

Code No: R15A0021

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech I Semester Supplementary Examinations, Nov/Dec 2018****Mathematics-I****(Common to all branches)**

<b>Roll No</b>									
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**Time: 3 hours****Max. Marks: 75**

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

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**PART-A (25 Marks)**

- 1). a Define rank of a matrix. [2M]
- b Let  $A$  be the  $2 \times 2$  matrix with elements  $a_{11} = 1, a_{12} = 4, a_{21} = 3$  and  $a_{22} = 2$ , then find the eigen values of the matrix  $A^T$ . [3M]
- c Find the value of  $c$  of Rolle's theorem in  $(-1,1)$  for  $f(x) = x^3 - x$ . [2M]
- d Define the terms; Saddle point and Stationary value of  $f(x, y)$ . [3M]
- e Write any two applications of first order differential equations. [2M]
- f Form a differential equation of  $y = A \cos 2x + B \sin 2x$ . [3M]
- g Solve  $(D^2 + 1)y = 0$ . [2M]
- h Solve  $(D^2 + 4D + 3)y = e^{2x}$ . [3M]
- i Find the Laplace Transform of  $\text{Sinh}t$ . [2M]
- j Find  $L^{-1} \left\{ \frac{3s-8}{4s^2+25} \right\}$ . [3M]

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

- 2 Find the values of  $\lambda$  and  $\mu$  for which the simultaneous equations  $2x + 3y + 5z = 9, 7x + 3y - 2z = 8, 2x + 3y + \lambda z = \mu$ , have (i) no solution, (ii) a unique solution, (iii) an infinite number of solutions [10M]

OR

- 3 a) Verify Cayley-Hamilton theorem for the matrix  $A = \begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$  and find its inverse. [5M]

Also express  $A^5 - 4A^4 - 7A^3 + 11A^2 - A - 10I$  as a linear polynomial in  $A$ .

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

**SECTION-II**

- 4 a) Verify Cauchy's mean value theorem for the functions  $f(x) = \sqrt{x}, g(x) = \frac{1}{\sqrt{x}}$  in the interval  $[a, b]$ , where  $0 < a < b$ . [5M]
- b) Expand  $\log_e x$  in powers of  $(x-1)$  and hence evaluate  $\log_e 1.1$  correct to 4 decimal places. [5M]

OR

- 5 The temperature  $T$  at any point  $(x, y, z)$  in space is  $T = 400xyz^2$ . Find the highest temperature on the surface of the unit sphere  $x^2 + y^2 + z^2 = 1$ . [10M]

**SECTION-III**

- 6 a) Solve  $(y \log y)dx + (x - \log y)dy = 0$ . [5M]  
b) Solve  $\frac{dy}{dx} + \frac{1}{x}y = \sin x$  [5M]

OR

- 7 a) A bacterial culture, growing exponentially, increases from 200 to 500 grams in the period from 6a.m. to 9a.m.. How many grams will be present at noon. [5M]  
b) Find the Orthogonal Trajectories of the family of circles  $x^2 + y^2 = a^2$ . [5M]

**SECTION-IV**

- 8 Solve  $(D^2 + 3D + 2)y = e^x \sin x$ . [10M]

OR

- 9 Determine  $q$  and  $i$  in an RLC circuit with  $L = 0.5H, R = 6\Omega, C = 0.02 F, e = 24 \sin 10t$  and initial conditions  $q = i = 0$  at  $t = 0$ . [10M]

**SECTION-V**

- 10 a) Find (i)  $L\{e^{3t} \sin^2 t\}$  and (ii)  $L\{e^{-3t} (2 \cos 5t - 3 \sin 5t)\}$  [5M]  
b) Find  $L\left\{\frac{\sin t}{t}\right\}$ . [5M]

OR

- 11 a) Using Convolution theorem, find  $L^{-1}\left\{\frac{s^2}{(s^2 + 4)(s^2 + 9)}\right\}$ . [5M]  
b) Using Laplace transform, solve  $(D^2 + 4D + 5)y = 5$ , given that  $y(0) = 0, y'(0) = 0$ . [5M]

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Code No: **R15A0011**

**MALLA REDDY COLLEGE OF ENGINEERING &  
TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech I Semester Supplementary Examinations, Nov/Dec 2018**

**Engineering Physics-I**

(Common to all branches)

<b>Roll No</b>										
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**Time: 3 hours**

**Max. Marks: 75**

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

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**PART – A**

**(25 Marks)**

1. (a). Define Interference of light. [2M]
- (b). Distinguish between Fresnel diffraction and Fraunhofer diffraction. [3M]
- (c). Explain basic principle of optical fiber. [2M]
- (d). Distinguish between population and population inversion. [3M]
- (e). Explain de-Broglie hypothesis. [2M]
- (f). Discuss dual nature of the light. [3M]
- (g). Define Ensembles. [2M]
- (h). Draw a neat diagram of EK- curve. [3M]
- (i). Define Fermi level at 0K and TK. [2M]
- (j). Draw energy level diagram of PN junction diode. [3M]

**PART – B**

**(50 Marks)**

**SECTION – I**

2. (a). Derive an expression for interference in thin films by reflected light. [5M]
- (b). Write the difference between Fresnel and Fraunhofer diffractions [5M]

(OR)

3. (a). Discuss Fraunhofer diffraction due to a single slit [7M]
- (b). Write a note on Brewster Law. [3M]

**SECTION – II**

4. (a). Discuss construction and working principle of Ruby laser. [6M]
- (b). Write any four applications of lasers. [4M]

(OR)

5. (a). Explain the basic principle in optical fiber . [4M]
- (b). Describe the structure of different types of optical fibers with ray paths [6M]

**SECTION – III**

6. (a). Explain with neat sketch the experimental verification of matter waves by using Davisson and Germer's experiment. [5M]
- (b). Discuss physical significance of wave function [5M]

(OR)

7. (a). Apply Schrodinger equation to the case of particle in a one dimensional infinite potential box and show that the energies of particle are quantized. [7M]  
(b). State Heisenberg uncertainty principle. [3M]

**SECTION – IV**

8. (a). Explain Fermi Dirac distributions. [5M]  
(b). Write the origin of energy bands in solids. [5M]

(OR)

9. (a). Derive an equation for effective mass of electron. [5M]  
(b). Distinguish between M.B and B.E distributions. [5M]

**SECTION – V**

10. Derive an expression for Concentration of holes in a valence band in intrinsic semiconductor. [10M]

(OR)

11. (a). Distinguish between Direct and Indirect band gaps of semiconductors. [4M]  
(b). With a neat diagram, discuss construction and working principle of LED. [6M]

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Code No: R15A0013

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech I Semester Supplementary Examinations, Nov/Dec 2018****Engineering Chemistry****(EEE, ECE, CSE & IT)**

<b>Roll No</b>									
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**Time: 3 hours****Max. Marks: 75**

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

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**PART-A (25 Marks)**

- 1). a Establish the relation between equivalent and molar conductance. [2M]
- b Give a comparative account on primary and secondary cells with examples. [3M]
- c Discuss the term corrosion with an example. Why a wire mesh corrodes faster at the joints? [2M]
- d We can use aluminium in place of zinc for cathodic protection of rusting of iron. Comment. [3M]
- e Mention two properties of Teflon which makes it a “Wonder Plastic”. [2M]
- f What is the difference between flash point and fire point? [3M]
- g What is the function of alkaline buffer in the determination of hardness of water by EDTA Method? [2M]
- h Discuss briefly why do we express hardness of water in terms of calcium carbonate equivalents? [3M]
- i Distinguish between gross and net calorific value of a fuel. [2M]
- j Write about constituents, characteristics and applications of LPG. [3M]

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

- 2 a. Summarize electrochemical series along with the characteristics of metals present above and below hydrogen. Outline the applications of the series with examples. [5M]
- b. Construct a lead – acid storage cell with neat labelling and discuss the working of cell along with discharging and recharging reactions [5M]

OR

- 3 a. Explain and elaborate Nernst equation of an electrochemical cell. Evaluate the EMF of a Daniel cell at 25<sup>0</sup>C, when the concentrations of ZnSO<sub>4</sub> and CuSO<sub>4</sub> are 0.001 M and 0.1 M respectively. The standard potential of cell is 1.1 V. [5M]
- b. Explain construction and working of H<sub>2</sub>-O<sub>2</sub> fuel cell. [5M]

**SECTION-II**

- 4 a. Explain the mechanism of electrochemical corrosion by hydrogen evolution with cell reactions. [5M]
- b. Discuss how metals are protected by Sacrificial anode protection method. [5M]

OR

- 5 a. What is meant by corrosion? What are the factors affecting dry corrosion? [5M]

b. Describe briefly galvanizing of iron by zinc by hot dipping method. [5M]

**SECTION-III**

6 a. Give the method of synthesis, properties and applications of the PVC and Dacron. [5M]

b. Give an account on refractories? Mention their classification and discuss the criteria of a good refractory. [5M]

OR

7 a. Explain the extrinsic conducting polymers with suitable examples. [5M]

b. What is natural rubber? Explain the process of vulcanization of rubber. [5M]

**SECTION-IV**

8 a. Explain how ion-exchangers help in water treatment using examples of cationic and anionic ion – exchangers? [5M]

b. What is boiler corrosion? Explain briefly about the different causes for boiler corrosion? [5M]

OR

9 a. What is internal treatment of water? Explain how Calgon works in conditioning the boiler feed water. Write the chemical reactions. [6M]

b. Explain briefly about disinfection of water by chlorination and ozonisation. [4M]

**SECTION-V**

10 a. Explain the proximate analysis of coal and its significance. [5M]

b. Explain Fischer –Tropsch method of synthesis of petrol. [5M]

OR

11 a. Discuss the relative merits and demerits of solid, liquid and gaseous fuels. [5M]

b. Differentiate between octane and cetane rating. [2M]

c. What is CNG? Why it is preferred over LPG? [3M]

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Code No: **R15A0014****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech I Semester Supplementary Examinations, Nov/Dec 2018****Environmental Studies****(ME &AE)**

<b>Roll No</b>									
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**Time: 3 hours****Max. Marks: 75**

**Note:** This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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**PART-A (25 Marks)**

- 1). a Define Ecological Pyramids. [2M]
- b Define Bio-Geo Chemical Cycle. Give Examples of Gaseous Cycles. [3M]
- c Discuss the advantages and disadvantages of Dams. [2M]
- d Write short note on consequences of Deforestation. [3M]
- e Differentiate In-situ & Ex-situ Conservation of Bio-diversity. [2M]
- f Discuss Man- Wildlife conflict is one of the major threat to bio-diversity with an example. [3M]
- g What are Ozone Depleting Substances? Give examples. [2M]
- h Write a note on EIA concept. [3M]
- i Discuss the Concept of Green Building. [2M]
- j Population Explosion is a major threat to Environmental Quality - Justify [3M]

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

- 2 a. Explain the Nitrogen Cycle with a neat sketch. [5M]
- b. Discuss the Functions of Forest Eco-system. [5M]

OR

- 3 a. Define Food Chain. Explain the types of Food Chains of an Eco-system. [5M]
- b. Write a detailed note on Structural aspects of an Eco-system. [5M]

**SECTION-II**

- 4 a. Alternative Sources of Energy has bright future – Justify with your answer. [7M]
- b. Classify the Resources. [3M]

OR

- 5 a. Define Deforestation. Explain the Causes and effects of Deforestation. [5M]
- b. Write a detailed note on Non- Renewable Sources of Energy. [5M]

**SECTION-III**

- 6 Define Bio-Diversity. Explain the types, Values, Threats and Conservation types in brief. [10M]

OR

- 7 What are Hot – Spots of Bio-Diversity. Explain the two important Hot – Spots of India. [10M]

**SECTION-IV**

8 Define Pollution. Explain the Solid Waste Management Practices in India. [10M]  
OR

9 a. Write notes on global warming and its impact on Environment. [5M]

b. Discuss on ozone depletion [5M]

**SECTION-V**

10 a. Discuss the following a) Kyoto Protocol b) Montreal Protocol [5M]

b. Define Sustainable Development. Explain the threats and strategies of Sustainable Development. [5M]

OR

11 Explain the Salient Features of Bio-Medical Waste Management and Handling Rules in India. [10M]

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

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech I Semester Supplementary Examinations, Nov/Dec 2018****Computer Programming with C****(Common to all branches)**

<b>Roll No</b>									
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**Time: 3 hours****Max. Marks: 70**

**Note:** This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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**PART-A (25 Marks)**

- 1). a List out different computer languages with examples? [2M]
- b Explain briefly about SDLC with neat diagram? [3M]
- c What is the use of function prototype and write its syntax [2M]
- d Differentiate between call by value and call by reference [3M]
- e How to declare and initialize a multi dimensional array? [2M]
- f What is meant by Arrays of strings? [3M]
- g Differentiate pointers to functions and pointers with functions. [2M]
- h Explain pointer to string in detail [3M]
- i List out file Input/output Functions. [2M]
- j Define structure. Write a C program on structure with in structure [3M]

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

- 2 a) Explain different types of computing environments [5+5]
  - b) Describe Conditional statements in C language
- OR
- 3 a) Write in detail about different types of loop statements in C. [5+5]
  - b) Write a C program to find the sum of individual digits of a given number

**SECTION-II**

- 4 a) Describe parameter passing method with example program. [5+5]
  - b) List out different types of storage classes
- OR
- 5 a) Explain inter function communication with example programs? [5+5]
  - b) Explain categories of functions with example?

**SECTION-III**

- 6 a) Explain different string manipulation functions with examples [5+5]
  - b) Describe about types of array with example programs
- OR
- 7 a) Write a C program to perform multiplication of two matrices. [5+5]
  - b) Define array? Write a C Program to print given list of numbers in ascending order?

**SECTION-IV**

- 8      a) Write a C program to find the length of the given string using pointers      **[5+5]**  
       b) Explain pointers and arrays with an example program

OR

- 9      a) Explain void pointers with program?      **[5+5]**  
       b) Explain array of pointers with program?

**SECTION-V**

- 10     a) Define i. Union ii. Array of Structures      **[5+5]**  
       b) Write a C Program to copy the contents of one file to another?

OR

- 11     a) Write a C program to reverse the first n characters in a file.      **[5+5]**  
       b) Explain pointers to structures with program?

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Code No: R15A0302

R15

**MALLA REDDY COLLEGE OF ENGINEERING &  
TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech I Semester Supplementary Examinations, Nov/Dec 2018**

**Engineering Drawing**

(ECE, CSE & IT)

Roll No									
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**Time: 3 hours**

**Max. Marks: 75**

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

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**SECTION - I**

12. a) Draw a rectangular hyperbola when the position of a point P on the curve is at a distance of 30 mm and 50 mm from two asymptotes. [7M]  
b) Construct a diagonal scale showing hectometer, decameter and meter, in which a 1cm long line represents 50 m and long enough to measure up to 1 km. Find R.F. and a mark a distance of 5 hm 3 dm 7m on it. [8M]

(OR)

13. A circle having a 40 mm diameter rolls on a circle with a 75 mm diameter. Trace the path of a point lying on the circumference of the rolling circle, when the rolling circle moves outside the outer circle. Name the curve. Also, draw a tangent and a normal to the curve at 100 mm from the center of bigger circle. [15M]

**SECTION – II**

14. a) A point at 25 mm above the reference line xy is the front view of the two points A and B. The top view of A is 40 mm behind the V.P and the top views of B is 50 mm in front of V.P. Draw the projections of the points and state their positions relative to the planes of projection and the quadrant in which they lie. [5M]

- b) A 70 mm long line is inclined at 30° to the H.P. The H.T. of the line lies 15mm below the reference line and V.T. of the line does not exist. Draw its projections when an end of the line is 25 mm above the H.P. [10M]

(OR)

15. Draw the projections of the following points on a common reference line keeping the distance between their projectors 30 mm apart. [14M]  
(a) Point A is 20 mm below the H.P and 50 mm in front of the V.P  
(b) Point B is in the H.P and 40 mm behind the V.P.  
(c) Point C is 30 mm in front of the V.P and in the H.P  
(d) Point D is 50 mm above the H.P and 30 mm behind the V.P  
(e) Point E is 20 mm below the H.P and 50 mm behind the V.P [15M]

**SECTION – III**

16. A hexagonal plane with a 30 mm side has a corner on the H.P., with its surface inclined at 45° to the H.P. Draw its projections when (a) the top view of the diagonal through the corner on

H.P. is inclined at  $30^\circ$  with the V.P., and (b) the diagonal through the corner on H.P. is inclined at  $30^\circ$  with the V.P. [15M]

(OR)

17. A cone, having a base with 50 mm diameter and a 70 mm long axis, is resting on one of the generators on the ground and is inclined at  $30^\circ$  to the V.P. Draw its projections when the apex is nearer to the V.P. than to the base. [15M]

**SECTION – IV**

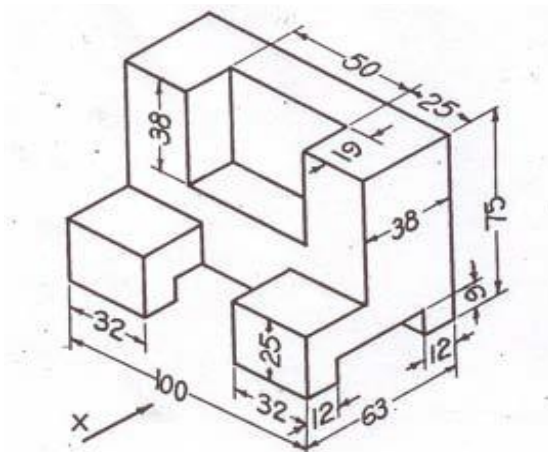
18. a) Draw an isometric view of a hexagon with 40 mm sides such that its surface is parallel to H.P. and a side parallel to V.P. [5M]  
b) Draw an isometric view of a hexagonal prism having a base with a 30 mm side and 70 mm long axis resting on its base on the H.P. [10M]

(OR)

19. Draw isometric projection of a frustum of a sphere with a 60 mm diameter, frustum circle with a 40 mm diameter, resting centrally on a cube with a 50 mm side such that the circle of the frustum is horizontal and do not touch the cube. [15M]

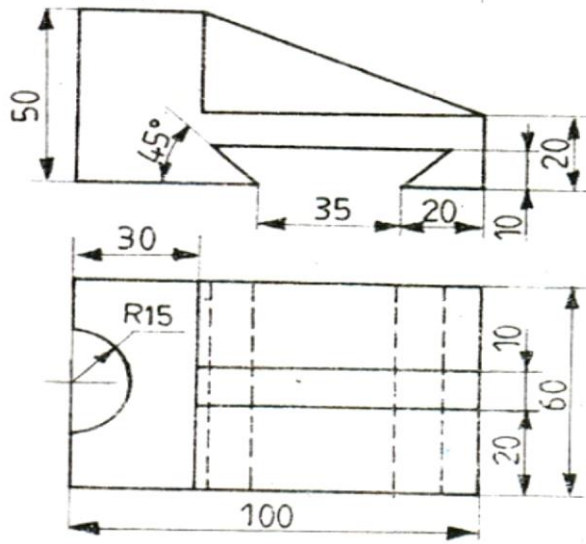
**SECTION – V**

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



(OR)

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



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Code No: **R15A0301****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech II Semester supplementary Examinations, Nov/Dec 2018****Engineering Mechanics****(Common to All Branches)**

<b>Roll No</b>									
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**Time: 3 hours****Max. Marks: 75****Note:** This question paper contains two parts A and B

Part A is compulsory which carries 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.

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**PART-A (25 Marks)**

- 1). a Write the definition and unique property of couple. [2M]
- b A force of magnitude 150 N passes through the origin and point, which has the coordinates (40, 60, -80). Determine its x, y, z components. [3M]
- c State the equations of equilibrium for planar systems. [2M]
- d What is a wedge? State its uses and the method of solving the problems on wedge friction. [3M]
- e Write the centroids of rectangle and triangle. [2M]
- f Differentiate centroid and centre of gravity. [3M]
- g Define polar moment of inertia. [2M]
- h Explain transfer formula for product of inertia. [3M]
- i Write the differential equation of motion of Rectilinear motion, and explain it. [2M]
- j A force of 500N is acting on a block of mass 50kg resting on a horizontal surface. Determine its velocity after the block has travelled a distance of 10m. Coefficient of kinetic friction is 0.5. [3M]

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

- 2 State and prove Varignon's theorem [10M]
- OR
- 3 The magnitude of the resultant of two concurrent including angle of  $90^\circ$  between them is  $\sqrt{13}$  kN. When this included angle is changed to  $60^\circ$ , the magnitude of the resultant becomes  $\sqrt{19}$  kN. Find the magnitude of the two forces. [10M]

**SECTION-II**

- 4 a) An inclined plane and a vertical wall as shown in below Figure.1 support two identical rollers, each of weight 100 N. Assuming smooth surfaces; find the reactions induced at the points of support A, B and C. [8M]

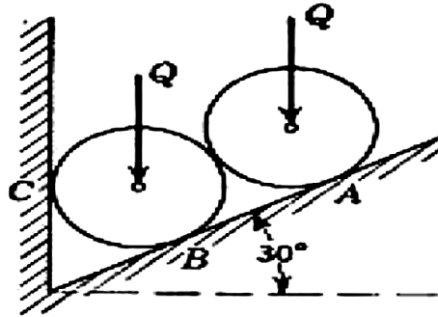


Figure 1

[2M]

b) Two forces are acting on a body and the body is in equilibrium. What conditions should be fulfilled by these two forces?

OR

- 5 Find the least horizontal force 'P' to start motion of any part of the system of three blocks resting upon one another as shown in the figure 2. The weights of the blocks are  $A = 3000\text{N}$ ,  $B = 1000\text{N}$ ,  $C = 2000\text{N}$ . Between A and B,  $\mu = 0.3$ , between B and C,  $\mu = 0.2$  and between C and the ground,  $\mu = 0.1$ . [10M]

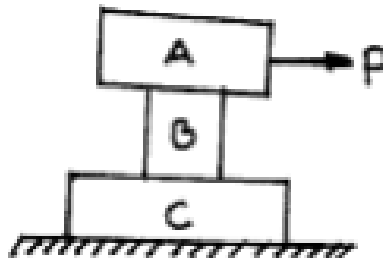


Figure 2

**SECTION-III**

- 6 a) Locate the centroid of a hatched area as shown in figure 3. [5M]

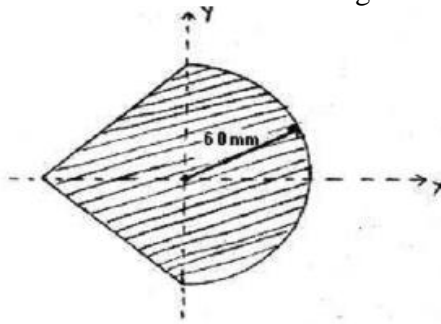


Figure 3

b) Find the centroid of a quarter circular line from basic principles. [5M]

OR

- 7 A solid hemisphere of density  $2\rho$  is attached centrally to a cylinder of density  $\rho$ . Find the height of cylindrical portion to have the centre of gravity of the solid combination on the axis of symmetry at the junction between the hemisphere and the cylinder. Take the cylinder diameter as 100 mm. [10M]

**SECTION-IV**

- 8 Determine the moment of inertia of a T-section shown in the figure 4 about an axis passing through the centre of the section and perpendicular to the stem or vertical leg. [10M]

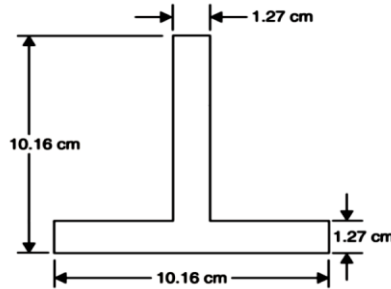


Figure 4

OR

- 9 Calculate the mass moment of inertia of the frustum of the cone shown in figure 5 with respect to the axis Z-Z and A-B assuming the density of the cone, as  $2500\text{kg/m}^3$ . [10M]

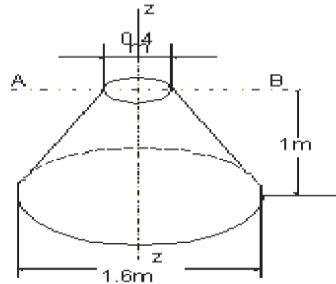


Figure 5

**SECTION-V**

- 10 a) The motion of a particle in rectilinear motion is defined by the relation  $s = 2t^3 - 9t^2 + 12t - 10$  where  $s$  is expressed in metres and  $t$  in seconds. Find the acceleration of the particle when the velocity is zero. [5M]  
 b) Derive the equations of motions when the body is accelerated uniformly. [5M]

OR

- 11 a) What are the different types of rigid body motion? Explain. [5M]  
 b) Two blocks shown in figure 6 below are originally at rest. Determine: (i) the acceleration of each block (ii) tension in cables. Assume the effect of friction in the pulleys, between the blocks and inclines as negligible. Mass of the pulley can also be neglected. [5M]

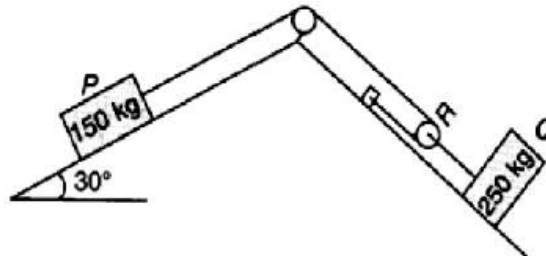


Figure 5

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