transmit motion from the engine to the differential of an automobile.
   b) The angle between the axes of two shafts connected by Hooke's joint is 18°. Determine the angle turned through by the driving shaft when the velocity ratio is maximum and unity

OR

4. a) Give a neat sketch of the straight line motion 'Hart mechanism.' Prove that it produces an exact straight line motion.
   b) Sketch an intermittent motion mechanism and explain its practical applications

SECTION – III

5. In a slider crank mechanism, the length of the crank is 200mm and length of connecting rod 825mm. the angular velocity and acceleration of crank is 60rad/s and 1100 rad/s^2. When the crank has turned 120°from the inner dead centre, find :
   (a) The velocity and acceleration of piston
   (b) Angular velocity and acceleration of connecting rod.

OR

6. In a simple steam engine, the lengths of the crank and the connecting rod are 100mm and 400mm respectively. The weight of the connecting rod is 50 kg and its centre of mass is 220mm from the cross head centre. The radius of gyration about the centre of the mass is 120mm. If the engine speed is 300rpm and the crank has turned 45°from IDC, determine :
   (i)The angular velocity and acceleration of the connecting rod
   (ii) Kinetic energy of the connecting rod.

SECTION – IV

7. Draw the profile of a cam operating a roller reciprocating follower and with the following data: Minimum radius of cam =25 mm; lift=30mm; Roller diameter= 15mm. The cam lifts the follower for 120° with SHM, followed by a dwell period of 30°. Then the follower lowers down during 150° of cam rotation with uniform acceleration and retardation followed by a dwell period. If the cam rotates at a uniform speed of 150

RPM. Calculate the maximum velocity and acceleration of follower during the descent period.

OR

8. Draw the profile of a cam operating a Knife-edged follower from the following data: (a) Follower to move outward through 40 mm during 60° of a cam rotation; (b) Follower to dwell for the next 45° (c) Follower to return its original position during next 90° (d) Follower to dwell for the rest of cam rotation. The displacement of the follower is to take place with simple harmonic motion during both the outward and return strokes. The least radius of the cam is 50mm. If the cam rotates at 300 r.p.m., determine the maximum velocity and acceleration of the follower during the outward stroke and return stroke.

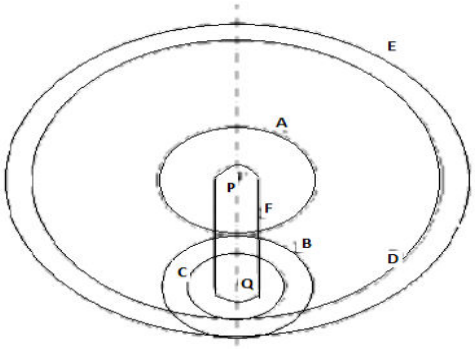
SECTION – V

9. a) Two 20° involute spur gears have a module of 10 mm. The addendum is one module. The larger gear has 50 teeth and pinions 13 teeth. Does the interference occur? If it occurs, to what value should the pressure angle be changed to eliminate interference?

   b) Two mating involute spur gears 20° pressure angle have a gear ratio of 2. the number of teeth on the pinion is 20 and its speed is 250 rpm. The module pitch of the teeth is 12 mm. if the addendum on each wheel recess on each side are half the maximum possible length each, find (1) the addendum for pinion and gear wheel (2) the length of arc of contact (3) the maximum velocity of sliding during approach and recess. Assume pinion to be driver

OR

10. A compound epicyclic gear is shown in figure. The gears A, D and E are free to rotate on axis P. The compound gears B and C rotate together on the axis Q at the end of arm F. All the gears have equal pitch. The number of external teeth on gears, A B and C are 18, 45 and 21 respectively. The gears D and E are annulus gears. The gear A rotates at 100 rpm in anticlockwise direction and the gear D rotates at 450 rpm clockwise. Find the speed and direction of the arm and the gear E.



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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
(R18A0307) Kinematics of Machinery
MODEL PAPER 3

Answer the following Questions Time: 3 hours 70Marks

SECTION - I

1. a) Distinguish among complete, incomplete and successful constraint relative motion between two elements or links. (4M)
   b) The length of the fixed link of a crank and slotted lever mechanism is 275 mm and that of the crank 110 mm. Determine, (i) the inclination of the slotted lever with the vertical in the extreme position. (ii) the ratio of the time of cutting stroke to the time of return stroke and (iii) the length of the stroke, if the length of the slotted lever is 495 mm and the line of stroke passes through the extreme positions of the free end of the lever.(10M)

OR

2. Describe the following mechanisms with neat sketches and state on which kinematic chain each one is based: (i) oscillating cylinder engine (ii) crank and slotted lever quick return mehanism (iii) elliptical trammel (iv) Rotary engine (14M)

SECTION – II

3. a) Show that the pantograph can produce paths exactly similar to the ones traced out by a point on a link on an enlarged or a reduced scale.
   b) Two shafts are connected by a Hooke's joint. The driving shaft revolves uniformly at 500rpm. If the total permissible variation in speed of a driven shaft is not to exceed = 6% of the mean speed, find the greatest permissible angle between the centerlines of the shafts. Also determine the maximum and minimum speeds of the driven shaft.

OR

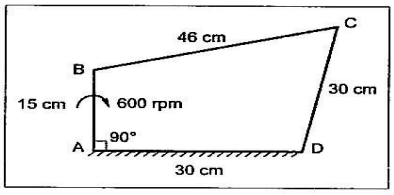
4. a) Prove that the peaucellier mechanism generates a straight-line motion.
   b) The track arm of a Davis steering gear is at a distance of 185 mm from the front main axle whereas the difference between their lengths is 90 mm. If the distance between steering pivots of the main axle is 1.2 m, determine the length of the chassis between the front and the rear wheels. Also find the inclination of the track arms to the longitudinal axis of the vehicle.

SECTION – III

5. Derive the expression for determining the angular position of the coupler link and the output link of the four bar mechanism.

OR

6. A four bar chain mechanism ABCD with its dimensions is shown in fig below. It is drive n by the crank AB which rotates at 600 rpm in clockwise direction. The link AD is fixed. Find the absolute velocity of point C and angular velocity of the links CB and CD.



SECTION – IV

7. Draw the displacement, velocity and acceleration diagrams for a follower when it moves with uni-form acceleration and retardation. Derive the expression for velocity and acceleration during out-stroke and return stroke of the follower.

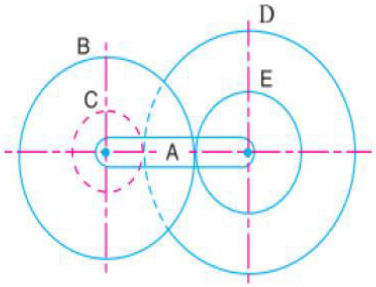
OR

8. Derive the expressions for displacement, velocity and acceleration for a circular arc cam operating a flat-faced follower a) when the contact is on the circular flank, and b) when the contact is on circular nose

SECTION – V

9. a) Derive an expression for minimum number of teeth required on a pinion to avoid interference when it gears with a rack.

   b) In a reverted epicyclic gear train, the arm A carries two gears B and C and a compound gear D - E. The gear B meshes with gear E and the gear C meshes with gear D. The number of teeth on gears B, C and D are 75, 30 and 90 respectively. Find the speed and direction of gear C when gear B is fixed and the arm A makes 100 r.p.m.clockwise



OR

10. a) Obtain the velocity ratio of an epicyclic gear train by tabular method?

    b) A compound train consists of six gears. The number of teeth on the gears are as follows : Gear : A B C D E F No. of teeth 60 40 50 25 30 24 The gears B and C are

on one shaft while the gears D and E are on another shaft. The gear A drives gear B, gear C drives gear D and gear E drives gear F. If the gear A transmits 1.5 kW at 100 r.p.m. and the gear train has an efficiency of 80 per cent, find the torque on gear F.

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Model paper 1

(R18A0308) APPLIED THERMODYNAMICS

Answer the Following Questions **Time: 3 hrs** **70Marks**

SECTION - I

1. a) Draw the lay out, P-v & T-S diagrams of Rankine cycle and its working in detail.
   b) In a steam turbine steam at 20 bar, 360° C is expanded to 0.08 bar. It then enters a condenser, where it is condensed to saturated liquid water. The pump feeds back the water into the boiler. Assume ideal processes; find per kg of steam the net work and the cycle efficiency.
   c.) With a neat sketch briefly explain about Babcock and Wilcox boiler.

OR

2. a.) A steam turbine consumes 9 kg/kW-hr when steam is supplied at a pressure f 10 bar and at 400^0. The exhaust takes place at 0.1 bar. Compare the efficiency of the engine with the Rankine efficiency.
   b.) What do you mean by natural draught? What are the limitations of natural draught?

SECTION - II

3. Dry saturated steam enters a frictionless adiabatic nozzle with negligible velocity at a temperature of 300^0C. It is expanded to a pressure of 5000 kPa. The mass flow rate is 1kg/s. Calculate the exit velocity of steam.

OR

4. In a De-Laval turbine steam issues from the nozzle with a velocity of 1200m/s. The nozzle angle is 20^0, the mean blade velocity is 400m/sand the inlet and outlet angles of blade are equal. The mass of steam flowing through the turbine per hour is 1000kg. Calculate: i) Blade angles ii) Relative velocity of steam entering the blades iii) tangential force on the blades iv) power developed v) blade efficiency Take blade velocity coefficient as 0.8.

SECTION - III

5. a) With a neat sketch explain working of single stage reciprocating compressor.

   b.) Derive the Equation for minimum work for multistage reciprocating air compressor.

OR

6. A surface condenser fitted with separate air and water extraction pumps has a portion of the tubes near the air pump suction screened off from the steam so that the air is

cooled below the condensate temperature. The steam enters the condenser at 38°C and the condensate is removed at 37°C. The air removed has the temperature of 36°C. If the total air infiltration from all sources together is 5kg/hr. determine the volume of air handled by the air pump per hour. What would be the corresponding value of the air handled if a combined air condensate pump was employed? Assume uniform pressure in the condenser.

SECTION - IV

7. In a gas turbine plant, air is drawn at 1 bar, 15^0 C and the pressure ratio is 6. The expansion takes place in two turbines. The efficiency of compressor is 0.82, high pressure turbine is 0.85 and low pressure turbine is 0.84. The maximum cycle temperature is 625^0 C. Calculate i) Pressure and temperature of gases entering the low pressure turbine. Ii) Net power developed iii) Work ratio iv) Thermal efficiency. v) Work output of high pressure turbine is equal to compressor work.

OR

8. In a jet propulsion unit, initial pressure and temperature to the compress r are 1.0 bar and 100C. The speed of the unit is 200m/s. The pressure and temperature of the gases /+before entering the turbine are 7500 C and 3 bar. Isentropic efficiencies of compressor and turbine are 85% and 80%. The static back pressure of the nozzle is 0.5 bar and efficiency of the nozzle is 90%. Determine (a) Power consumed by compressor per kg of air. (b)Air-fuel ratio if calorific value of fuel is 35,000 kJ/kg. (c) Pressure of gas leaving the turbine. (d)Thrust per kg of air/sec Cp of gases=1.12 kJ/kg K, Cp of air=1.005 kJ/kg K, γ =1.4 for air, γ =1.32 for gases.

SECTION - V

9. a.) Explain the importance of psychometric chart.?

   b.) Classify different types of refrigerants

OR

10. a.) With a neat sketch explain about bell-column cycle.

    b.) Write the differences between VCR and VAR

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Model paper 2

(R18A0308) APPLIED TERMODYNAMICS

Answer the Following Questions **Time: 3 hrs** **70Marks**

SECTION - I

1. a) Explain with a neat diagram about Regenerative cycle. Derive an expression for the thermal efficiency.
   b) A steam turbine is fed with steam having an enthalpy of 3100 kJ/kg. It moves out of the turbine with an enthalpy of 2100 kJ/kg. Feed heating is done at a pressure of 3.2 bar with steam enthalpy of 2500 kJ/kg. The condensate from a condenser with an enthalpy of 125 kJ/kg enters into the feed heater. The quantity of bled steam is 11200 kg/h. Find the power developed by the turbine. Assume that the water leaving the feed heater is saturated liquid at 3.2 bar and the heater is direct mixing type. Neglect pumps work.

OR

2. A power generating plant uses steam as a working fluid and operates at a boiler pressure of 50 bar, dry saturated and condenser pressure of 0.05 bar. Calculate for these limits a) the cycle efficiency, and b) the work ratio and specific steam consumption for Rankine cycle.
   b.) write ashort notes on Adiabatic flame Temperature.
   c.) What are the factors involved in the selection of a boiler?

SECTION - II

3. a.)In a steam nozzle the steam expands from 4bar to 1bar. The initial velocity is 60m/s and the initial temperature is 200^0C. Determine the exit velocity if the nozzle efficiency is 92%.
   b.) List the advantages of steam turbines over gas turbines.
   c.) Determine the isentropic enthalpy drop in the stage of Parsons Reaction turbine which has the following particulars: speed = 1500 rpm, mean diameter of rotor = 1m, stage efficiency = 80%, speed ratio = 0.7, blade outlet angle = 20^o.

OR

4.) a.)What is Compounding explain different types of compounding in steam turbines.
   b.) Derive the equation for Degree of Reaction (DOR)

SECTION - III

5.)a.) Explain the essential parts of a centrifugal compressor with neat sketch.
   b.) With help of neat sketch explain multi stage reciprocating air compressor.

OR

6.a.) Explai roots blower with a neat sketch.
   b.) Explain Differences between surface and jet condensers.

SECTION - IV

7.) A gas turbine unit receives air at 1 bar and 300K and compresses it adiabatically to 6.2 bar the compressor efficiency is 88%. The fuel has C.V of 44186kJ/kg and the fuel air ratio is 0.017kJ/kg of air. The turbine i9nternal efficiency is 90% calculate the work of turbine and compressor per kg of air compressed and thermal efficiency. For products if combustion Cp= 1.147 kj/kg-K and ¥ = 1.33

OR

8.) a) Write a detailed classification of Rocket engines.

b.) Explain working of turbo prop engine with a neat sketch.

SECTION - V

9 a) What are the various properties of Refrigerants ?

b) Describe with a neat sketch explain bell column cycle.

OR

10. a.) Explain the working principle of VAR with A neat sketch.

b.) Explain DBT, WBT, DPT and Relative humidity.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Model paper 3
(R18A0308) APPLIED THERMODYNAMICS

Answer the Following Questions **Time: 3 hrs** **70Marks**

SECTION - I

1. A steam power plant operates on a theoretical reheat cycle. Steam at boiler at 150 bar, 550 °C expands through the high pressure turbine. It is reheated at a constant pressure of 40 bar to 550°C and expands through the low pressure turbine to a condenser at 0.1 bar. Draw T-s and h-s diagrams. Find :

   (i) Quality of steam at turbine exhaust; (ii) Cycle efficiency; (iii) Steam rate in kg/kW

b.) Explain first law Analysis of combustion reactions

OR

2. a.)A power generating plant uses steam as a working fluid and operates at a boiler pressure of 50 bar, if the steam is superheated to 500 °C before supplying, to turbine calculate for Rankine cycle, a) the cycle efficiency and b) the specific steam consumption. Neglect the feed pump work.

b.) Give sketches and description of the following boiler mountings
   a) Water level indicator
   b) Safety valve
   c) High steam and low water safety valve
   d) Fusible plug and
   e) Feed check valve.

SECTION - II

3. a.) A convergent divergent nozzle at a pressure of 10 bar and a temperature of 300 °C. The exit of nozzle is in a space where the pressure is 5.35 bar. Calculate the flow per m^2 of exit area. When the fluid is superheated steam $\gamma = 1.3$, behaves gas through out.

OR

4.) In a reaction turbine the blade tips are inclined at 35^o and 20^o in the direction of motion. The guide blades are of same shape as the moving blades but reversed in direction. At a certain place in the turbine, the drum diameter is 1m and the blades are 10cm high. At this place, the steam has a pressure of 1.75 bar and dryness 0.935. If the speed of the turbine is 250 rpm and steam passes through the blades without shock, find the mass of steam flow and power developed in the ring of moving blades.

SECTION - III

5.) a.) Explain working principle of a roots blower.

b.) Derive the equation for DOR of axial flow compressor.

OR

6.) A surface condenser deals with 13625 kg of steam per hour at a pressure of 0.09 bar. The steam enters 0.85 dry and the temperature at the condensate and air extraction pipes is 360C. The air leakage amounts to 7.26 kg/hour. Determine: The surface required if the average heat transmission rate is 3.97 kJ per second.

SECTION - IV

7.) In a gas turbine cycle, the pressure ratio is 6 and maximum cycle temperature is 6500 C. The efficiencies turbine and compressors are 0.85 and 0.82. Air enters the compressor at 150 C and flow rate of air is 12kg/sec. For compression process, cp=1.005 kJ/kg-K; γ =1.32. For combustion process, cp=1.11 kJ/kg-K. Determine power developed thermal efficiency and work ratio.

OR

8.) a) Explain liquid propellant rocket with a neat sketch.

b) What are the various thrust augmentation techniques used in turbo-jet engine?

SECTION - V

9.) a.) Explain the properties of dry air and wet air.

b.) Explain different types of psychometric processes with sketches.

OR

10.) a.) Briefly Explain the Advantages of VCR over VAR

b.) Explain the bell column cycle with P-V and T-S diagrams.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Model paper 1
(R18A0309) STRENGTH OF MATERIALS

Answer the Following Questions **Time: 3 hrs** **70Marks**

1. Define the Stress-strain curve with salient points? (14M)

(OR)

2. Derive the relation between young's modulus, modulus of rigidity and bulk modulus?

3. A gas cylinder of internal diameter 40 mm is 5 mm thick. If the tensile stress in the material is not to exceed 30 MPa, find the maximum pressure which can be allowed in the cylinder. (14M)

(OR)

4. Find the angle of twist per meter length of a hollow shaft of 100 mm external diameter and 60 mm internal diameter, if the shear stress is not to exceed 35 MPa. Take modulus of rigidity G= 85GPa.

5. A cantilever beam of 2 m long carries a uniformly distributed load of 1.5kN/m over a length of 1.6 m from the free end. Draw shear force and bending moment diagrams for the beam. (14M)

(OR)

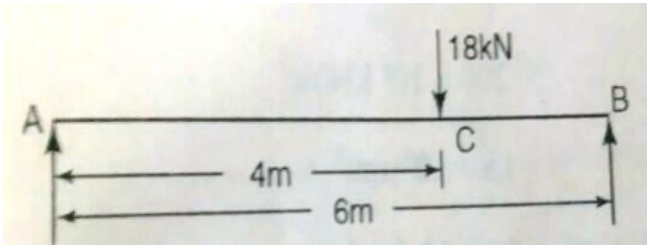
6. A simply supported beam 6 m long is carrying a uniformly distributed load of 5kN/m over a length of 3 m from the right end. Draw shear force and bending moment diagrams for the beam and also calculate the maximum bending moment on the beam.

7. State the assumptions in theory of simple bending and derive the bending equation?(14M)

(OR)

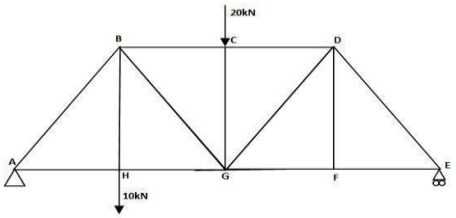
8. The cross- section of a T-beam is as follows: flange thickness = 10 mrn; width of flange = 100 mm; thickness of web = 10 mm; depth of web = 120mm. If a shear force of2KN is acting at a particular section of the beam. Draw the shear stress distribution across the beam cross- section?

9. A simply supported beam of 6m span is subjected to a concentrated load of 18kN at 4m from left support. Calculate i) The position and maximum value of deflection . ii)Slope at mid span iii) Deflection at load point (14M)



(OR)

10. Find the force in members CG, FG, BG, BC. Use method of section to compute the result. Indicate the zero force members. BH = 4m, AH=HG=GF=FE = 3m,



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Model paper 2
(R18A0309) STRENGTH OF MATERIALS

Answer the Following Questions **Time: 3 hrs** **70Marks**

1 A bar of 0.3m long is 50mm square in section for 120mm of its length, 25mm diameter for 80mm and 40mm diameter for the remaining length. If a tensile force of 100KN is applied to the bar calculate the maximum and minimum stresses produced in it, and the total elongation. Take E=200GPa. (14M)

(OR)

2. Define hook's law and explain the stress-strain curve for mild steel with salient points?

3. A simply supported beam of 16m long carries the point loads of 4KN, 5KN and 3KNat distances 3m, 7m and 10m respectively from the left support. Calculate the maximum shear force
and bending moment. Draw the SFD and BMD. (14M)

(OR)

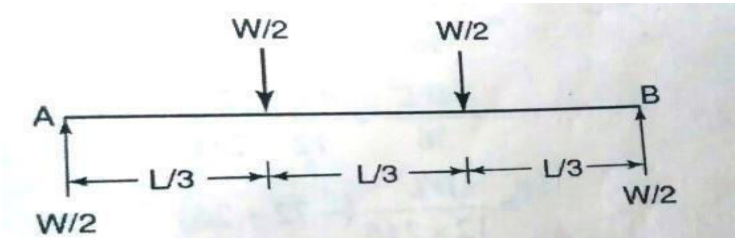
4. A beam of length l carries a uniformly distributed load of w per unit length. The beam is supported on two supports at equal distances from the two ends. Determine the position of the supports, if the B.M, to which the beam is subjected to , is as small as possible. Draw the SFD & BMD for the beam.

5.Two wooden planks 150mmX50mm each are connected to form a T-section of beam. If a moment of 6.4kN-m is applied around the horizontal neutral axis, inducing tension below the neutral axis, find the bending stresses at both extreme fibers of the cross section. (14M)

(OR)

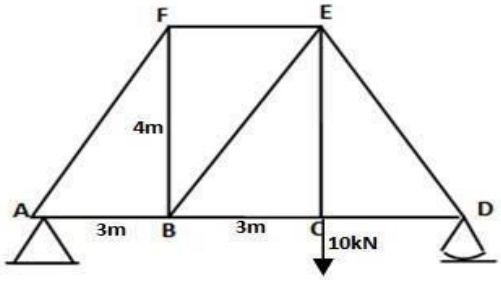
6. An I-section beam 350mmX200mm has a web thickness of 12.5mm and a flange thickness of 25mm. It carries a shearing force of 200kN at a section. Sketch the shear stress distribution across the section.

7. A simply supported beam of span 'L' is subjected to equal loads W/2 at each of $1/3^{rd}$ span points. Find the expression for deflection under the load at mid span. (14M)



OR)

8. Find the forces in the members AF, AB , CD, DE, EC and the reaction forces at A and D. CD = 3m.



9. Write The Assumptions in Torsion? And derive the torsion equation? (14M)

(OR)

10. Derive the formula for change in volume & change in dimensions for thin cylinder due to internal pressure.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Model paper 3
(R18A0309) STRENGTH OF MATERIALS

Answer the Following Questions **Time: 3 hrs** **70Marks**

1 A flat steel bar 200mmX20mmX8mm is placed between two aluminum bars 200mmX20mmX6mm so as to form a composite bar. All the three bars are fastened together at room temperature. Find the stresses in each bar, where the temperature of the whole assembly is 0 -6 0 -6 0 raised through 50 C. Assume E_S = 200GPa, E_{Al}= 80GPa, σ_S = 12x10 / C, σ_{Al}= 24x10 / C.

(OR)

2 Derive the stresses in the bars of uniformly tapering circular sections.(14M)

3 A horizontal beam of 10m long is carrying a uniformly distributed load of 1kN/m. The beam is supported on two supports 6m apart. Find the position of supports, so that bending moment on the beam is small as possible. Also draw the SFD & BMD for the beam. (14M)

(OR)

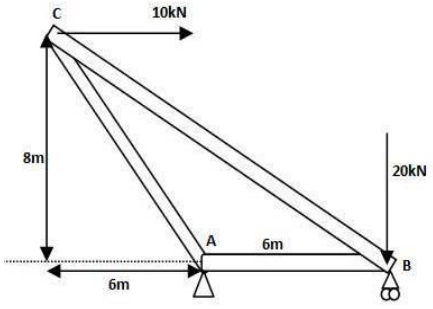
4 A cantilever beam is 2m long carries a uniformly distributed load of 1.5kN/m over a length of 1.6m from the free end. Draw SFD & BMD for the beam.

5.What are the assumptions in theory of simple bending & Derive the bending equation? (14M)

(OR)

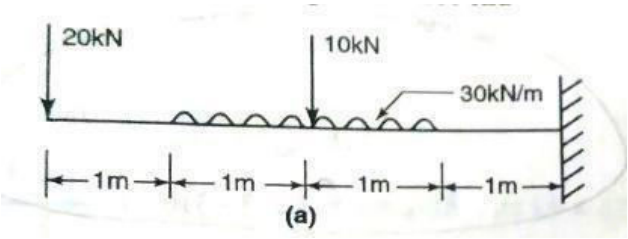
6. A rolled steel joist 200mmx160mm wide has flange 22mm thick and web 12mm thick. Find the proportion, in which the flanges and web resist shear force.

7.Find the reaction components at A and B. Also find the forces in each individual member, specify compression or tension. (14M)



(OR)

8. Plot the elastic curve and maximum deflection and maximum slope for the cantilever beam loaded as shown in the fig. take E=200GPa and I=300X10^6 mm^4 . (14M)



9.Find the maximum torque that can be safely applied to a shaft of 80mm diameter. The permissible angle of twist is 1.5 degrees in a length of 5m and shear stress not to exceed 42MPa.
Take C=84GPa. (14M)

(OR)

10. A cylindrical shell of 500 mm diameter is required to withstand an internal pressure of 4MPa. Find the minimum thickness of the shell, if maximum tensile strength for the plate material is 400MPa and efficiency of the joints is 65%. Take factor of safety as 5

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Model paper 1
(R18A0310) DYNAMICS OF MACHINERY

Answer the Following Questions **Time: 3 hrs** **70Marks**

SECTION – I

1(a) What is the effect of the gyroscopic couple on the stability of a four wheeler while negotiating a curve? In what way does this effect along with that of the centrifugal force limit the speed of the vehicle?(5)

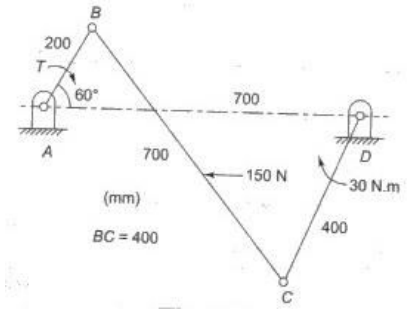
b) How do the effects of gyroscopic couple and of centrifugal force make the rider of a two-wheeler .Derive a relation for the limiting speed of the vehicle.(5)

(OR)

2. The rotor of a marine turbine has a moment of inertia of 750 kg. m2 and rotates at 3000 rpm clockwise when Viewed from aft. If the ship pitches with angular simple harmonic motion having a periodic time of 16 seconds and an amplitude of 0.1 radian, find the (i) maximum angular velocity of the rotor axis (ii) maximum value of the gyroscopic couple (iii) gyroscopic effect as the bow dips. (10)

SECTION – II

3. Determine the torque required to be applied to the link AB of a four link mechanism shown in figure to maintain static equilibrium at the given position.(10)



(OR)

4. In a four link mechanism ABCD the link AB revolves with an angular velocity of 10 rad/s and angular acceleration of 25 rad/s^2 at the instant when it makes an angle of 45^0 with AD, the fixed link. The lengths of the links are AB = CD = 800 mm, BC = 1000 mm and AD = 1500 mm. The mass of the links is 4 kg/m length. Determine the torque required to overcome the inertia forces , neglecting the gravitional effects. Assume all links to be of uniform cross-sections.(14)

SECTION – III

5. a. Explain single plate clutch with neat sketch (6)
   b. Derive the equation for a uniform wear and uniform pressure of pivot bearing (8)

(OR)

6(a). Classify dynamometers and explain function of one transmission type dynamometer. (6)
(b) A simple band brake is operated by a lever of length 500 mm. The brake drum has a diameter of 500 mm and the brake band embraces 5/8th of the circumference. One end of the band is attached to the fulcrum of the lever while the other end is attached to a pin on the lever 100 mm from the fulcrum,.If the effort applied to the end of the lever is 2 kN and the coefficient of friction is 0.25, find the maximum braking torque on the drum.(8)

SECTION – IV

7. A 2-cylinder uncoupled locomotive with cranks at 90^0 has a crank radius of 32.4cms. The distance between centers of driving wheel is 150 cms. The pitch of cylinders is 60cms. The diameter of treads of driving wheel is 180 cms. The radius of center of gravity of balance weights is 65 cms. The pressure due to dead load on each wheel is 4 tonnes. The weight of reciprocating and rotating parts per cylinder are 330 kg and 300 kg respectively. The speed of locomotive is 60 kmph. Find:
   (a) The balancing weights both in magnitude and position required to be placed in the planes of driving wheels to balance whole of the revolving and 2/3 of reciprocating masses.
   (b) Swaying couple.
   (c) The variation of tractive force.

(OR)

8..Four masses m1, m2, m3 and m4 having 100, 175, 200 and 25 kg are fixed to cranks of 20 cm radius and revolve in places 1, 2, 3 and 4. The angular position of the cranks in planes 2, 3 and 4 with respect to the crank in plane 1 are 75^0, 135^0 and 200^0 taken in the same sense. The distance of planes 2, 3 and 4 from plane 1 are 60 cm, 186 cm and 240 cm respectively. Determine the position and magnitude of the balance mass at a radius of 60 cm in plane L and M located at middle of the plane 1 and 2 and the middle of the planes 3 and 4 respectively.

SECTION – V

9. A Proell governor has equal arms of length 300mm . The upper and lower ends of the arms are pivoted on the axis of the governor. The extension arms of the lower links are each of 80 mm long and parallel to the axis, when the radius of rotation of the balls are 150 mm and 200 mm. The mass of each ball is 10 Kg and the mass of the central load is 100 Kg, determine the range of the speed of the governor?

(OR)

10..A Hartnell governor operates between 290 rpm and 310 rpm with a sleeve lift of 15 mm. The two right-angled bell-crank levers are pivoted at 120 mm from the governor axis. The sleeve arms and the ball arms are 80 mm and 120 mm respectively. Mass of each ball is 2.5 kg. The ball arms are parallel to the governor axis at the lowest equilibrium speed., Determine the stiffness of the spring and the loads on the spring at the lowest and the highest equilibrium speeds.(14)

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Model paper 2
(R18A0310) DYNAMICS OF MACHINERY
Answer the Following Questions Time: 3 hrs 70Marks

1 How do the effects of gyroscopic couple and of the centrifugal force make the rider of a two – wheeler to tilt on one side? Derive a relation for the limiting speed of the vehicle.

[14]

. OR

2. The length of connecting rod of a gas engine is 500 mm, and its C.G. lies at 165 mm from the crank pin center. The rod has a mass of 80 kg and a radius of gyration of 180 mm about an axis passing through the centre of the mass. The stroke of piston is 225 mm, and the crank speed is 300 rpm. Determine the inertia force on the crankshaft when the crank has turned through 125^0 from the inner dead centre. [14]

3. In a four link mechanism ABCD the link AB revolves with an angular velocity of 10 rad/s and angular acceleration of 25 rad/s^2 at the instant when it makes an angle of 45^0 with AD, the fixed link. The lengths of the links are AB = CD = 800 mm, BC = 1000 mm and AD = 1500 mm. The mass of the links is 4 kg/m length. Determine the torque required to overcome the inertia forces , neglecting the gravitional effects. Assume all links to be of uniform cross-sections.(14)

OR

4. A conical pivot with angle of cone as 1000 supports a load of 18 KN. The external radius is 2.5 times the internal radius. The shaft rotates at 150 rpm. If the intensity of pressure is to be 300 KN/m2 and coefficient of friction as 0.05, what is the power lost in working against the friction?

5. In a turning moment diagram, the areas above and below the mean torque line, taken in order, are 5.81, 3.23, 3.87, 5.16, 1.94, 3.87, 2.58, and 1.94 cm^2 respectively. The scales of the diagram are **:** Turning moment 1 cm = 7 kN-m ; Crank angle 1 cm =60^0. The mean speed of the engine is 120 rpm, and the variation of speed must not exceed ± 3 % of the mean speed. Assuming the radius of gyration of the flywheel to be 106.67 cm, find the weight of the flywheel to keep the speed within the given limits.

OR

6. A single – cylinder reciprocating engine has the following data **:** Speed of the engine = 240 rpm ; Stroke = 320 mm ; Mass of the reciprocating parts = 70 kg ; Mass of the revolving parts = 52.5 kg at the crank radius.; If 65 % of the reciprocating parts and all the revolving parts are to be balanced, find the (a) balancing mass required at a radius of 300 mm, and (b) unbalanced force when the crank has revolved through 60^0 fromT.D.C.

OR

7. Find the natural frequency of transverse vibrations of a system, having several point loads attached to the same shaft, by Dunkerley's method. .

OR

8. A vibrating system consists of a mass of 20 kg, a spring of stiffness 20 kN/m, and a damper. The damping provided is only 30 % of the critical value. Find the natural frequency of damped vibration, and ratio of two successive amplitudes.

9. Deduce the governing equation of a Porter governor, taking into account the friction at the sleeve. Also discuss the effect of friction on the functioning of the governor.

OR

10. A number of masses are attached to a shaft which is rotating at an angular speed of $\boldsymbol{\omega}$ rad/s. If the masses are in different planes, describe the method of balancing all theses masses (either analytically or graphically).

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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Model paper 3
(R18A0310) DYNAMICS OF MACHINERY
Answer the Following Questions Time: 3 hrs 70Marks

1. The rotor of the turbine of a ship has a mass of 2500 kg and rotates at a speed of 3200 rpm counter-clockwise when viewed from stern. The rotor has radius of gyration of 0.4m. Determine the gyroscopic couple and its effect when
a) The ship steers to the left in a curve of 80m radius at a speed of 15 knots (1 knot = 1860 m/h)
b) The ship pitches 5 degrees above and 5 degrees below the normal position and the bow is descending with its maximum velocity. The pitching motion is simple harmonic with a periodic time of 40 seconds.

OR

2. In a four-link mechanism shown in Figure 1. Torque T3 and T4 have magnitudes of 30 N.m and 20 N.m respectively. The link lengths are AD = 800 mm, AB = 300 mm, BC = 700 mm and CD = 400 mm. For the static equilibrium of the mechanism, determine the required input torque T2.

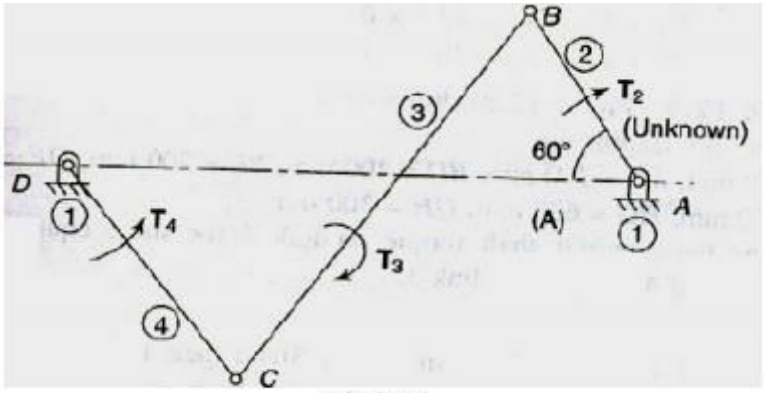

Figure 1

[14]

. OR

3. Derive an expression for the efficiency of an inclined plane when a body moves
a) up a plane, b) down a plane..

OR

4. a) Explain uniform pressure and solve the following problem.
b) A conical pivot with angle of cone as 1000 supports a load of 18 KN. The external radius is 2.5 times the internal radius. The shaft rotates at 150 rpm. If the intensity of pressure is to be 300 KN/m2 and coefficient of friction as 0.05, what is the power lost in working against the friction?

5. The turning moment diagram for a multi-cylinder engine has been drawn to a scale of 1 mm = 325 Nm vertically and 1 mm = 30 horizontally. The areas above and below the mean torque line are -26, +378, -256, +306, -302, +244, -380, +261 and -225 mm2 . The engine is running at a mean speed of 600 r.p.m. The total fluctuation of speed is not to exceed +1.8% of the mean speed. If the radius of flywheel is 0.7 m, find the mass of the flywheel

OR

6. A single – cylinder reciprocating engine has the following data **:** Speed of the engine = 240 rpm ; Stroke = 320 mm ; Mass of the reciprocating parts = 70 kg ; Mass of the revolving parts = 52.5 kg at the crank radius.; If 65 % of the reciprocating parts and all the revolving parts are to be balanced, find the (a) balancing mass required at a radius of 300 mm, and (b) unbalanced force when the crank has revolved through 60^0 fromT.D.C.

OR

7. The cranks of a two-cylinder uncoupled inside cylinder locomotive are at right angles and are 300 mm long. The distance between the centre lines of the cylinder is 650 mm. The wheel centre lines are 1.6 m apart. The reciprocating mass per cylinder is 300 kg. The driving wheel diameter is 1.8 m. If the hammer blow is not to exceed 45 kN at 100 km/hr, determine: a) The fraction of the reciprocating masses to be balanced, b) The variation in tractive effort c) The maximum swaying couple.

OR

8. A vibrating system consists of a mass of 20 kg, a spring of stiffness 20 kN/m, and a damper. The damping provided is only 30 % of the critical value. Find the natural frequency of damped vibration, and ratio of two successive amplitudes.

9. Deduce the governing equation of a Porter governor, taking into account the friction at the sleeve. Also discuss the effect of friction on the functioning of the governor.

OR

10. The lengths of the upper and lower arms of a Porter governor are 200 mm and 250 mm respectively. Both the arms are pivoted on the axis of the rotation. The central load is 150 N, the weight of each ball is 20 N and the friction of the sleeve together with the resistance of the operating gear is equivalent to a force of 30N at the sleeve. If the limiting inclinations of the upper arms to the vertical are 300 and 400 . Determine the range of the speed of the governor.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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Model paper 1
(R18A0311) MANUFACTURING PROCESSES

Answer the Following Questions **Time: 3 hrs** **70Marks**

1) Explain the mechanism of chip formation in metal cutting with a neat sketch?

(Or)

2) What is meant by built up edge? State the causes of it?

3) Classify different types of Lathes. Explain any one in detail?

(Or)

4) Explain Casting? What is the Moulding procedure involved in Casting?

5) With a neat sketch, explain construction and working of a planner?

(Or)

6) Explain with a newt sketch the construction and working of tool and cutter grinder?

7) State the advantages and limitations of centreless grinding?

(Or)

8) Compare the grinding with lapping and broaching processes?

9) Explain the design principles of milling fixtures

(Or)

10) State and explain various factors to be considered for the selection of clamping device to achieve the purpose of clamping?

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Model paper 2
(R18A0311) MANUFACTURING PROCESSES

Answer the Following Questions **Time: 3 hrs** **70Marks**

1) Explain Elementary treatment of metal cutting theory?

(Or)

2) Explain Geometry of single point tool and angles?

3) What is working principle of Engine Lathe, what are specifications of lathe?

(Or)

4) Explain tool layout and cam design?

5) What is working Principle of Planning Machine, mention also parts of same?

(Or)

6) Explain kinematics scheme of the drilling and boring machines?

7) How are milling machines are classified? Explain in details with neat sketch?

(Or)

8) Explain kinematic scheme of grinding machine?

9) Explain comparison to grinding and lapping machines?

(Or)

10) Explain types of clamping and work holding devices?

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Model paper 3
(R18A0311) MANUFACTURING PROCESSES

Answer the Following Questions **Time: 3 hrs** **70Marks**

1) What are the requirements of a metal cutting tool?

(Or)

2) Explain the importance and functions of different tool angle and other parameters associated with the help of neat sketch working principle of lathe machine.
3) What are the differences between a capstan lathe and turret lathe?

(Or)

4) Explain clearly what is meant by jig boring? Also explain elements of vertical boring machine?
5) Explain the feature of different types of bonds used in the manufacturing of grinding wheels?

(Or)

6) Sketch and explain three methods of cylindrical grinding?
7) Give a complete a classification of broaching machines?

(Or)

8) What are the functions of jig and fixtures? Enumerate the design principles of milling fixtures?
9) Why quick return mechanism is used in shaper machine? Explain.

(Or)

10) What do you understand by Principle of least points and principle of extreme points?

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
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MODEL QUESTION PAPER-1
(R18A0024) 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) $F_Y(3)$

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

[14M]

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
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MODEL QUESTION PAPER-2
(R18A0024) 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 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*

X	0	5	10	15	20
Y	7	11	16	20	26

[7M]

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
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MODEL QUESTION PAPER-3
(R18A0024) 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 $F(X) = \begin{cases} 0 & if\ x \le 1 \\ k(x-1)^4 & if\ 1 < x \le 3 \\ 1 & if\ x > 3 \end{cases}$

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

$$f_{xy}(x,y) = \begin{cases} x^2 + \frac{xy}{3}, & 0 \le x \le 1, 0 \le y \le 2 \\ 0, & otherwise \end{cases}$$

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

$$f_{wz}(wz) = \begin{cases} bwz, & 1 \le w \le 3,\ 2 \le z \le 4 \\ 0, & otherwise \end{cases}$$

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]