

AR16

CODE: 16EE1003

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

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

ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CSE, IT Branches)

Time: 3 Hours

Max Marks: 70

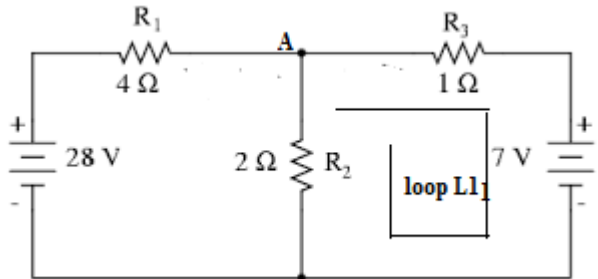
Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

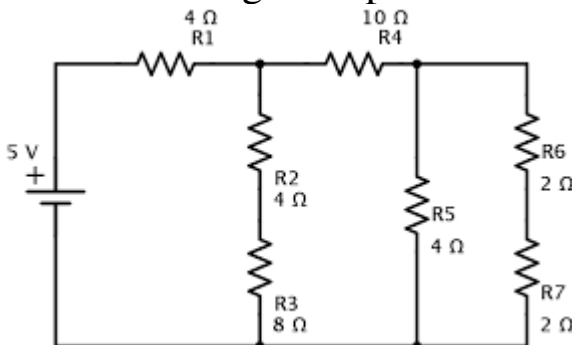
UNIT-I

1. a) State and explain Kirchhoff's laws and ohm's law 6M
Verify the KCL(at Node A) and KVL (Loop L1) for the fig. 8M
b) Shown Below

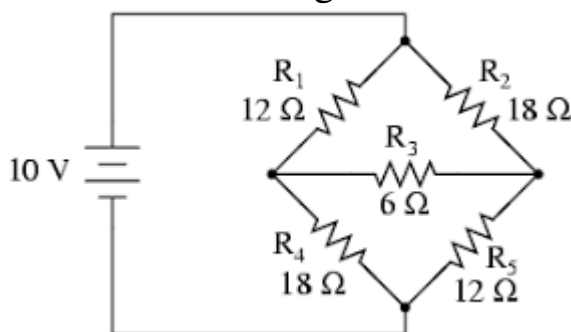


(OR)

2. a) Find the voltage and power across the 8Ω resistor. 7M



- b) Find Current through 6Ω resistor. 7M



UNIT-II

3. a) Derive the EMF equation of a DC Generator 7M
b) Draw and Explain the Internal and external characteristics of DC shunt generator? 7M

(OR)

4. a) Derive the Torque Equation of DC Motor. 7M
b) Explain the speed control methods of DC motor. 7M

UNIT-III

5. a) Derive the equation for regulation of 1-Ø transformer. 7M
b) Explain the principle of operation of three phase induction motor and determine the synchronous speed and slip of a 8 pole, 3-phase, 50Hz induction motor? 7M

(OR)

6. a) Derive the EMF equation of a 1-Ø transformer. 7M
b) Derive the Torque Equation of a 3-Ø Induction Motor. 7M

UNIT-IV

7. a) Explain the procedure to find the regulation of alternator by synchronous impedance method? 7M
b) Explain the principle operation of Moving Iron instrument with neat diagram? 7M

(OR)

8. a) Derive the EMF equation of a Alternator. 7M
b) Explain the principle operation of permanent magnet Moving Coil with neat diagram? 7M

UNIT-V

9. a) Explain the working of P-N junction diode and draw the V-I characteristics? 7M
b) Explain the working and operation of full wave rectifier and draw the output waveforms? 7M

(OR)

10. a) Explain the operation of P-N-P Transistor. 7M
b) Explain the working and operation of half wave rectifier and draw the output waveforms? 7M

ENGINEERING MECHANICS**(For EEE, ECE 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

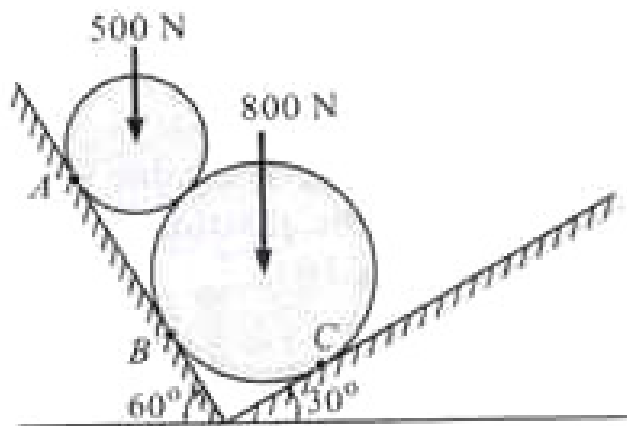
1. Find the resultant force for the following system of forces (all pull) acting at a point: i) 25 N due North; (ii) 10 N North-East; (iii) 15 N due East; (iv) 20 N 30° East of South; (v) 30 N 60° South of West
What angle does it make with East?

(OR)

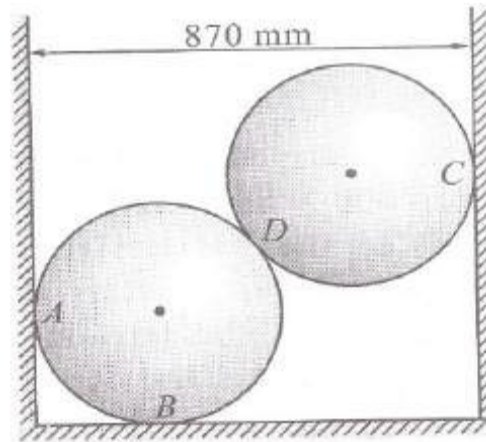
2. a) Two forces of magnitude 50 N and 30 N are acting at a point. If the angle between the two forces is 60° , determine the magnitude and direction of the resultant force 7M
b) Discuss graphical and analytical methods for finding resultant of several coplanar concurrent forces 7M

UNIT-II

3. a) State and prove Varignon's theorem 7M
b) Two smooth cylinders with diameters 250 mm and 400 mm respectively are kept in a groove with slanting surfaces making angles 60° and 30° as shown in the Figure. Determine the reactions at contact points A, B and C. 7M

**(OR)**

4. a) Two smooth spheres of weight 100N and radius 250 mm each are in equilibrium in a horizontal channel of width 870 mm as shown in the Figure. Find the reactions at the surfaces of contact A, B, C, and D assuming all surfaces to be smooth. 7M



- b) Define free body diagram and explain the equilibrium of planar systems

7M

UNIT-III

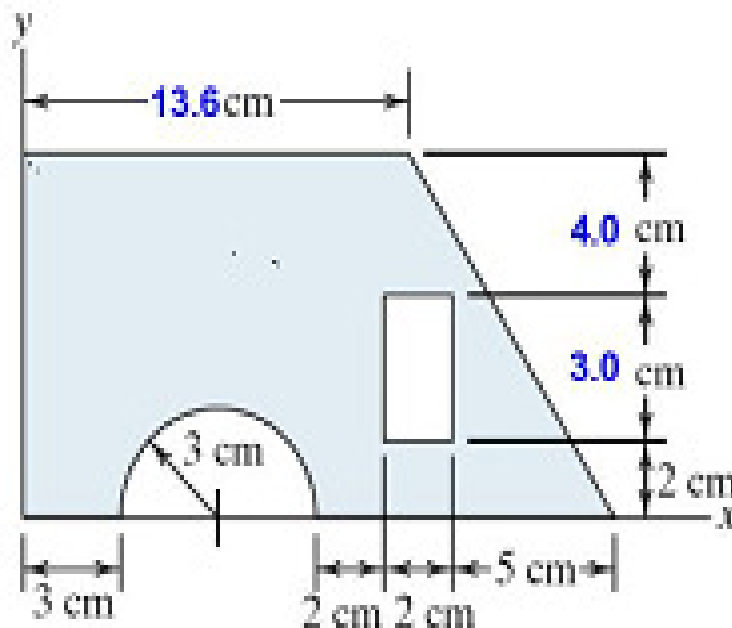
5. a) A uniform ladder of weight 800N and of length 7 m rests on a horizontal ground and leans against a smooth vertical wall. The angle made by the ladder with the horizontal is 60° . When a man of weight 600N stands on the ladder at a distance 4m from the top of the ladder, the ladder is at the point of sliding. Determine the coefficient of friction between the ladder and the floor. 10M

- b) Explain the types of friction

4M

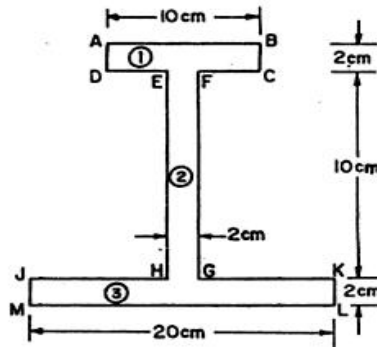
(OR)

6. Determine the centroid of the area shown in Fig with respect to its axes shown. 14M



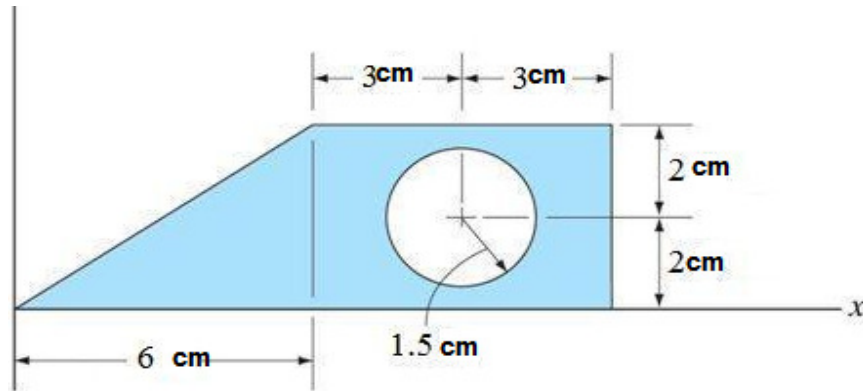
UNIT-IV

7. Find the moment inertia of the given I- section Fig with respect to centroidal x and y axes. 14M



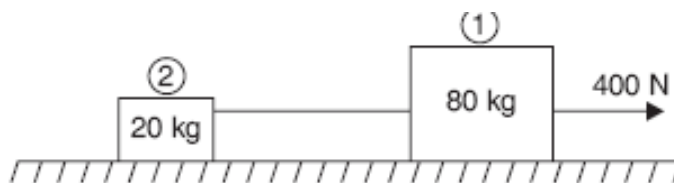
(OR)

8. Find the moment of inertia of the shaded area shown in the Fig about the vertical centroidal axis 14M



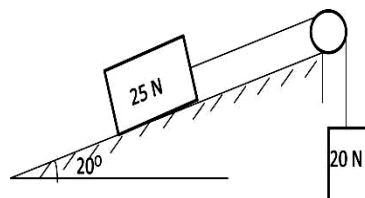
UNIT-V

9. Determine the acceleration of the two bodies and the tension in the thread, using D' Alembert's principle of two bodies of masses 80 kg and 20 kg are connected by a thread and move along a rough horizontal surface under the action of a force 400 N applied to the first body of mass 80 kg as shown in Figure. The co-efficient of friction between the sliding surfaces of the bodies and the plane is 0.3 14M



(OR)

10. Two bodies weighing 25N and 20N are connected to the ends of an inextensible string, which passes over a smooth pulley as shown in figure. The weight 25N is placed on a 20° inclined plane while the weight 20N is hanging over the pulley. Determine (i) Acceleration of the system when 25N moves up (ii) Tension in the string. 14M



AR13

CODE: 13BS1002

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, June-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 $(n+1)^{\text{th}}$ 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 $(n+1)^{\text{th}}$ 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. **6M**
 - b) Find an approximate value of the real root of $x^3 - x - 1 = 0$ by bisection method. **6M**
- (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. **6M**
 - b) Find the straight line that best fits the following data by the method of least squares **6M**

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. **6M**
- | | | | | | |
|------------------|---------|---------|---------|---------|---------|
| 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 **6M**
- | | | | | |
|----|---|---|----|-----|
| x: | 0 | 1 | 2 | 5 |
| y: | 2 | 3 | 12 | 147 |
- .

(OR)

1 of 2

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. **6M**
- | | | | | | | |
|-------------|------|------|------|------|------|------|
| Year: | 1901 | 1911 | 1921 | 1931 | 1941 | 1951 |
| Population: | 12 | 13 | 20 | 27 | 39 | 52 |
- b Evaluate $\int_0^{\pi} t \sin t \, dt$ using the Trapezoidal rule. **6M**

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 $\int_0^t \frac{e^t \sin t}{t} dt$ **6M**
- b Evaluate the integral using Laplace transform $\int_0^{\infty} t e^{-3t} \sin t \, dt$ **6M**
- (OR)
9. a Find the inverse Laplace transform of $\frac{s-2}{s^2+5s+6}$ **6M**
- b Using convolution theorem find the inverse Laplace transform of $\frac{1}{s^2(s+1)^2}$ **6M**

UNIT-V

10. a Form the partial differential equation by eliminating the arbitrary function from $f(xy + z^2, x + y + z) = 0$ **6M**
- b Solve $xp - yq = y^2 - x^2$ **6M**
- (OR)
11. a Solve $z(x-y) = p x^2 - q y^2$ **6M**
- b Solve $p - x^2 = q + y^2$ **6M**