

Code No: R15A0013**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****I B.Tech I Semester Supplementary Examinations, February 2021****Engineering Chemistry****(ECE, CSE & IT)**

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Time: 2 hours 30 min**Max. Marks: 75**Answer Any **Five** Questions

All Questions carries equal marks.

- 1 Write the construction and working of Calomel electrode with neat diagram and proper reactions involved in it. **[15M]**
- 2 Write a brief note on construction, working and reactions involved in lead acid battery . **[15M]**
- 3 Discuss the chemical and electrochemical theories of corrosion. **[15M]**
- 4
 - a. Write the procedure involved in Electroplating of Cu. **[7M]**
 - b. Define hot dipping and explain the process of Galvanisation using neat diagram **[8M]**
- 5 Write a detailed note on various types of Polymerization. **[15M]**
- 6 Write a short note on following properties of lubricants **[15M]**
 - i. Cloud point
 - ii. Pour point
 - iii. Flash and fire points.
- 7 How hard water is softened by Ion exchange process? Explain in detail with neat diagram. **[15M]**
- 8 Write the steps involved in refining of petroleum with neat sketch. **[15M]**

Code No: **R15A0302****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

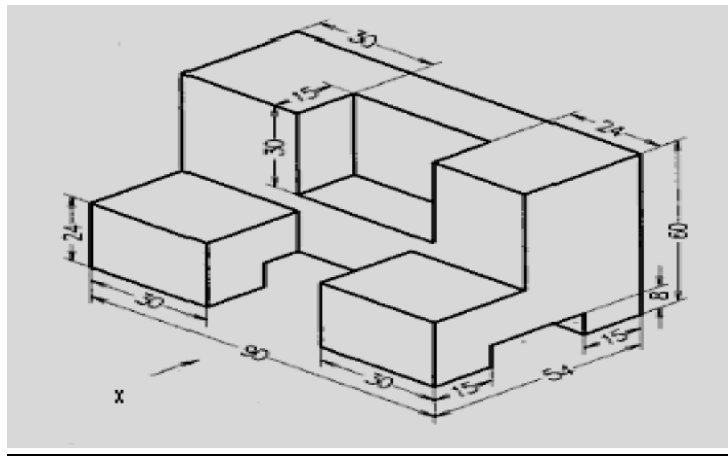
I B.Tech I Semester Supplementary Examinations, February 2021**Engineering Drawing****(ECE, CSE & IT)**

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Time: 2 hours 30 min**Max. Marks: 75**Answer Any **Five** Questions

All Questions carries equal marks.

- 1 Construct a parabola when the distance between the focus and directrix is 30mm. Draw the tangent and normal at the any point on the curve [15M]
- 2 Draw a hypocycloid of a circle of 40 mm diameter which rolls inside another circle of 200 mm diameter for one revolution. Draw a normal and tangent at any point on it [15M]
- 3 [15M]
Draw the projections of the following points on a common reference line:
(i) P, 40 mm below HP and in the VP
(ii) Q, 35 mm behind VP and in the HP
(iii) R, 25 mm below HP and 25 mm in front of VP
(iv) S, 30 mm behind VP and 45 mm below HP.
(v). Point A lies in the H.P. and 22 mm in front of the V.P.
(vi). Point B lies 20 mm behind the V.P. and 32 mm above the H.P.
(vii). Point C lies 32 mm below the H.P. and 22 mm in front of V.P.
- 4 The projections of the ends of a line EF are on the same projector. The end E is 10 mm above HP and 15 mm in front of VP. The end F is 35 mm above HP and 45 mm in front of VP. Draw the projections. Find the true length, true inclinations and traces [15M]
- 5 A Hexagonal lamina of 20 mm side rests on one of its corners on the HP. The diagonal passing through this corner is inclined at 45° to the HP. The lamina is then rotated through 90° such that the top view of this diagonal is perpendicular to the VP and the surface is still inclined 45° to the HP. Draw the projections of the lamina [15M]
- 6 Draw the top and front views of a rectangular pyramid of sides of base 40X50 mm and height 70 mm when it lies on one of its larger faces on HP. The longer edge of the base of the triangular face lying on HP is inclined at 60° to VP in the top view with the apex of the pyramid being nearer to VP. [15M]
- 7 A hollow cylinder of base 50 mm diameter and axis 70 mm long has a square hole of 20 mm side. The axis of the cylinder and the hole coincide. Draw the three possible ways of representing the isometric projection of the solid [15M]
- 8 Draw Front view, top view and side view of a given object (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, February 2021

Engineering Mechanics

(ME & AE)

Roll No									
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Time: 2 hours 30 min

Max. Marks: 75

Answer Any **Five** Questions
All Questions carries equal marks.

- 1(a) Find the resultant of the force acting on a particle P as shown in **Fig:1** **[5+10M]**

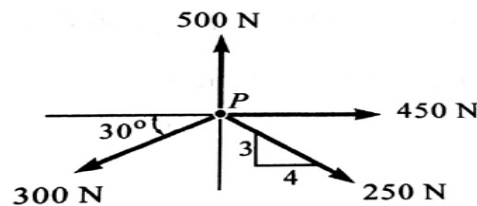


Fig:1

- (b) Three collinear horizontal forces of magnitude 150N, 450N and 300N are acting On a rigid body. Determine the resultant of forces when (i) all the forces are acting in the same direction; (ii) the force of 300N act in the same direction. **[8+7M]**
- 2(a) Explain how will you reduce the system of coplanar, non-concurrent forces to a force and a couple? **[8+7M]**
- (b) What do you understand by the term ‘Couple’? Discuss the characteristics of a couple
- 3 Two smooth cylinders with diameters 250 mm and 400 mm respectively are kept **[15M]**
in a groove with slanting surfaces making angles 60° and 30° as shown in the **Figure 2**. Determine the reactions at contact points A, B and C.

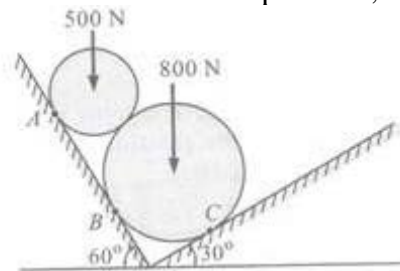


Figure 2

- 4 An effort of 200N is required just to move a certain body up an inclined plane of angle 15°, the force acting parallel to the plane. If the angle of inclination of the plane is made 20°, the effort, required, again applied parallel to the plane, is found to be 230N. Find the weight of body and the Co-efficient of friction **[15M]**
- 5 Locate the centroid of an I-section about X-X axis as shown in the **figure-3**. **[15M]**

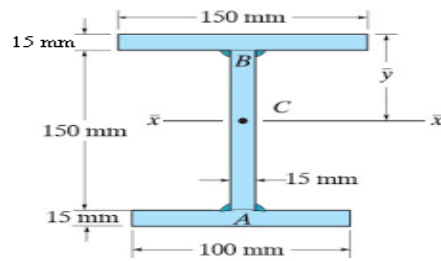


figure-3

- 6 Using the analytical Method, determine the centre of gravity of the plane lamina of given Fig:4 [15M]

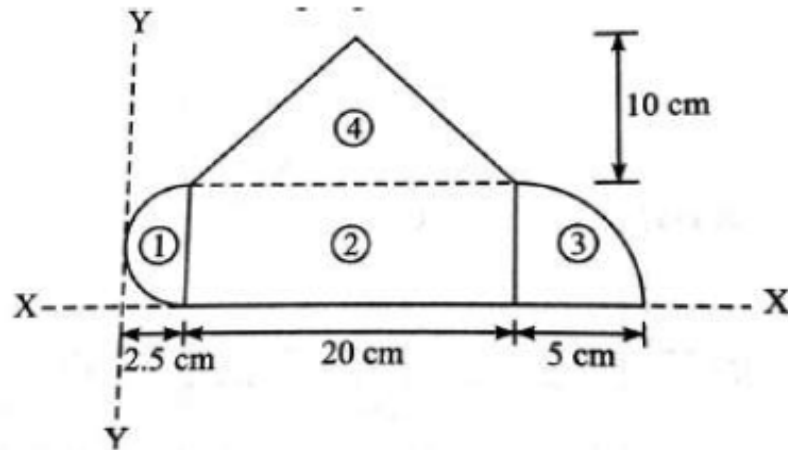
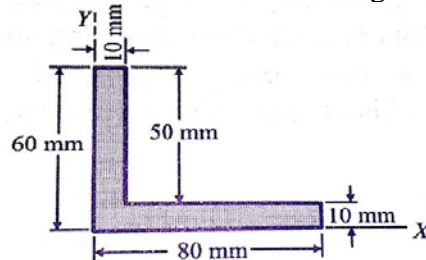


Fig:4

- 7 Find area moment of inertia of L section shown in Figure about X axis [15M]



- 8 Two bodies of weight 60N and 40N are connected to the two ends of a light inextensible string. The string is passing over a smooth pulley. Determine:
 (i) the acceleration of the system
 (ii) the tension in the string. Take $g=9.8\text{m/s}^2$ [15M]

Code No: R15A0011**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****I B.Tech I Semester Supplementary Examinations, February 2021****Engineering Physics-I****(ME, ECE, CSE, IT & AE)**

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Time: 2 hours 30 min**Max. Marks: 75**

Answer Any **Five** Questions
All Questions carries equal marks.

- 1 Discuss the phenomenon of interference in thin films by reflected light. Obtain the conditions for maxima and minima. [15M]
- 2 Derive an expression for the intensity distribution due to diffraction at a single slit. [15M]
- 3 Explain principle, construction and working of Semiconductor laser with the help of Energy Level Diagram. [15M]
- 4 Define Numerical Aperture and Acceptance angle. Derive the expressions for them. [15M]
- 5 Derive an expression for Schrodinger time independent wave equation. [15M]
- 6 Describe Davisson and Germer experiment to verify the wave nature of matter. [15M]
- 7 a) Compare the highlights of M-B, F-D & B-E distributions. [10M]
b) Explain Formation of energy bands in solids by using Band theory of solids. [5M]
- 8 Explain the principle, construction and working of solar cell with necessary diagrams and mention its characteristics. [15M]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

I B.Tech I Semester Supplementary Examinations, February 2021**Mathematics-I****(ME, ECE, CSE, IT & AE)**

Roll No									
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Time: 2 hours 30 min**Max. Marks: 75**

Answer Any **Five** Questions
All Questions carries equal marks.

1 a) Reduce the given matrix into normal form and hence find the rank $\begin{pmatrix} 2 & 3 & -2 & 5 & 1 \\ 3 & -1 & 2 & 0 & 4 \\ 4 & -5 & 6 & -5 & 7 \end{pmatrix}$.

b) For a matrix $A = \begin{bmatrix} 1 & 2 & -3 \\ 0 & 3 & 2 \\ 0 & 0 & -2 \end{bmatrix}$ find the Eigen values of $3A^3 + 5A^2 - 6A + 2I$.

[8M+7M]

2. If $A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ verify Cayley-Hamilton theorem. Find A^{-1} using Cayley- Hamilton theorem. [15M]

3. a) Prove that $\frac{\pi}{6} + \frac{1}{5\sqrt{3}} < \sin^{-1}\left(\frac{3}{5}\right) < \frac{\pi}{6} + \frac{1}{8}$.

b) Find minimum values of $x^2 + y^2 + z^2$ if $x + y + z = 3a$. [8M+7M]

4. a) Verify Rolle's Theorem for $\log \left[\frac{x^2+ab}{x(a+b)} \right]$ on $[a,b]$, $b > a > 0$.

b) Using Taylor's series expand $f(x, y) = e^y \log(1+x)$ in powers of x and y . [7M+8M]

5. a) Solve $x^3 \sec^2 y \frac{dy}{dx} + 3x^2 \tan y = \cos x$.

b) If the surroundings are maintained at 30°C and the temperature of body cools from 80°C to 60°C in 12 minutes, find the temperature of body after 24 minutes. [7M+8M]

6 a) Find the orthogonal Trajectory of the family of $ay^2 = x^3$.

b) If the population is increasing exponentially at the rate of 2% per year. What will be the percentage increase over a period of 10 years? [8M+7M]

7. Apply the method of variation of parameters to solve $\frac{d^2y}{dx^2} + y = \tan x$. [15M]

8. Solve $\frac{d^2x}{dt^2} + 2\frac{dx}{dt} + 5x = e^{-t}\sin t, x(0) = 0, x'(0) = 1$ by using Laplace Transform. [15M]

Code No: **R15A0501****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

I B.Tech I Semester Supplementary Examinations, February 2021**Computer Programming with C****(ME, ECE, CSE, IT & AE)**

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Time: 2 hours 30 min**Max. Marks: 75**

Answer Any **Five** Questions
All Questions carries equal marks.

- 1 a) Sketch the structure of C program and explain. [7M]
b) Elucidate how do you create and run a C program [8M]
- 2 Illustrate the standard data types supported by C language. [15M]
- 3 a) Distinguish between actual and formal parameters with an example. [7M]
b) Differentiate between call by value and call by reference with an example [8M]
- 4 Describe the following with examples: [15M]
 - i. Function definition
 - ii. Function call
 - iii. Function declaration.
- 5 Define array. Explain the declaration and initialization of one dimensional and two dimensional array with an example [15M]
- 6 a) Explain declaration and initialization of array of strings. [7M]
b) Develop a C program to find whether a given string is palindrome or not. [8M]
- 7 Briefly explain the concept of functions returning pointers with example. [15M]
- 8 Exemplify the following: i. Self-referential structure ii. Typedef declarations iii. Enumerations, iv. Union [15M]
