AR18

CODE: 18EST103 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, February-2022

ENGINEERING MECHANICS

(Civil Engineering)

Time: 3 Hours **Max Marks: 60**

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 prove parallelogram law of forces? 4 M
   b) Two forces of magnitude 50 N and 30 N are acting at a point. If the angle between the two forces is 60^0, determine the magnitude and direction of the resultant force. 8 M

(OR)

2. a) What are the different methods of finding resultant force 4 M
   b) A particle '*O*' is acted upon by the forces shown in Fig. 2. Find the direction as well as magnitude of the resultant force 8 M

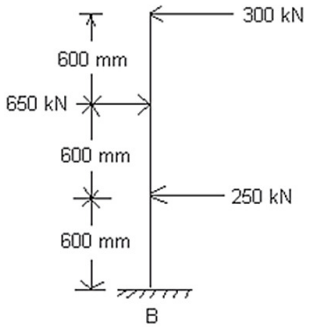


Fig. 1

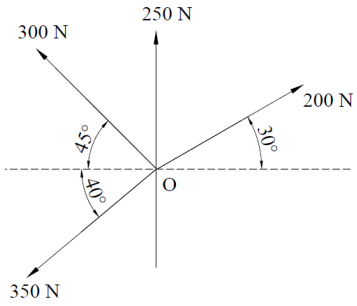
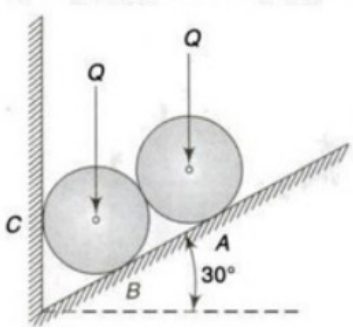


Fig. 2

UNIT-II

3. a) State and explain Lami's theorem with a neat sketch. 4 M
   b) Two identical rollers each of weight Q = 445 N, are supported by an inclined plane and a vertical wall as shown in Figure. Assuming smooth surfaces, find the reactions induced at the points of support A, B and C. 8 M



(OR)

4. a) What are the steps to be followed in drawing free body diagram 4 M
   b) Determine the forces S_1 and S_2 induced in the bars AC and BC in Fig. 4 due to the action of the horizontal applied load at C. The bars are hinged together at C and to the foundation at A and B. 8 M

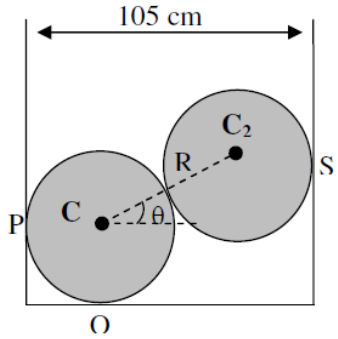


Fig. 3

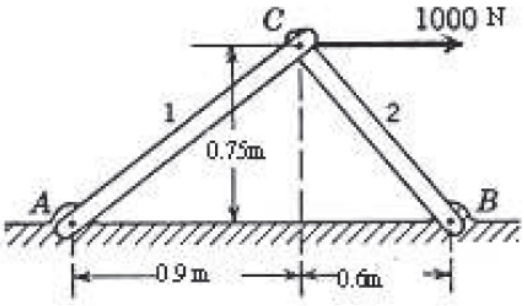


Fig. 4

UNIT-III

5. a) Define limiting angle of friction. 6 M

b) A uniform ladder of length 3.25 m and weighing 250 N is placed against a smooth vertical wall with its lower end 2.5 m from the wall shown in Fig. 5. The coefficient of friction between the ladder and floor is 0.3. What is the frictional force acting on the ladder at the point of contact between the ladder and the floor? Show that the ladder will remain in equilibrium in this position 6 M

(OR)

6. a) Draw examples for Perfect, Deficient & redundant trusses 4 M

b) Determine the forces in all the members of the truss shown in Fig. 6. 8 M

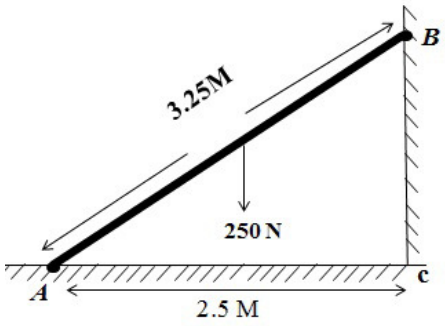


Fig. 5

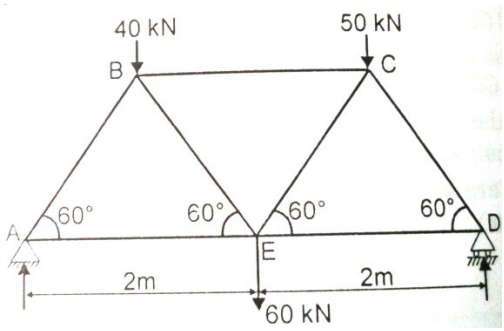


Fig. 6

UNIT-IV

7. Find the coordinates of centroid of a rectangle of base ‘b’ and height ‘h’. 12 M

(OR)

8. a) Define mass moment of inertia and explain Transfer formula for mass moment of inertia. 6 M

b) Find area moment of inertia of the triangle shown in Fig.7 about X axis 6 M

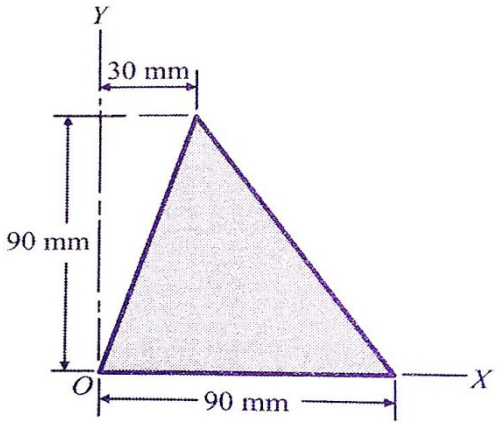


Fig. 7

UNIT-V

9.	a)	A stone is dropped into a well while splash is heard after 2.5 seconds. Then determine depth of water surface assuming the velocity of sound as 330 m/s.	4 M
	b)	A train starting from rest accelerates uniformly for 3 min, runs at a constant speed for the next 5 min and then comes to rest in 2 min. If it covers a total distance of 9 km, find the retardation in m/s^2.	8 M

(OR)

10.	a)	Explain the concept of D'Alemberts principle?	4 **M**
	b)	A vertical lift of total mass 400 kg acquires an upward velocity of 3 m/s over a distance of 2 m with constant acceleration, starting from rest. Calculate the tension in the cable supporting the lift.	8 M

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AR18

CODE: 18EET102 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, February-2022

ELECTRIC CIRCUIT THEORY

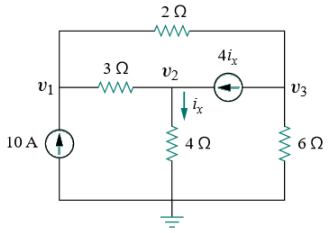
(Electrical and Electronics Engineering)

Time: 3 Hours **Max Marks: 60**

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

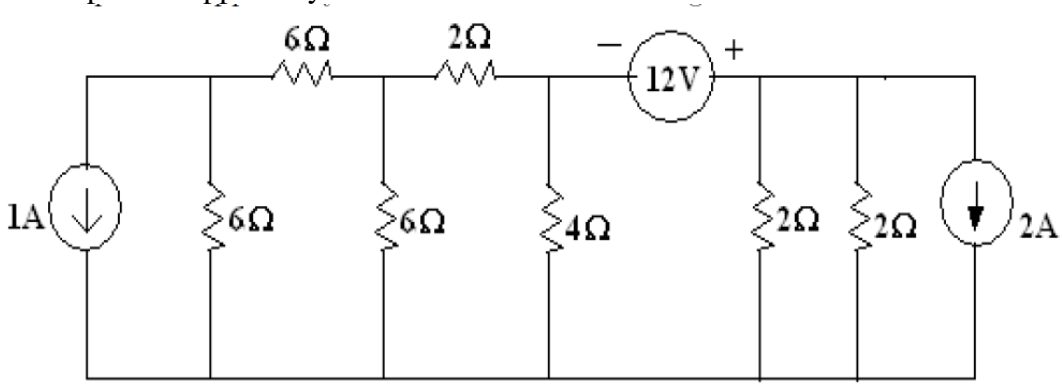
UNIT-I

1. a) Write a short note on dependent and independent sources? 5M
   b) Calculate V_1, V_2 & V_3 using Node analysis. 7M



(OR)

2. a) State and explain kirchoff's laws. 5M
   b) Find the power supplied by12V source. 7M

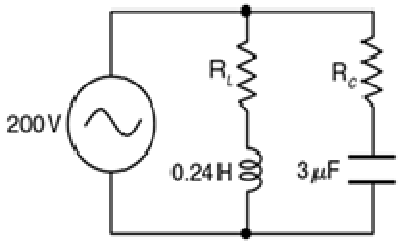


UNIT-II

3. a) Explain resonance in series RLC circuit. 5M
   b) A series connected circuit has R = 4Ω and L = 25mH. 7M
      i. Calculate the value of C that will produce a quality factor of 50
      ii. Find ω_1, ω_2 and BW.

(OR)

4. Determine the resonant frequency, the source current and the input impedance for the circuit shown in figure for each of the following cases 12M
   Case 1 : R_L = 150 Ω, Rc = 100Ω
   Case 2 : R_L = 150 Ω, Rc = 0Ω

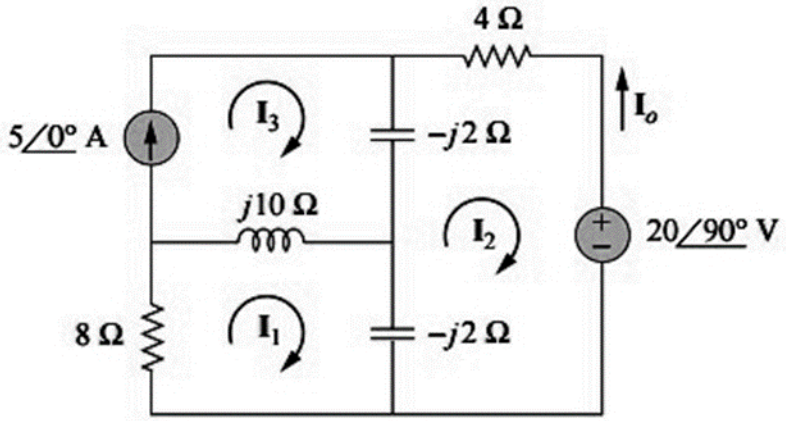


UNIT-III

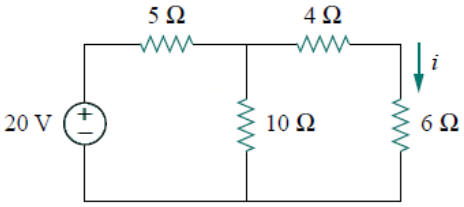
5. State and explain Thevenin's and Norton's theorems 12M

(OR)

6. a) Using superposition theorem find Io in the circuit. 9M

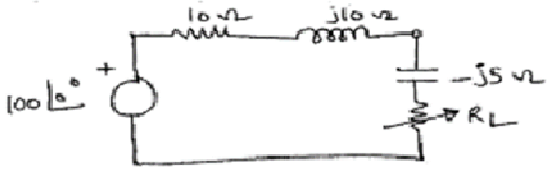


b) Verify reciprocity propertyfor the following circuit. 3M



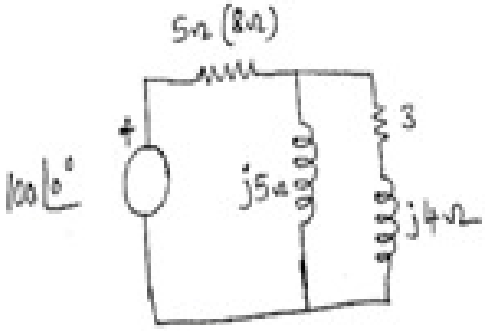
UNIT-IV

7. a) State and explain compensation theorem. 5M
   b) Determine the value of R_L for which power transfer is maximum for the network shown in figure below. Also find the maximum power. 7M



(OR)

8. a) State and explain Millman's Theorem. 5M
   b) In a network shown below, 5 Ω resistor is changed to 8 Ω. Determine the resulting change in current through (3+j4) impedance using Compensation theorem 7M

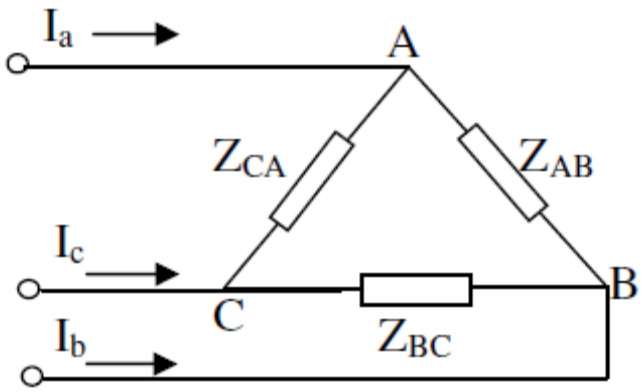


UNIT-V

9. Derive the relation between line and phase voltage and currents in star and delta system 12M

(OR)

10. a) For the circuit shown in figure , the line voltage is 240 V. Take V_{ab} as reference and determine following: i) phase currents, ii) line currents, iii) total power absorbed in the load. Also draw phasor diagram. $Z_{AB}=25\Omega$, $Z_{BC}=12 \angle 60^0$ and $Z_{CA}=16 \angle -30^0$ 6M



b) A three-phase, three-wire, ABC system, with line voltage $V_{BC} = 311.1 \angle 0^0$ V has line currents $I_A = 61.5 \angle 116.6^0$ A, $I_B = 61.2 \angle -48^0$ A and $I_C = 16.1 \angle 218^0$ A. Find the readings of wattmeter in lines i) A and B, ii) B and C, and iii) A and C 6M

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AR18

CODE: 18EST105 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, February-2022

BASIC ELECTRONICS

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 60**

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)	Explain the formation of a PN-junction diode?	6M
	b)	Explain how PN-junction diode acts as a switch?	6M
		(OR)	
2.	a)	Explain various breakdown mechanisms in a PN-junction diode?	6M
	b)	With a neat circuit diagram, explain how Zener diode acts as a voltage regulator?	6M

UNIT-II

3.	a)	Explain the input-output characteristics of a Bipolar Junction Transistor in Common Base configuration?	6M
	b)	Distinguish between Bipolar Junction Transistor and Junction Field Effect Transistor?	6M
		(OR)	
4.	a)	Explain the construction and working of a Junction Field Effect Transistor?	6M
	b)	Explain the terms (i) drain resistance (ii) Amplification factor (iii) Trans conductance	6M

UNIT-III

5.	a)	Explain the effect of Coupling and Bypass capacitor in a CE amplifier?	6M
	b)	Explain different types of distortions in amplifiers?	6M
		(OR)	
6.	a)	Explain the classification of small signal amplifiers?	6M
	b)	Draw and explain the AC model of a CE amplifier?	6M

UNIT-IV

7.	a)	What is the difference between positive and negative feedback and explain the advantage of negative feedback in amplifiers?	6M
	b)	Explain the effect of negative feedback on input and output in an amplifier?	6M
		(OR)	
8.	a)	State and Explain Barkhausen criteria for getting oscillations in a oscillator circuit	6M
	b)	Draw the circuit diagram of a RC phase shift oscillator and explain its working	6M

UNIT-V

9.	a)	Explain the different configurations of a differential amplifier	6M
	b)	Explain the following terms (i) CMRR (ii) PSRR (iii) slew rate of an op amp	6M
		(OR)	
10.	a)	Draw the block diagram of an op amp and explain the function of each block	6M
	b)	Explain the characteristics of an ideal op amp	6M

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AR18

CODE: 18ECT102 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, February-2022

NETWORK THEORY

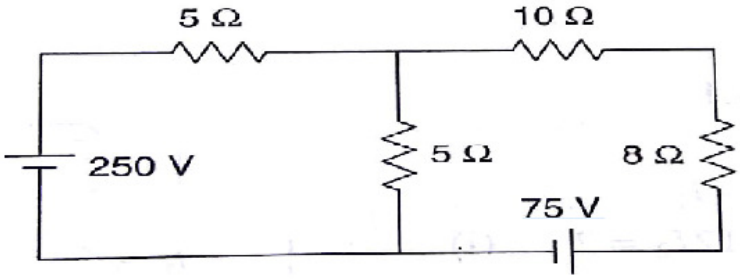
(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 60**

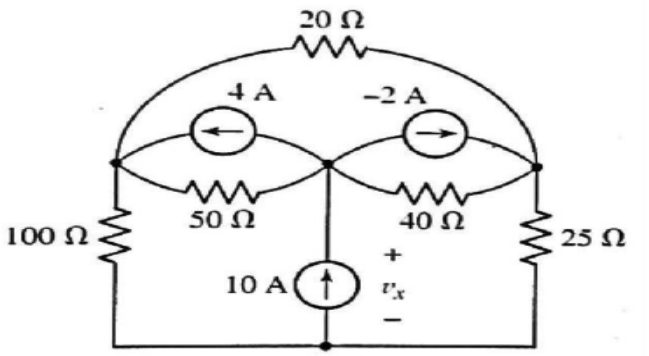
Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Find the current through the 8Ω resistor in the circuit shown below using Thevenin's theorem 6M

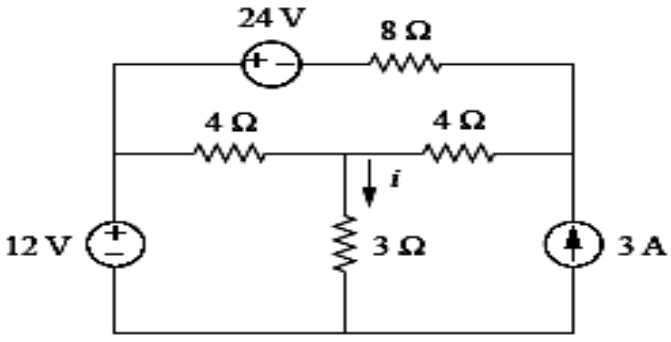


b) Use nodal analysis to find Vx in the circuit. 6M



(OR)

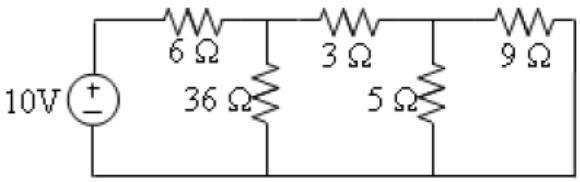
2. For the circuit shown in below Figure. use the superposition theorem to find *i* and verify the same 12M



UNIT-II

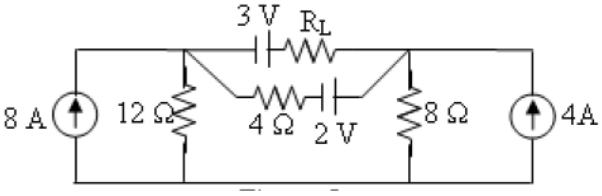
3. a) Prove that maximum power is transferred from source to load when load resistance is equal to the source resistance. 6M

b) Find current in 9 Ω resistor in the circuit shown in Figure when 5 Ω resistor is changed to 6 Ω using compensation theorem 6M

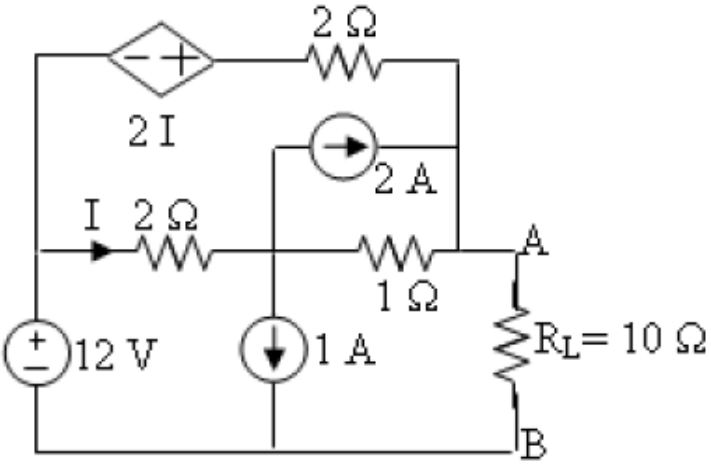


(OR)

4. a) Obtain the maximum amount of power transferred to RL from the sources using Maximum power transfer theorem in the circuit shown in Figure 6M

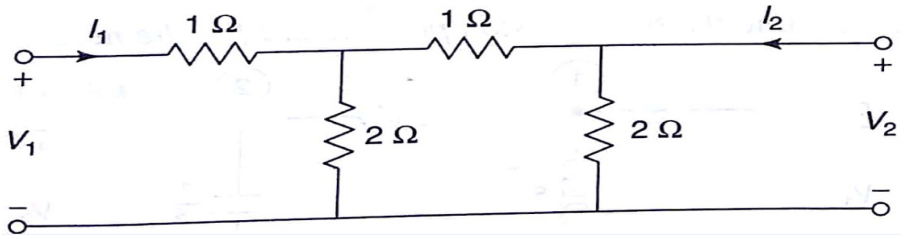


b) Determine the current through RL=10 ohms resistor as shown in Figure using Thevenin's theorem and verify it by Norton's theorem. Find the value of RL for which maximum power will be transferred to it. Also determine the maximum power transfer 6M



UNIT-III

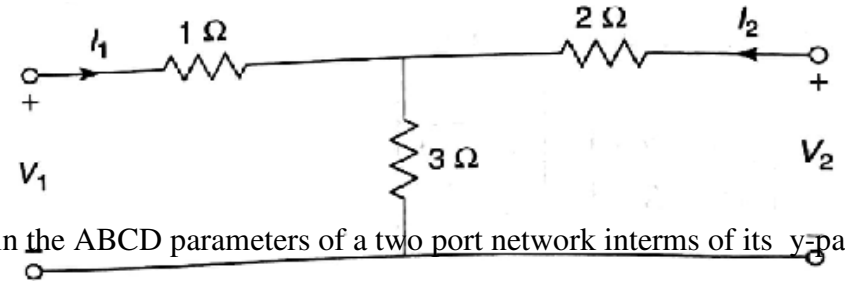
5. a) Obtain the ABCD parameters for the network shown below 6M



b) Obtain the Y parameters of a two port network interms of its Z – parameters 6M

(OR)

6. a) Obtain the z– parameters for the network shown below 6M



b) Obtain the ABCD parameters of a two port network interms of its y-parameters. 6M

UNIT-IV

7. a) A coil of resistance 20Ω and inductance of 0.2H is connected in parallel with a capacitor of 100μF.determine the resonant frequency and input impedance at resonance. 6M

b) Derive an expression for resonant frequency for a series RLC circuit. 6M

(OR)

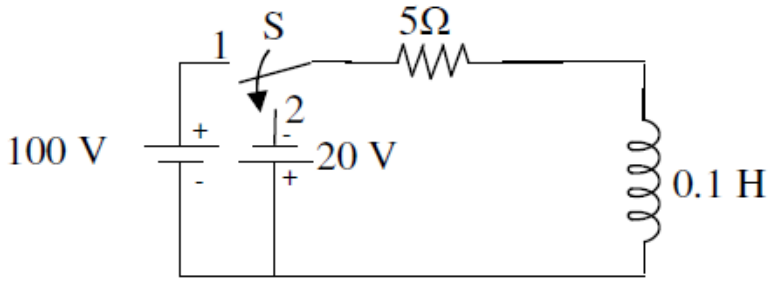
8. a) Derive the expression for a resonant frequency for a tank circuit. 6M

b) A series RLC circuit has the following parameters: R = 10 ohms, L = 3H, C = 120 μF. Calculate the resonant frequency. Under resonant condition, calculate current, power, and voltage drops across various elements, if the applied voltage is 100V. 6M

UNIT-V

9. a) Derive mathematical expression for the transient response of series R-L circuit for d.c excitation. 6M

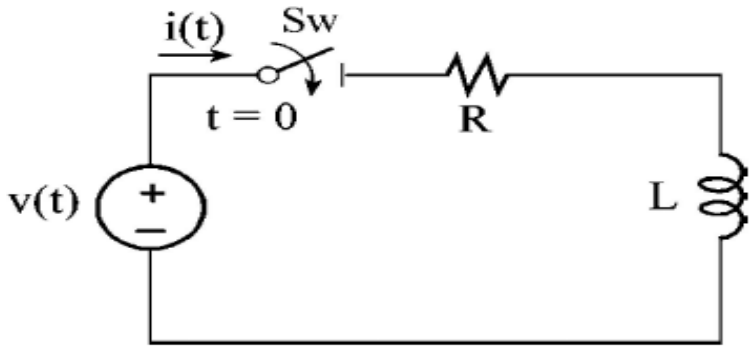
b) In the circuit shown in fig., the switch S is in position 1 for 0.01 seconds and then changed to position 2. Find the time at which the current is zero and reversing its direction. 6M



(OR)

10. a) Derive the mathematical expression for the transient response of series R-C circuit for d.c excitation . 6M

b) In an RL circuit of Fig., the switch closes at t=0. Find the complete current response if R=10Ω, L =0.01H, and V(t) = 120V 6M



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AR16

CODE: 16ME1001 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, February, 2022

ENGINEERING DRAWING

(Common to EEE & ECE)

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

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

UNIT-I

1. Draw an involute of a circle of 40mm diameter. Also, draw a normal and tangent to it at a point 100mm from the centre of the circle. **14M**

(OR)

2. Draw an ellipse by concentric circles method by taking major axis as 100 mm and minor axis as 70 mm. **14M**

UNIT-II

3. A point P is 15mm above the H.P and 20mm in front of V.P. Another point Q is 25 mm behind the V.P. and 40mm below the H.P. Draw the projections of P and Q keeping the distance between their projectors equal to 90mm. Draw the straight lines joining 1)Their top views and 2) Their front views **14M**

(OR)

4. A line AB, 90mm long is inclined at 30° to the H.P. its end A is 12mm above the H.P. and 20mm in front of the V.P. its front view measures 65mm .Draw the top view of AB and determine the inclination with V.P. **14M**

UNIT-III

5. Draw the projections of regular hexagon of 25 mm side having one of its edge in HP and inclined at 60^0 to VP and its surface making an angle of 60^0 to HP. **14M**

(OR)

6. PQRS is a Rhombus having diagonal PR=60mm and QS=40mm and they are perpendicular to each other. The plane of the rhombus is inclined with H.P. such that its top view appears to be square. The top view of PR makes 30° with V.P. Draw its projections and determines inclination of the plane with the H.P. **14M**

UNIT-IV

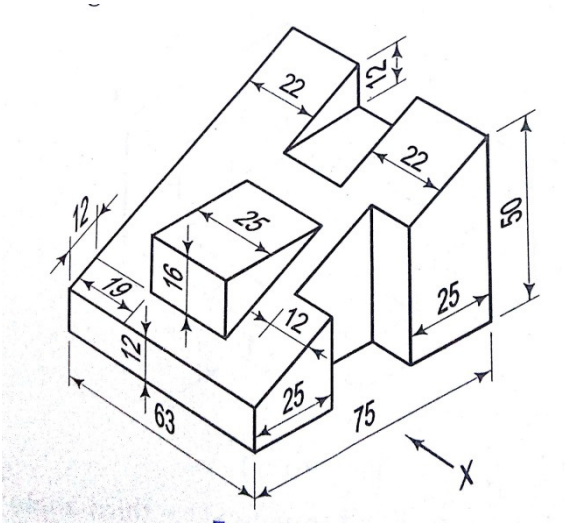
7. Draw the projections of cylinder 75mm diameter and 100mm long, lying on the ground with its axis inclined at 30° to the V.P. and parallel to the ground. **14M**

(OR)

8. Draw the projections of a cone, base 75 mm diameter and axis 100 mm long, lying on the H.P. on one of its generators with the axis parallel to the V.P. **14M**

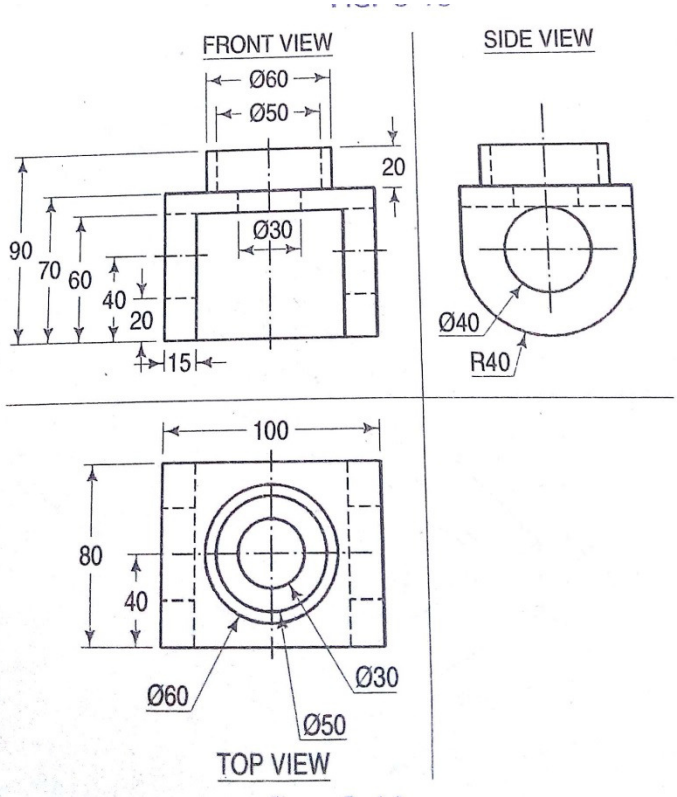
UNIT-V

9. Draw the 1) Front View 2) Top View 3) Left hand side View of block shown in fig. **14M**



(OR)

10. Draw the isometric projection of the block whose orthographic projections are shown figure? **14M**



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AR16

CODE: 16ME1002 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, February-2022

ENGINEERING MECHANICS

(For CSE & IT Branches)

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

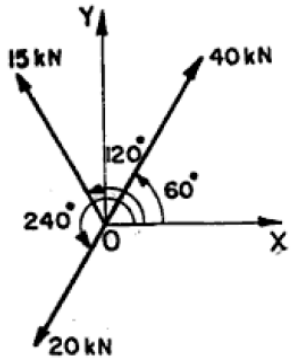
Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. The following forces act at a point : 14 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.

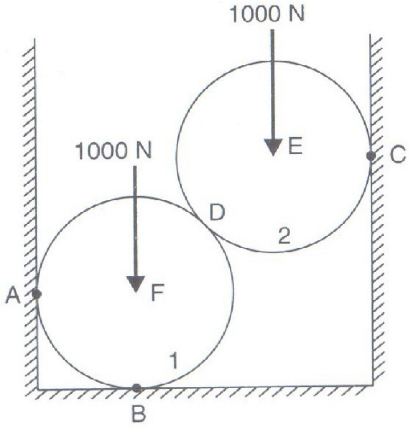
(OR)

2. Three forces of magnitude 40kN, 15kN and 20kN are acting at a point O as shown in figure. The angles made by 40kN, 15kN and 20kN forces with X-axis are 60^0, 120^0 and 240^0 respectively. Determine the magnitude and direction of the resultant force. 14 M



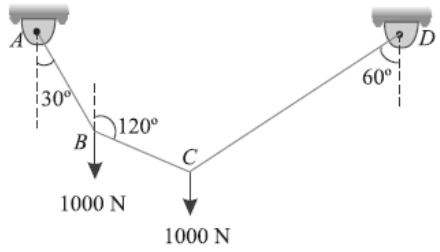
UNIT-II

3. 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. 14 M



(OR)

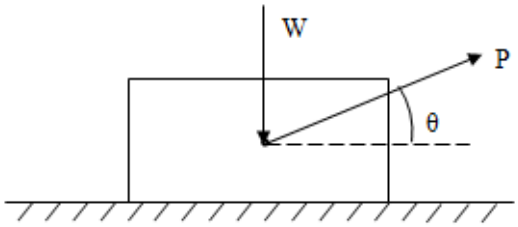
4. A string ABCD, attached to fixed points A and D has two equal weights of 1000 N attached to it at B and C. The weights rest with the portions AB and CD inclined at angles as shown in Figure. Find the tensions in the portions AB, BC and CD of the string, if the inclination of the portion BC with the vertical is 120°. 14 M



UNIT-III

5. a) Explain the terms (a) Limiting Friction, (b) Cone of Friction and (c) Angle of Friction 6 M

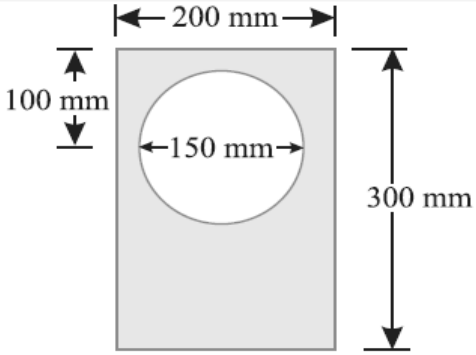
   b) A pull of 20 kN at 30^0 to the horizontal is necessary to move a block of wood on a horizontal table in the figure. If the coefficient of friction between the bodies of contact is 0.25, what is the weight of the block? 8 M



(OR)

6. a) Differentiate between Centroid and Centre of Gravity 4 M

   b) Find the centroid of the plate with circular hole shown in figure. 10 M



UNIT-IV

7. Derive the expression for moment of inertia of a triangle whose bas ‘b’ and height ‘h’ about centroidal X-X axis parallel to its base. 14 M

(OR)

8. Derive the expression for mass moment of inertia of a solid sphere of radius ‘r’ about X-X axis passing through its centre of gravity. 14 M

UNIT-V

9. A particle, starting from rest, moves in a straight line, whose equation of motion is given by $s = t^3 - 2t^2 + 3$. Find the velocity and acceleration of the particle after 5 seconds. 14 M

(OR)

10. A particle is thrown with a velocity of 5 m/s at an elevation of 60° to the horizontal. Find the velocity of another particle thrown at an elevation of 45° which will have (a) equal horizontal range, (b) equal maximum height, and (c) equal time of flight. 14 M

AR13

CODE: 13ME1001 **SET-1**

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

ENGINEERING DRAWING
(Common to EEE & ECE)

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

PART-A

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

1. a) What is representative fraction?
   b) What are the possible positions of a straight line with respect to the planes of projection?
   c) Define eccentricity
   d) List out the main differences between first angle projection and third angle projection
   e) When a plane is perpendicular to a reference plane its projection on that plane is _____
   f) What is an oblique plane?
   g) What are the solids of revolution?
   h) What are the dimensions of the solid that can be seen in the side view?
   i) What is the difference between Isometric view and Isometric projection?
   j) How are the invisible features of an object represented in orthographic projection?

PART-B

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

UNIT-I

2. Construct a diagonal scale of R.F.=1:32,00,000 to show kilometres and long enough to measure upto 400km. Show distances of 257 km and 333 km on your scale. **12M**

(OR)

3. Draw an ellipse by concentric circles method by taking major axis as 100 mm and minor axis as 70 mm. **12M**

UNIT-II

4. A point P is 15mm above the H.P and 20mm in front of V.P. Another point Q is 25 mm behind the V.P. and 40mm below the H.P. Draw the projections of P and Q keeping the distance between their projectors equal to 90mm. Draw the straight lines joining 1)Their top views and 2) Their front views **12M**

(OR)

5. A line AB is 75 mm long. A is 50 mm in front of VP and 15 mm above HP. B is 15 mm in front of VP and is above HP. Top view of AB is 50 mm long. Draw and measure the front view. Find the true inclinations. **12M**

UNIT-III

6. Draw the projections of regular hexagon of 25 mm side having one of its edge in HP and inclined at 60^0 to VP and its surface making an angle of 60^0 to HP. **12M**

(OR)

7. A rectangular plate 50x25 size is perpendicular to both HP and VP. The longer edges are parallel to HP and then rest one is 20 above it. The shorter edge, nearer to VP is 15 from it. The plane is 50 from the profile plane. Draw the projections of the plane. **12M**

UNIT-IV

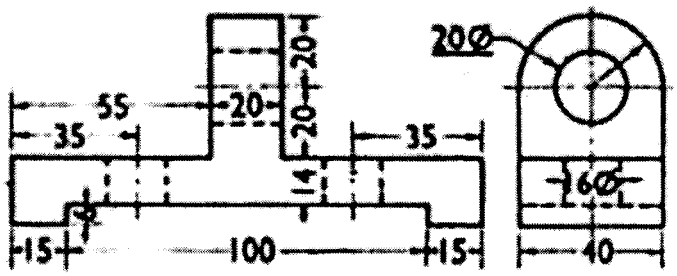
8. Draw the projections of a cone, base 75 mm diameter and axis 100 mm long, lying on the H.P. on one of its generators with the axis parallel to the V.P. **12M**

(OR)

9. A tetrahedron of 40 mm side lies with one of its edges on HP and inclined at 45^0 to VP. The triangular face containing that edge is inclined at 30^0 HP. Draw the top and front views of the solid. **12M**

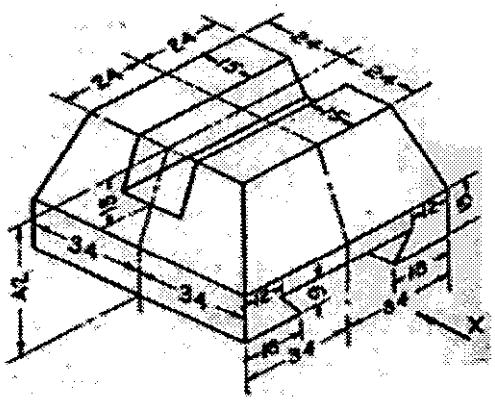
UNIT-V

10. Two views of a casting are shown below. Provide isometric view of the casting. **12M**



(OR)

11. Draw the front view, top view and left side of the object shown below. **12M**



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