AR16

CODE: 16EE1003 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, April-2022

ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CSE, IT Branches)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. Compute the necessary equations for star to delta connection when the resistors $R_1, R_2 R_3$ are connected in star. 14M

(OR)

2. a) Derive the expression for energy stored in inductor? 7M
   b) For the voltage waveform v_C (t) shown in Fig. 1, find the charge and current for a capacitor of value C = 1/10 farads. 7M

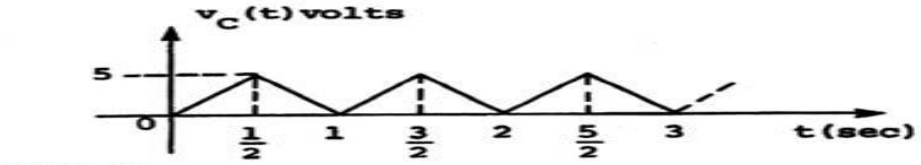

Fig. 1

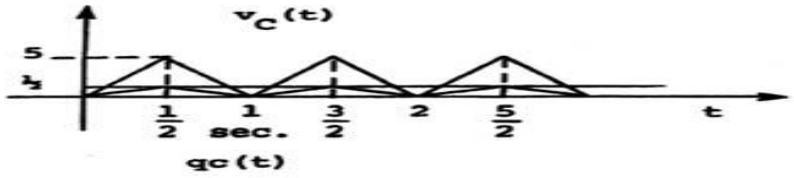

Fig. 2

UNIT-II

3. Explain the principle of operation of generator and derive its generated EMF expression? 14M

(OR)

4. Explain in details external and internal characteristics of DC shunt generator with neat diagrams and mention its applications? 14M

UNIT-III

5. Explain the operation of single phase transformer and derive its EMF equation 14M

(OR)

6. a) Draw the equivalent circuit of single phase transformer with necessary phasor diagrams? 7M
   b) Explain the various power stages in three phase induction motor? 7M

UNIT-IV

7. Explain in detail regulation by synchronous impedance method? 14M

(OR)

8. Explain briefly the construction and operation of Moving Iron instruments? 14M

UNIT-V

9. Explain various configurations of transistor? 14M

(OR)

10. a) Explain the operation of Bridge rectifier with neat diagrams? 7M
    b) A half wave rectifier, having a resistive load of 1000 ohms rectifies alternating voltage of 325V peak value and diode has forward resistance of 100 ohms. Calculate: 7M
       i. Peak, average and RMS value of current. ii) DC output power.
       iii) AC input power. iv) Efficiency of rectifier.

AR13

CODE: 13BS1002 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, April, 2022

ENGINEERING MATHEMATICS-II
(Common to CIVIL, MECH, CSE, IT)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) The $(n+1)^{th}$ approximation of root of f(x) = 0 by Newton Raphson method is
   b) If $y = a_0 + a_1x + a_2x^2$ then the first normal equation is $\sum y_i$
   c) Write the relation between the operators E and D
   d) In Newton's forward difference interpolation formula the value of p lies between
   e) In which method successive approximations are used
   f) If $y' = (x,y)$ then Euler's formula for $(n+1)^{th}$ iteration is
   g) Find the Laplace transform of $t\,e^{2t}$
   h) Find the inverse Laplace transform of $\frac{1}{s(s-2)}$
   i) Eliminate a and b from z = ax + by
   j) Write one dimensional heat equation

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Find the root of the equation $xe^x = \cos x$ using the Regula –falsi method correct to four decimal places. [6 M]
   b) Find an approximate value of the real root of $x^3 - x - 1 = 0$ by bisection method. [6 M]

(OR)

3. a) Using Newton Raphson method find the root of the equation f(x)= $e^x - 3x = 0$ that lies between 0 and 1. [6 M]
   b) Find the straight line that best fits the following data by the method of least squares [6 M]

x :	1	2	3	4	5
y :	14	27	40	55	68

UNIT-II

4. a) From the following table, estimate the number of students who obtained marks between 40 and 45. [6 M]

Marks :	30 - 40	40 - 50	50 -60	60 -70	70 - 80
No. of students:	31	42	51	35	31

b) Find the interpolating polynomial from the following data, using Lagrange method of interpolation. [6 M]

x:	0	1	2	5
y:	2	3	12	147

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(OR)

5. a) The population of a certain village in thousands is given in the following table. By using central forward difference formula estimate the village population in 1936. [6 M]

Year:	1901	1911	1921	1931	1941	1951
Population:	12	13	20	27	39	52

b) Evaluate $\int_0^{\pi} tsint\ dt$ using the Trapezoidal rule. [6 M]

UNIT-III

6. Solve $\frac{dy}{dx} = x^2 + y$ With y(0) = 2 by both Picard's method and Taylor's series method up to third degree terms and compute y(0.2) . [12M]

(OR)

7. Using Euler's modified method solve $\frac{dy}{dx} = x + \sin y$, y(0)=1 , compute y(0.2) and y(0.4) with h=0.2 **.** [12M]

UNIT-IV

8. a) Find the Laplace transformation of $\int_0^t \frac{e^t sint}{t} dt$ [6 M]

b) Evaluate the integral using Laplace transform $\int_0^{\infty} te^{-3t} sint\ dt$ [6 M]

(OR)

9. a) Find the inverse Laplace transform of $\frac{s-2}{s^2+5s+6}$ [6 M]

b) Using convolution theorem find the inverse Laplace transform of $\frac{1}{s^2(s+1)^2}$ [6 M]

UNIT-V

10. a) Form the partial differential equation by eliminating the arbitrary function from
f($xy + z^2$, $x + y + z$) = 0 [6 M]

b) Solve $xp - yq = y^2 - x^2$ [6 M]

(OR)

11. a) Solve $z(x-y) = p x^2 - q y^2$ [6 M]

b) Solve $p - x^2 = q + y^2$ [6 M]

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AR13

CODE: 13ME1003 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I Semester Supplementary Examinations, April-2022

ENGINEERING MECHANICS
(Common to EEE & ECE)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Define coplanar non concurrent forces and coplanar concurrent forces
   b) State triangle law of forces.
   c) Write about different types of equilibrium?
   d) Draw F.B.D for a body of weight W placed on a table.
   e) State laws of friction
   f) Write the coordinates for centroid of a quarter circle.
   g) State the parallel axis theorem.
   h) What is the moment of inertia of a circular section of diameter (*d*)
   i) Distinguish between rectilinear motion and curvilinear motion.
   j) Differentiate kinematics and kinetics?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

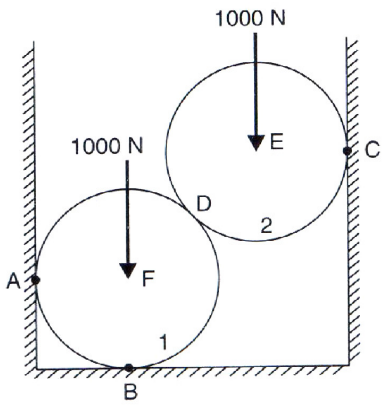
2. The resultant of two forces acting at a point is 75.71 kN, where one force is double that of the other and if the direction of one is reversed, the resultant becomes 57.17 kN. Find the magnitude of two forces and the angle between them. 12 M

(OR)

3. The following forces act at a point : 12 M
   (i) 20 N inclined at 30° towards North of East.
   (ii) 25 N towards North.
   (iii) 30 N towards North West and
   (iv) 35 N inclined at 40° towards South of West.
   Find the magnitude and direction of the resultant froce.

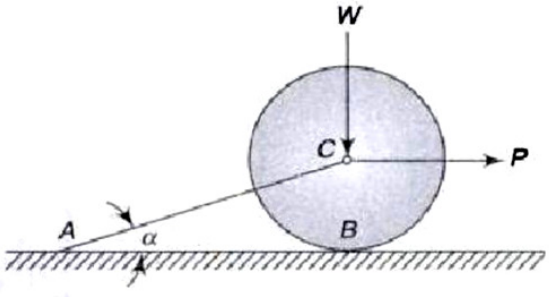
UNIT-II

4. Two spheres, each of weight 1000N and radius 25cm rest in a horizontal channel of width 90cm as shown in the figure. Find the reactions on the points of contact A, B and C. 12 M



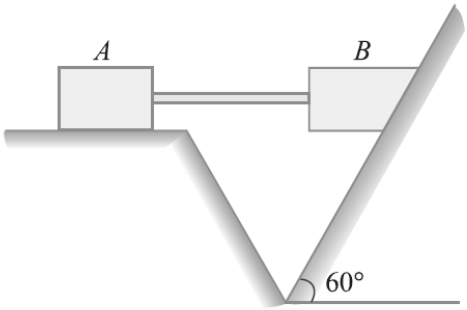
(OR)

5. A right circular roller of weight w rests on a smooth horizontal plane and is held in position by an inclined bar AC find the tension S in thevv bar AC and the vertical reaction Rb at B if there is a horizontal force acting on c. 12 M



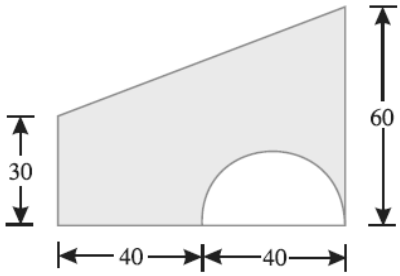
UNIT-III

6. Two blocks A and B, connected by a horizontal rod and are supported on two rough planes as shown in Figure. The coefficients of friction are 0.3 between block A and the horizontal surface, and 0.4 between block B and the inclined surface. If the block B weighs 100 N, what is the smallest weight of block A, that will hold the system in equilibrium? 12 M



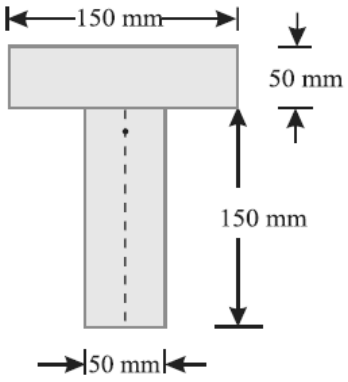
(OR)

7. Locate the co-ordinates of the centroid of the shaded area of a lamina shown in Figure? 12 M



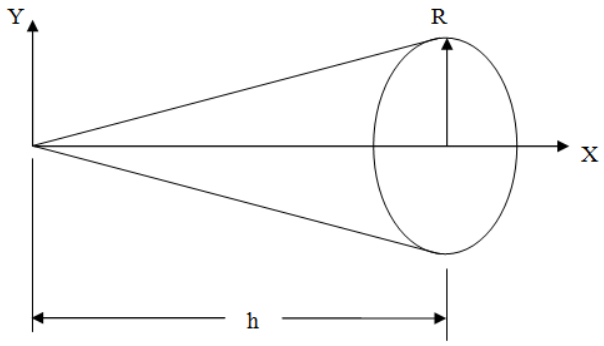
UNIT-IV

8. Find the moment of inertia of T-section shown in the figure, about X-X and Y-Y axes passing through its centroid. 12 M



(OR)

9. Find the mass moment of inertia of the solid cone shown in figure of height h and base radius R about its axis of rotation 12 M

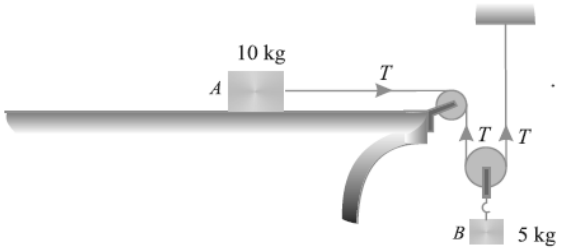


UNIT-V

10. The equation of motion of a particle moving in a straight line is given by : $s = 18t + 3t^2 - 2t^3$, where (s) is in metres and (t) in seconds. Find (1) velocity and acceleration at start, (2) time, when the particle reaches its maximum velocity, and (3) maximum velocity of the particle. 12 M

(OR)

11. A block of wood A of mass 10 kg is held on a rough horizontal table. An elastic string connected to the block passes over a smooth pulley at the end of the table and then under a second smooth pulley carrying a body B of mass 5 kg as shown in figure. The other end of the string is fixed to a point above the second pulley. When the 10 kg block is released, it moves with an acceleration of g/9. Determine the value of coefficient of friction between the block and the table. 12 M



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