R15 Code No: R15A0021 MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

I B.Tech I Semester supplementary Examinations, May 2019

Mathematics-I (Common to all Branches)

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Roll No										
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Time: 3 hours

Note: This question paper contains two parts A and B Part A is compulsory which carriers 25 marks and Answer all questions. Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

- Define the terms consistency and inconsistency of a system of linear equations. 1). a [2M]
 - Let A be a square matrix. If the eigen values of A are 2, 5 and 6, then find the b [**3M**] eigen values of adjA.
 - Explain geometrical interpretation of Rolle's theorem. [2M] с

d If
$$u = x + y + z$$
, $uv = y + z$, $uvw = z$, show that $\frac{\partial(x, y, z)}{\partial(u, v, w)} = u^2 v$. [3M]

e Define exact differential equation.

[2M] f Form the differential equation of a family of circles passing through the origin and [**3M**] having centres on the x-axis.

- Solve $(D^2 + 1)y = Cosx$. [2M] g
- Solve $(4D^2 4D + 1)y = 100$. h [**3M**]
- Find the Laplace Transform of Cosht. i
- j Find $L^{-1}\left\{\frac{s^2+9s-9}{s^3-9s}\right\}$.

PART-B (50 MARKS) **SECTION-I**

Investigate for what values of λ and μ the simultaneous equations 2 [10M] $x+y+z=6, x+2y+3z=10, x+2y+\lambda z=\mu$, have (i) no solution, (ii) a unique solution, (iii) an infinite number of solutions.

OR

Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 5 & 3 \\ 3 & 2 \end{bmatrix}$. Hence find A^{-1}, A^3 . 3 a) [5M]

b) the $x_1 = (1, 2, 4), x_2 = (2, -1, 3), x_3 = (0, 1, 2), x_4 = (-3, 7, 2)$ linearly [5M] Are vectors dependent? If so express one of these as a linear combination of the others.

SECTION-II

- 4 a) If $f(x) = e^x$, $g(x) = e^{-x}$, prove that 'c' of Cauchy's mean value theorem is the [5M] arithmetic mean between a and b.
 - b) Using Maclaurin's series, expand the function log(1+x). [5M]

[2M] [**3M**]

A rectangular box open at the top is to have volume of 32 cubic ft. Find the [10M] dimensions of the box requiring least material for its construction. **SECTION-III** 5

6 a) Solve
$$(1+e^{\frac{x}{y}})dx + e^{\frac{x}{y}}(1-\frac{x}{y})dy = 0.$$
 [5M]
b) Solve $(1+xy)ydx + (1-xy)xdy = 0.$ [5M]
minutes. Find when the body cools down to $35^{\circ}C$. [5M]
minutes. Find when the body cools down to $35^{\circ}C$.
b) Show that the system of confocal conics $\frac{x^2}{a^2+\lambda} + \frac{y^2}{b^2+\lambda} = 1$, where λ is a parameter, is self orthogonal.
8 Solve $(D^2 - 4D + 4)y = 8x^2e^{2x}\sin 2x.$ [10M]
9 Solve $(D^2 + 4)y = 8x^2e^{2x}\sin 2x.$ [10M]
9 Solve $(D^2 + 4)y = 8x^2e^{2x}\sin 2x.$ [10M]
10 a) Find $L\{e^{2t} + 4t^3 - 2\sin 3t + 3\cos 3t\}$ [5M]
b) Find $L\{f(t)\}$, where f(t) is a periodic function of period 2π and it is given by [5M]
 $f(t) = \begin{cases} \sin t, & 0 < t < \pi \\ 0, & \pi < t < 2\pi \end{cases}$ [5M]
11 a) Using Convolution theorem, find $L^{-1}\{\frac{s}{(s^2 + a^2)^2}\}$. [5M]
b) Using Laplace transform, solve $(D^2 + 2D + 5)y = e^{-t}\sin t$, given that $y(0) = 0$, [5M]
 $y^{\circ}(0)=1.$

R15

Max. Marks: 75

Code No: R15A0011 MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous Institution – UGC, Govt. of India) I B.Tech I Semester supplementary Examinations, May 2019

Engineering Physics-I

(Common to all Branches)											
Roll No											

Time: 3 hours

Note: This question paper contains two parts A and BPart A is compulsory which carriers 25 marks and Answer all questions.Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

1). a	What are the necessary conditions for obtaining interference fringes.	[2M]
b	Distinguish between Fresnel diffraction and Fraunhofer diffraction.	[3 M]
с	State the properties of laser beam.	[2M]
d	Write a note on attenuation in optical fibers.	[3 M]
e	State Heisenberg's uncertainty principle.	[2M]
f	What is the physical significance of wave function.	[3 M]
g	Define Ensembles.	[2M]
h	Write the mathematical expression for the Fermi-Dirac statistics.	[3 M]
i	Distinguish between intrinsic and extrinsic semiconductors.	[2M]
j	Write short note on direct and indirect band gap semiconductors.	[3 M]
U U	PART-B (50 MARKS)	
	SECTION-I	
2	(a).Derive an expression for wavelength of light in Newton's rings experiment.	[5M]
	(b).Discuss in detail Fraunhofer diffraction due to single slit.	[5M]
	OR	
3	(a).With ray diagram discuss the theory of thin films and derive the condition for	[5M]
	constructive and destructive interference in the case of reflected system.	[5M]
	(b).State Brewster's law. How can this law be used to produce plain polarized light	
	SECTION-II	
4	(a). Describe construction and working of He-Ne gas laser.	[5M]
	(b).Write applications of lasers in medical and communication field.	[5M]
	OR	[]
5	(a).Derive an expression for Acceptance angle and Numerical aperture of an	[5M]
	optical fiber.	[5M]
	(b). Distinguish between step index and graded index fibers.	
	SECTION-III	
6	(a).Explain in detail the Davisson and Germer's experiment to prove the existence	[5 M]
	of matter waves.	

	(b).Derive time independent Schrodinger's wave equation.	[5M]
	OR	
7	(a). Show that the energies of a particle in a potential box are quantized.	[5 M]
	(b). What are matter waves? Derive the expression for Debroglie's wavelength.	[5M]
	<u>SECTION-IV</u>	
8	(a). Distinguish between M.B, B.E, and F.D distributions.	[5M]
	(b).Explain the origin of energy bands in solids.	[5M]
	OR	
9	(a).Discuss the Kronig Penny model for the motion an electron in a periodic	[5M]
	potential.	[5M]
	(b).On the basis of band theory, how the crystalline solids are classified into	
	conductors, semiconductors and insulators.	
	SECTION-V	
10	(a).Derive an expression for the carrier concentration of p-type semiconductor.	[5M]
	(b).Explain Hall effect and derive an expression for Hall coefficient.	[5M]
	OR	
11	(a). Discuss the formation of PN junction diode.	[5M]
	(b).Draw I-V characteristic curve of a PN junction diode and explain.[5]	[5M]

Code No: R15A0013 MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous Institution – UGC, Govt. of India)

I B.Tech I Semester supplementary Examinations, May 2019

Engineering Chemistry

$(ECE, CSE \approx 11)$										
Roll No										

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B Part A is compulsory which carriers 25 marks and Answer all questions. Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions,

Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

1). a b	Write Nernst equation for calculation of e.m.f. of cell and mention the terms in it. What is meant by battery? What are the characteristics of good battery?	[2M] [3M]
c d	Write the conditions under which the electrochemical corrosion takes place? Galvanized containers are not used for storage of food products, but tin coated containers are used. Comment on the statement.	[2M] [3M]
e	PVC is soft and flexible; whereas Bakelite is hard and brittle. Give reason.	[2M]
f	What are refractories? What are the characteristics of good refractory?	[3 M]
g	What are the salts responsible for the temporary and permanent hardness?	[2M]
h	What do you mean by priming and foaming?	[3M]
i	Why natural gas is called a fossil fuel?	[2M]
j	Give an account on formation of coal.	[3 M]
	PART-B (50 MARKS)	
	SECTION-I	
2	a. How can you determine the pH of a solution by calomel electrode	[5M]
	b. Discuss about Hydrogen-Oxygen fuel cell with a neat design and chemical reactions.	[5M]
	OR	
3	a. Define equivalent conductance.0.05N solution of a salt occupying volume between two platinum electrodes of 1.72 cm apart and area 4.5cm ² has a resistance of 250 ohms. Calculate the equivalent conductance of the solution.	[5M]
	b. Define reversible and irreversible cells with examples. List out the conditions of reversibility. SECTION-II	[5M]
4	a. Make use of cell reactions and explain the mechanism of electrochemical corrosion by oxygen consumption.	[5M]
	1. What are the maximum binetime of electric plating 0 Circles are electric field.	F / T A / T A

b. What are the main objectives of electro plating? Give an account of the **[5M]** method using in electroplating.

		OR									
5	a.	Write the differences between electrochemical series and galvanic series?	[5M]								
	b.	Discuss how metals are protected by impressed current cathode method.	[5M]								
		<u>SECTION-III</u>									
6	a.	Discuss the term "Elastomer". Explain the synthesis, properties and	[6M]								
		applications of BUNA-S.									
	b.	What are Nanomaterials? Discuss briefly about the applications of the nanomaterials?	[4M]								
		OR									
7	a.	Distinguish between thermoplastic resins and thermosetting resins.	[5M]								
	b.	What is a lubricant? Give an account on classification and properties of lubricants.	[5M]								
		SECTION-IV									
8	a.	Explain zeolite process for the softening of water?	[5M]								
	b.	Write a short note on specifications of portable water.	[2M]								
	c.	What is breakpoint chlorination?	[3M]								
		OR									
9	a.	Determine the temporary, permanent and total hardness in degree Clark	[5M]								
		units for a water sample which showed the following analysis. Ca									
		$(HCO_3)_2 = 16.2 \text{ mg/lit}, \text{ MgCO}_3 = 29.2 \text{ mg/lit}, \text{ NaCl} = 5.85 \text{ mg/lit}, \text{ CaCl}_2 = 16.2 \text{ mg/lit}, \text{ MgCO}_3 = 29.2 \text{ mg/lit}, \text{ NaCl} = 5.85 \text{ mg/lit}, \text{ CaCl}_2 = 16.2 \text{ mg/lit}, \text{ MgCO}_3 = 29.2 \text{ mg/lit}, \text{ NaCl} = 5.85 \text{ mg/lit}, \text{ CaCl}_2 = 16.2 \text{ mg/lit}, \text{ MgCO}_3 = 29.2 \text{ mg/lit}, \text{ MgCO}_3 $									
		11.1mg/lit, $MgSO_4 = 12.0$ mg/lit, Organic matter = 15.5mg/lit.									
	b.	What is brackish water? How to make the brackish water fit for domestic	[5M]								
		usage by reverse osmosis?									
		<u>SECTION-V</u>									
10	a.	How do you explain knocking in a diesel engine? How can it be controlled?	[5M]								
	b.	What is Calorific value? Explain HCV and LCV.	[5M]								
		OR									
11	a.	Explain the ultimate analysis of coal and its significance.	[5M]								
	b.	Describe a method of catalytic cracking of petroleum fractions and discuss	[5M]								
		the advantages of catalytic cracking.									

Code No: R15A0014 MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous Institution – UGC, Govt. of India)

I B.Tech I Semester supplementary Examinations, May 2019 Environmental Studies

(ME & AE)

()										
Roll No										

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B Part A is compulsory which carriers 25 marks and Answer all questions. Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

1). a	Define Ecology and Eco-Systems.	[2M]
b	What are Food Webs? Give Example of a Food Web.	[3 M]
с	Discuss the Consequences of Over utilization of Ground and Surface water	[2M]
	Resources.	
d	Classify the Resources.	[3M]
e	Define Genetic Bio-diversity. Give example	[2M]
f	What are the Consumptive uses Values of Bio-diversity.	[3 M]
g	Write a short note on Green house effect.	[2M]
ĥ	Discuss the impacts of Climate Change on Environment in brief.	[3M]
i	Define EIA. Write a note on components of EIA.	[2M]
j	Write note on Montreal Protocol.	[3 M]
Ū	PART-B (50 MARKS)	
	SECTION-I	
2 a.	Explain the Carbon Cycle with a neat sketch.	[5M]
b.	Discuss the Structural aspects of an Eco-system.	[5M]
	OR	
3 a.	Define Ecological Pyramids. What are the various types of Ecological Pyramids	[7M]
	an Eco-system.	
b.	Write a detailed note on Bio-magnification, Bio-accumulation.	[3 M]
	SECTION-II	
4 a.	Explain the Role of Renewable Resources in meeting the needs of Present Society.	[7M]
b.	Classify the Natural and Man-made Resources.	[3 M]
	OR	
5 a.	Deforestation is a major threat for Environmental Consequences - Discuss.	[5M]
b.	Write a detailed note on advantages and disadvantages of Dams.	[5M]
	SECTION-III	
6	Bio-diversity is playing an important role in Ecological Balance – Justify with	[10M]
	your answer.	_

OR

7 What is meant by Bio-Diversity. Explain the major Hot-spots of India and threats [10M] to Bio-diversity.

SECTION-IV

8 Define Water Pollution. Explain the Impacts of Modern Agricultural Practices on [10M] Soil Quality

OR

Explain causes effects and control measures for air pollution. 9 a. [8M] b. Discuss Composition and Components of e- Waste Management [2M] **SECTION-V** Discuss the following a) Population Explosion b) Concept of Sustainable 10 a. [5M] Development. Discuss Air (Prevention and Control of Pollution) Act, 1986. b. [5M] OR 11 Explain the Salient Features of Hazardous Waste Management and Handling [10M] Rules in India.

Code No: **R15A0501**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

I B.Tech I Semester supplementary Examinations, May 2019

Computer Programming with C

(Common to all branches)												
Roll No												
									Μ	ax. I	Marks	: 75

Time: 3 hours

Note: This question paper contains two parts A and B Part A is compulsory which carriers 25 marks and Answer all questions. Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

1). a	List out the different types of software's?	[2M]
b	Define an Algorithm? List out the Algorithm properties	[3M]
c	Differentiate between actual and formal parameters	[2M]
d	Explain the function prototype?	[3M]
e	List the input/output functions for strings	[2M]
f	Differentiate between Strings and Arrays?	[3M]
g	Define Pointer to Pointer.	[2M]
h	Write a program on pointer arithmetic	[3M]
i	Differentiate between Structure and union	[2M]
j	Describe about typedef and enum.	[3M]
	PART-B (50 MARKS)	
	<u>SECTION-I</u>	
2	a) Write about different types of operators	[5M]
	b) Explain Entry control loop and Exit control loop	[5M]
	OR	
3	a) State the program development steps	[5M]
	b) Write a C program to find arithmetic operations using switch statement	[5M]
	<u>SECTION-II</u>	
4	Define Recursion? Write a C program to find GCD of two numbers using	[10M]
	Recursion?	
	OR	
5	a) Explain about different Storage classes	[6M]
	b) Define function. Explain categories of functions.	[4M]
	SECTION-III	
6	a) Write about String manipulation functions?	[5M]
	b) How to pass 1D array to function explain with example program?	[5M]
7	OR	[5]/[]
/	a) Explain otherty about string nationing functions?	[3]VI] [5]VI]
	b) write a C Program to check whether given string is a paindrome of not?	[3][1]
0	<u>DECTION-IV</u> Write a short note on dynamic memory management functions	[10]
ð	write a short note on dynamic memory management functions.	

		OR	
9	a)	Explain briefly about pointer to 1-D array with program?	[5 M]
	b)	Differentiate pointers to functions and pointers with functions.	[5M]
		SECTION-V	
10	a)	Define structure. Write a C program on structure with in structure	[5M]
	b)	Write a C program to merge two files into a third file.	[5M]
		OR	
11	a)	Write about self-referential structures with example program?	[5M]
	b)	Write a C program to copy one file to another?	[5M]

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Code No: R15A0302 MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India) I B.Tech I Semester supplementary Examinations, May 2019 Engineering Drawing (ECE_CSE_& IT)

Roll No	$(ECE, CSE \otimes II)$										
	Roll No										

Time: 3 hours

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 15marks.

SECTION - I

a) Draw a regular pentagon having 40mm long sides, using general method. [5M]
 b) Draw an ellipse when the distance of its focus from the directrix is 60mm and eccentricity is 3/5. Also, draw a tangent and normal to the ellipse at a point distant 100mm away from the directrix. [10M]

(OR)

2. A circus man rides on a motor cycle inside a globe having a 6 m diameter. The motor cycle wheel is 1 m in diameter. Draw the locus of a point lying on the circumference of the wheel of the motor cycle for one complete run. [15M]

<u>SECTION – II</u>

3. a) A point A is 40 mm above H.P and 25 mm in front of V.P. Another point B is 20 mm behind V.P and 30 mm below H.P. The horizontal distance between the points is 100. Draw the projections of the points A and B and join their front views and top views.[5M]

b) A line inclined at 60° to the V.P has a 60 mm long line. One end of the line is 20 mm in front of the V.P. The line is 15 mm above the reference line. Draw its projections. [10M]

(**OR**)

4. A 120 mm long line PQ has its ends P and Q 10 mm and 60 mm below the H.P., respectively. The end projectors are 50 mm apart. The mid-point of PQ is 60 mm in front of the V.P. Draw the projections and find the angles with both the reference planes.[15M]

SECTION – III

5. A thin circular lamina with a 70 mm diameter. Draw its projections. It is inclined at 30° to the H.P., while the other is inclined at 45° to the V.P. [15M]

(**OR**)

6. A hexagonal prism, having base with 30 mm side and a 70 mm long axis, is resting on one of the edges of its base in the H.P. such that the edge makes 60° with the V.P. and the base makes an angle of 60° with the H.P. Draw its projections. [15M]

SECTION - IV

7. Draw an isometric view of a pentagonal pyramid having a base with a 30 mm side and a 50 mm long axis (a) when its axis is vertical and (b) when its axis is horizontal. [15M]

Max. Marks: 75

(**OR**)

8. The frustum of a cone with a 60 mm base diameter, 40 mm top diameter and 50 mm height is surmounted centrally over a cylindrical block with a 80 mm diameter and 30 mm thickness. Draw its isometric projections. [15M]

<u>SECTION – V</u>

9. Draw front view, top view and side view for isometric view as shown below. All dimensions are in mm.[15M]



(**OR**)

10.Draw isometric view from given orthographic views as shown below. All dimensions are in mm. [15M]



Code No: R15A0301 MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous Institution – UGC, Govt. of India) I B.Tech I Semester supplementary Examinations, May 2019 Engineering Mechanics

(ME & AE)

Roll No										

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

1). a	State and explain parallelogram law of forces.	[2M]
b	State and explain Varignon's theorem.	[3 M]
c	Define the term "Friction". What are coulomb's laws of dry friction?	[2M]
d	Define a Free Body Diagram. Draw the FBD for ball-and-socket joint.	[3 M]
e	State pappus theorem.	[2M]
f	Write the coordinates for the centroids of parabola and semi parabola	[3 M]
g	Find the product of inertia of a rectangle of sides a and b with respect to the axes	[2M]
	that lie along its two sides.	
h	Explain the terms moment of inertia and radius of gyration.	[3 M]
i	What is a rolling body? Explain its importance.	[2M]
j	Explain briefly about the kinematics of rotational Motion around a fixed axis.	[3 M]
	PART-B (50 MARKS)	
	SECTION-I	
2	Determine the resultant of the system of concurrent forces having the following magnitudes and passing through the origin and indicated points: P=280N	[10M]
	(12, 6,-4); T=520N (-3, -4, 12); F=270N (6, -3, -6).	

OR

3 Figure 1 shows two vertical forces and a couple of moment 2000 N-m acting on a **[10M]** horizontal rod, which is fixed at, end A. Determine the resultant of the system.



4 An inclined plane and a vertical wall as shown in below Figure.2 support two **[10M]** identical rollers, each of weight 100 N. Assuming smooth surfaces; find the reactions induced at the points of support A, B and C.



Figure 2 OR

5 In a screw – jack, where the helix angle of thread is α and the angle of friction is [10M] φ , W is the load to be moved up / down, and P is the effort applied horizontally to a lever at a distance L from the axis of the screw, discuss the effects of moving the load (a) up and (b) down, if (i) $\varphi < \alpha$, and (ii) $\varphi > \alpha$ in each case.

SECTION-III

6 a) From the first principle find the centroid of a right angle triangle of height h and **[5M]** breadth b.

b) Determine the coordinates x_c and y_c of the centre of a 100 mm diameter circular hole cut in a thin plate so that this point will be the centroid of the remaining shaded [5M] area shown in figure 3. All dimensions are in mm.



7 a) Determine the centre of gravity of a solid hemisphere of radius R from its diametric [5M]

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axis.

b) Locate the centre of gravity of a right circular cone with base radius **r** and altitude **[5M] h** about the axis which is along the X-axis.

SECTION-IV

8 Find the moment of inertia of the T-Section shown in fig4





9 a) Find the mass moment of inertia of a hollow sphere with respect to a diameter if [5M] the mass per unit volume of the material is ρ and the outer and inner radii are Ro and Ri, respectively.

b) From basic principles find the moment of inertia of a solid disc. [5M]

<u>SECTION-V</u>

10a) A particle moves along straight line. Its motion in represented by the equation[5M]S = 16t + 4t2 - 3t3 where S is in metres and t, in seconds. Determine

i. displacement, velocity and acceleration 2 seconds after start.

ii. displacement and acceleration when velocity is zero and

iii. displacement and acceleration when acceleration is zero.

b) A train is uniformly accelerated and passes successive kilometer stones with velocities of 18km/hr and 36km/hr respectively. Calculate the velocity when it passes the third kilometer stone. Also find the time taken for each of the two intervals of one kilometer.

OR

11 A solid cylinder weighing 1200 N is acted upon by a force P horizontally as [10M] shown in figure 5. Determine the maximum value of P for which there will be rolling without slipping. If P= 1000 N, determine the acceleration of the mass centre and the angular acceleration, given that the coefficient of static friction $\mu s = 0.2$ and the co-efficient of kinetic friction $\mu k = 0.15$.



[10M]