AR18

CODE: 18EST103 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

ENGINEERING MECHANICS

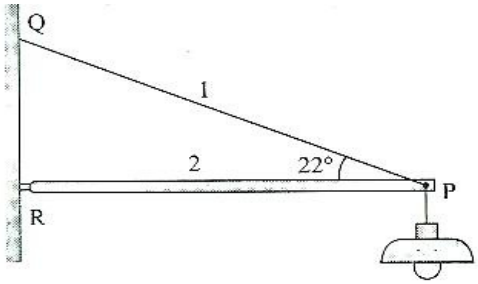
(Civil Engineering)

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

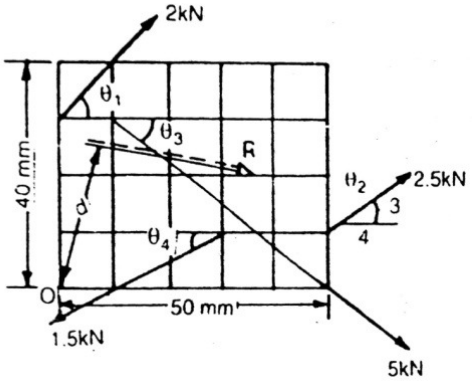
UNIT-I

1. a) State and prove parallelogram law of force. 6M
   b) An electric light fixture is held with the arrangement shown in Fig. If the weight of the fixture is 20kN. Determine the axial forces in the bar and the string. 6M



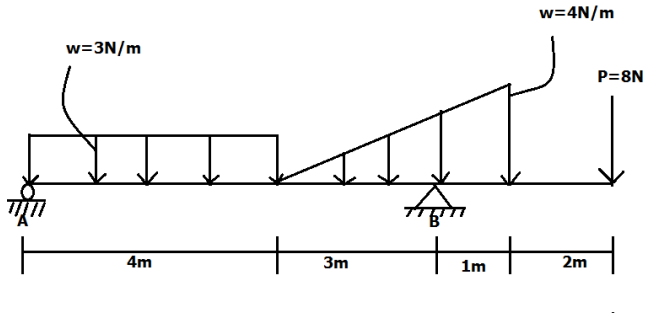
(OR)

2. a) State the law of superposition of forces and theorem of transmissibility of a force. 6M
   b) Compute the resultant of the force system as shown in fig 6M



UNIT-II

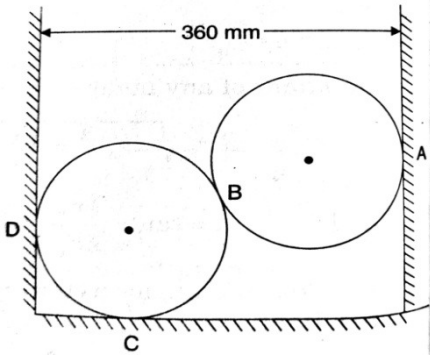
3. a) Determine the reactions at supports A and B of the overhanging beam as shown in fig. 6M



b) State and prove the varignon's theorem 6M

(OR)

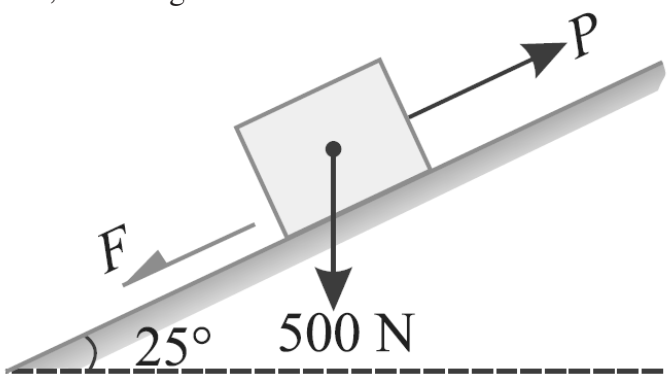
4. a) Two smooth spheres each of radius 100mm and weighing 100N, rest in a horizontal channel having vertical walls, the distance between which is 360mm. find the reactions at the points of contact A,B,C and D as shown in Fig 6M



b) State and prove the lami's theorem. 6M

UNIT-III

5. a) A body of weight 500 N is lying on a rough plane inclined at an angle of 25° with the horizontal. It is supported by an effort (P) parallel to the plane as shown in Fig. Determine the minimum and maximum values of P, for which the equilibrium can exist, if the angle of friction is 20°. 6M

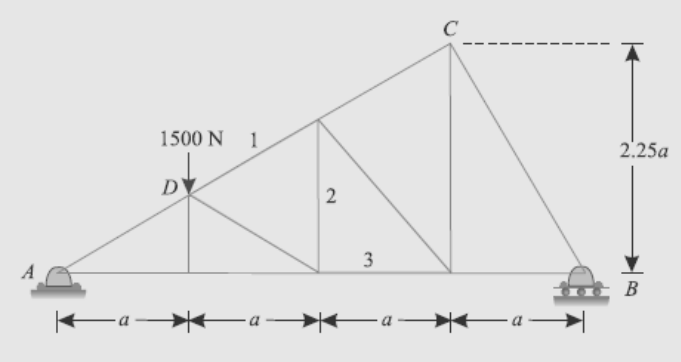


b) State the laws of friction and Define coefficient of friction 6M

(OR)

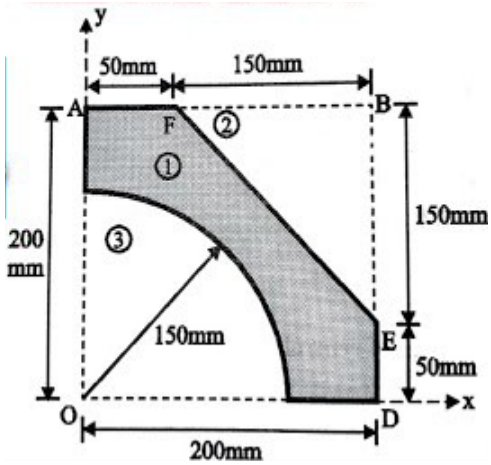
6. a) Describe how the trusses are analyzed by the method of sections. 6M

b) A plane is loaded and supported as shown in Fig. Determine the nature and magnitude of the forces in the members 1, 2 and 3. 6M



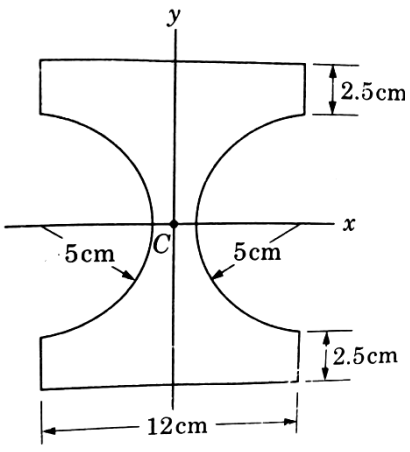
UNIT-IV

7. Find the centroid coordinates as shown in fig 4 with respect to the axes as shown in fig. 12M



(OR)

8. Find the moments of inertia of the cross-section of an iron beam with respect to the centroidal axes. 12M



UNIT-V

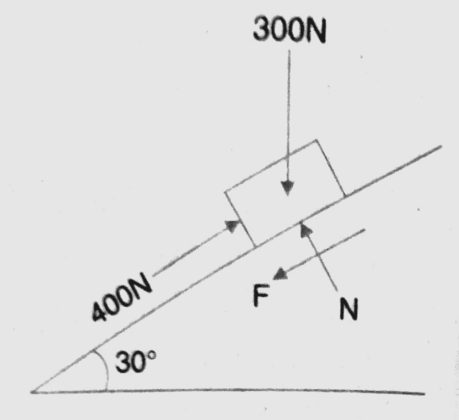
9. a) Define the terms average acceleration, instantaneous acceleration, impulse and momentum. 6M

   b) A particle moving with an acceleration of 10 m/s^2 travels a distance of 80 m during the 8th second of its travel. Find its initial velocity. 6M

(OR)

10. a) Define curvilinear motion of a particle, plane motion of a rigid body and radius of gyration 6M

    b) A body weighing 300 N is pushed up a 30° plane by a 400 N force acting parallel to the plane. If the initial velocity of the body is 1.5 m/sec and coefficient of kinetic friction is μ = 0.2, what velocity will the body have after moving 6 m as shown in fig. 6M



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AR18

CODE: 18EET102 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

ELECTRIC CIRCUIT THEORY

(Electrical and Electronics Engineering)

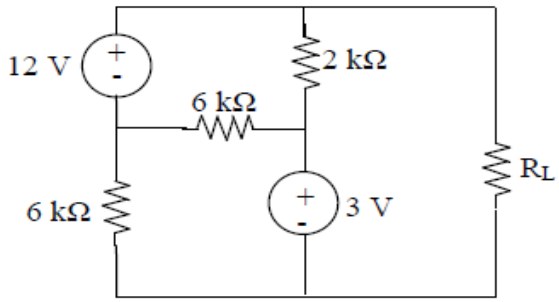
Time: 3 Hours **Max Marks: 60**

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

UNIT-I

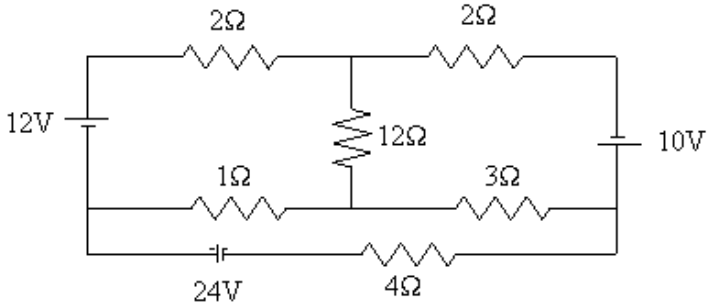
1. a) State and explain Kirchoff's Voltage and Current Laws with suitable examples 4M

   b) Find the current in load resistor when the value of R_L=5K ohms using nodal analysis. 8M



(OR)

2. a) Determine the current through 1Ω resistor in the circuit shown in the figure below using mesh analysis 4M



   b) Define (i) Resistance (ii) Capacitance (iii) Inductance (iv) Impedance (v) Admittance (vi) Susceptance (vii) Reactance (viii) Current. Also, mention the units of all the above parameters. 8M

UNIT-II

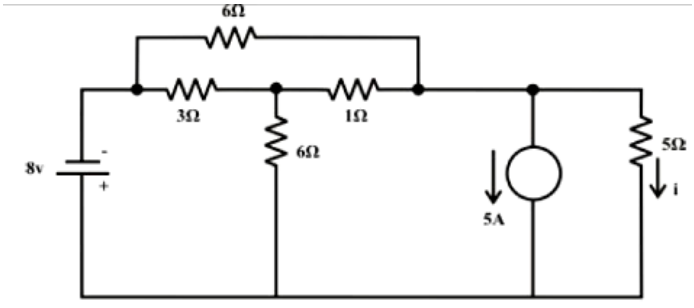
3. a) A circuit having a resistance of 5 ohms, an inductance of 0.5 H and a variable capacitance in series is connected across a 220V, 50Hz supply. Calculate: 6M
   (i) The capacitance to give resonance
   (ii) The voltage across the capacitance and the inductance
   (iii) The Q-factor of the circuit
   b) Draw and explain the locus diagram of a series RC Circuit. 6M

(OR)

4. a) A coil of resistance 5 ohms and inductance 0.5H are connected in series with a capacitance of 0.25 microfarads. Find the impedance of the circuit when the frequency is (i) 60Hz and (ii) 3KHz. 6M
   b) A coil of resistance 2.5 ohms and inductance 0.02H is connected in series with a capacitor across 230V mains. What must be the capacitance in order that the maximum current occurs at a frequency of (i) 30Hz (ii) 60Hz (iii) 120Hz ? Also find the voltage across the capacitor in each case. 6M

UNIT-III

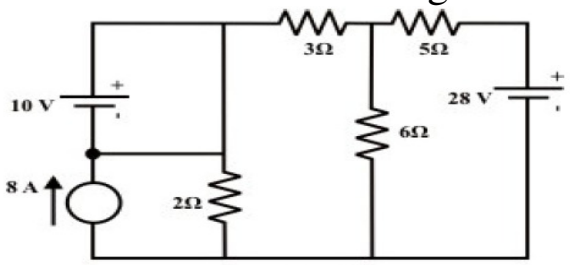
5. a) State and explain difference between Thevenin's theorem and Norton's theorem with suitable example. 7M
   b) Using Superposition theorem, find the current I through 5Ω resistor 5M



(OR)

6. a) State and briefly explain superposition and reciprocity theorems with one example each 7M

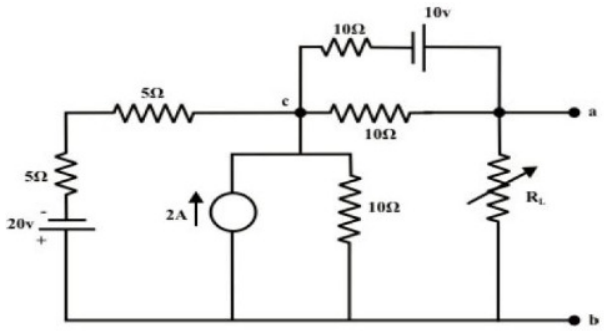
b) Find the current in 6 ohms resistor using Thevenin's theorem. 5M



UNIT-IV

7. a) State and explain Millman's and Tellegen's theorem with suitable example each. 7M

b) Find the value of R_L that absorbs maximum power from the 5M

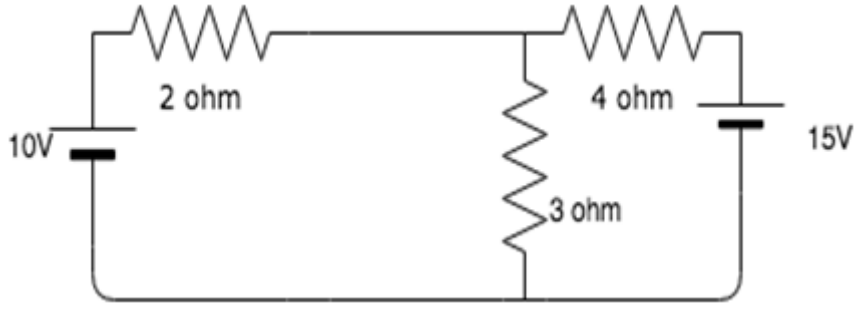


circuit and power during this condition

(OR)

8. a) State and explain Compensation theorem with suitable example 6M

b) Verify tellegen's theorem for the following circuit. 6M



UNIT-V

9. a) Define active power, reactive power and apparent power with proper equations and power triangle. 5M

b) The input power of a 3-phase inductor motor was measured by two-wattmeter method. The readings were 6.2KW and -2.7KW and the line voltage was 415V. Calculate 7M
   (i) the power factor
   (ii) the total active power consumed by the motor and
   (iii) the line current drawn from the mains.

(OR)

10. a) A 3-phase, 4-wire, 240V, 50Hz, RYB system of supply has a star connected load with $Z_{RY} = Z_{YB} = Z_{BR} = 15\angle -30^0$ ohms. Obtain the three line currents and phase currents and draw the complete phasor diagram showing line voltages, line currents and phase currents. 6M

b) Draw the phasor diagram for a balanced star-connected supply system and establish the relation between line currents and phase currents 6M

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AR18

CODE: 18EST105 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, October, 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)	Describe avalanche breakdown and zener breakdown in detail.	6M
	b)	Explicate the operation of bridge rectifier and draw the waveforms of input and output voltages.	6M
		(OR)	
2.	a)	Illustrate the operation of zener diode under forward bias and reverse bias conditions with neat diagrams.	6M
	b)	Compare half wave, full wave and bridge rectifiers.	6M

UNIT-II

3.	a)	Elucidate the input and output characteristics of a transistor in common emitter configuration with neat diagrams.	6M
	b)	A transistor has β=200. Find the collector and base currents if I_E=8mA.	6M
		(OR)	
4.	a)	Define α and β of a transistor and derive the relation between them.	6M
	b)	Explicate the operation of JFET with the help of drain and transfer characteristics.	6M

UNIT-III

5.	a)	Analyze common emitter amplifier AC equivalent circuit and derive the expressions for voltage gain, current gain, input impedance, output impedance.	6M
	b)	Briefly discuss about distortion in amplifier circuits.	6M
		(OR)	
6.	a)	Explain the general characteristics of amplifier circuits.	6M
	b)	Explain the importance of bypass capacitor in amplifier circuits with neat diagrams.	6M

UNIT-IV

7.	a)	Derive the expressions for input impedance, output impedance and voltage gain of current shunt feedback amplifier with the help of topology diagram.	8M
	b)	Explain the working of Colpitts Oscillator with neat diagrams.	4M
		(OR)	
8.	a)	Show that for voltage shunt feedback amplifier input and output resistances are decreased by a factor of (1+Aβ) with feedback.	6M
	b)	State and explain Barkhausen criterion.	6M

UNIT-V

9.	a)	Give four differential amplifier configurations. Which is mostly used and why?	6M
	b)	Explain the working of op-amp inverting amplifier and derive the expression for its voltage gain.	6M
		(OR)	
10.	a)	Explain various methods for improving CMRR in detail.	6M
	b)	Explain the working of op-amp non inverting amplifier and derive the expression for its voltage gain.	6M

AR18

CODE: 18ECT102 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

NETWORK THEORY

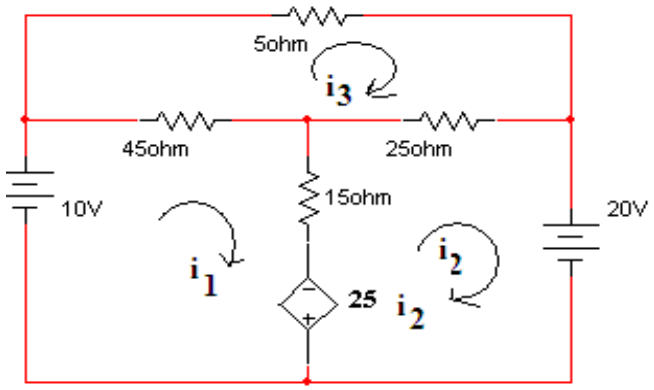
(Electronics and Communication Engineering)

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

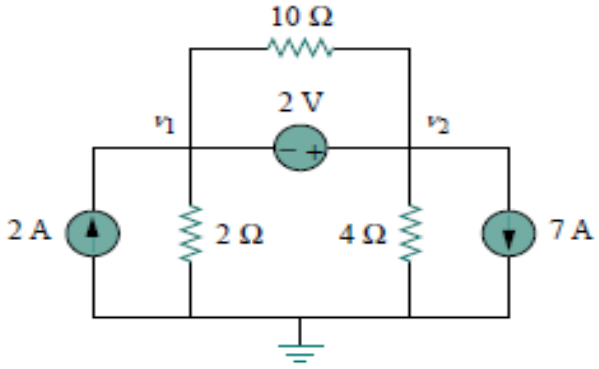
UNIT-I

1. a) Explain super position theorem. (5M)
   b) Find the current through 5 Ω resistor of the circuit shown below (7M)

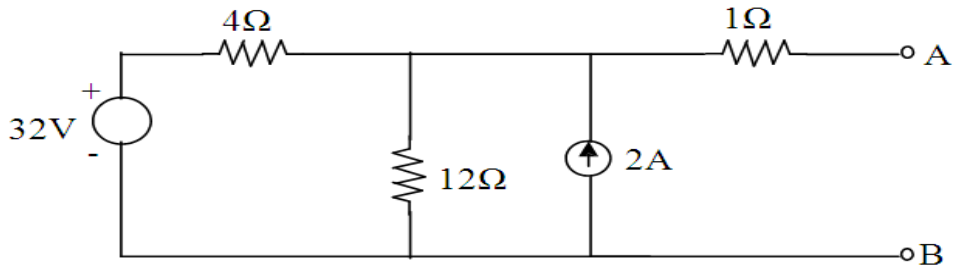


(OR)

2. a) For the circuit shown below, find the node voltages. (6M)



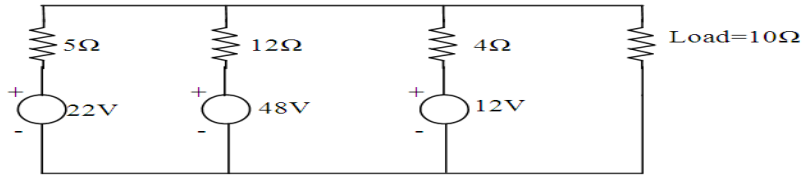
   b) Find the Norton's equivalent circuit of the circuit shown in figure below. (6M)



UNIT-II

3. a) State and explain Maximum power transfer theorem. (6M)

b) (6M)

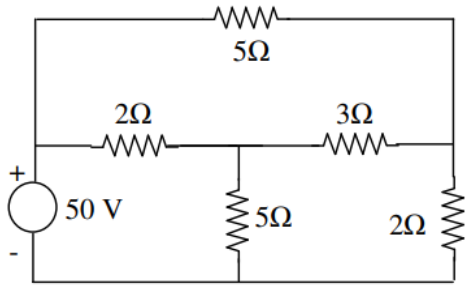


Use Millman's theorem to find the current through the load and the current supplied by each source.

(OR)

4. a) State and expalin Reciprocity theorem. (6M)

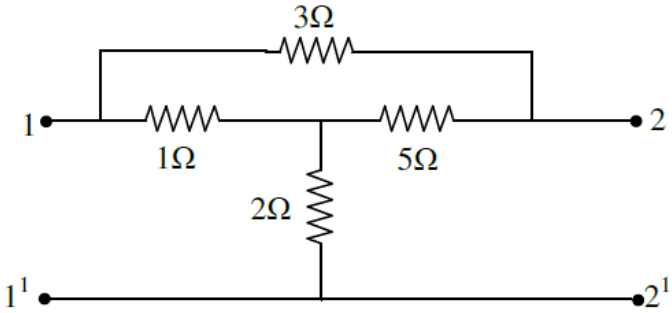
b) Verify the Tellegen's theorem for the circuit shown in Figure. (6M)



UNIT-III

5. a) Determine y-parameters of a two-port network whose z parameters are Z11= Z22=6 Ω and Z12=Z21=4 Ω. (5M)

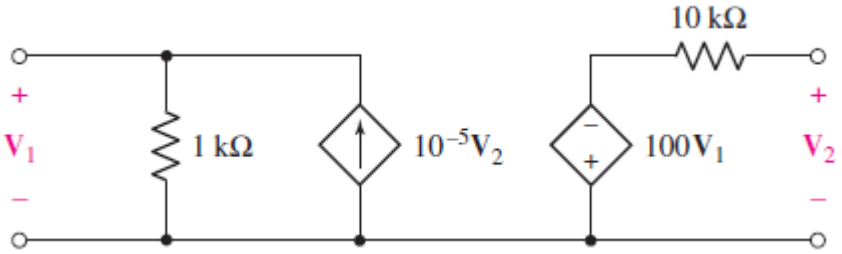
b) For the network shown in below figure, find ABCD parameters. (7M)



(OR)

6. a) Why Z-parameters are known as open circuit parameters and Y-parameters are known as short circuit parameters? (5M)

b) Find h- parameters for the network shown. (7M)



UNIT-IV

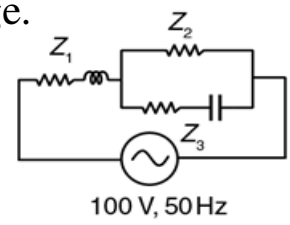
7. a) Explain resonance, bandwidth and Q factor in series RLC circuit. (6M)

b) A series RLC circuit with R = 10Ω, L = 318.3mH, C = 31.83μF is excited from a 10V, 50Hz(ω = 314 rad/s) source. Determine the value of resonant frequency and Q factor. (6M)

(OR)

8. a) What is parallel resonance? Draw the behavioural characteristics of conductance, admittance, and current in parallel resonance RLC circuit. (5M)

b) Determine the value of X_c such that the total current of the circuit will be in phase with the total voltage. What is the circuit current and power. (7M)



$Z_1 = (6.25 + j1.25)\Omega$, $Z_2 = (5 + j10)\Omega$,
$Z_3 = (5 - j X_c)\Omega$,

UNIT-V

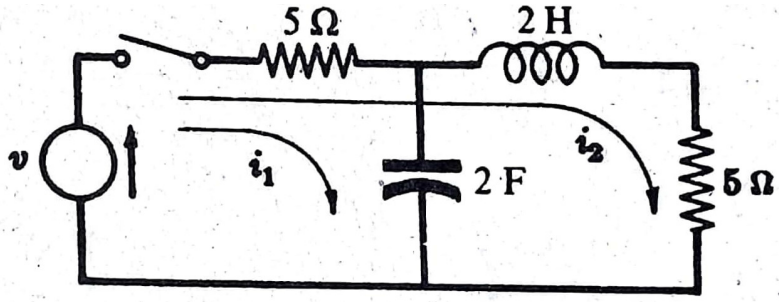
9. a) Derive an expression for voltage across 'C' in a series R-C circuit excited by a unit step voltage. Assume zero initial conditions. (6M)

b) A series R-L circuit has R=20 Ω and L=8 H. The circuit is connected across a DC voltage source of 120 V at t=0. Calculate the current through the circuit. (6M)

(OR)

10. a) A series R-C circuit, with R=50 Ω, C=10 μF has a sinusoidal voltage of 230√ 2 sin 314t. Find the transient response. (6M)

b) In the two-mesh network shown in figure, write the 's' domain equations and construct the corresponding transformed circuit. (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, October, 2022

ENGINEERING DRAWING

(Common to EEE & ECE)

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

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UNIT-I

1. Draw a Vernier scale of R.F. = 1/25 to read up to 4 meters. On it show lengths 2.39 m and 0.91 m — 14M

(OR)

2. To draw a hyperbola with the distance of the focus from the directrix at 50mm and e=3/2. Draw tangent and normal at any point. — 14M

UNIT-II

3. A point at 25mm above the reference line XY is the front view of two points A and B. The top view of A is 40mm behind VP and the top views of B is 50mm in front of VP. Draw the projections of the points and state their positions relative to the planes of projections and the quadrants in which they lie. — 14M

(OR)

4. A 80mm long line AB has the end A at a distance of 20mm above HP and 40mm in front of V.P. The line is inclined at 30 deg to H.P and parallel to V.P, draw the projection of the line. — 14M

UNIT-III

5. Draw the projections of a regular hexagon of 25mm side, having one of its sides in the H.P. and inclined at 60 degrees to the V.P., and its surface making an angle of 45 degrees with H.P. — 14M

(OR)

6. The top view of a plate, the surface of which is perpendicular to the VP and inclined at 60degrees to the HP. is a circle of 60 mm diameter. Draw its Projections. — 14M

UNIT-IV

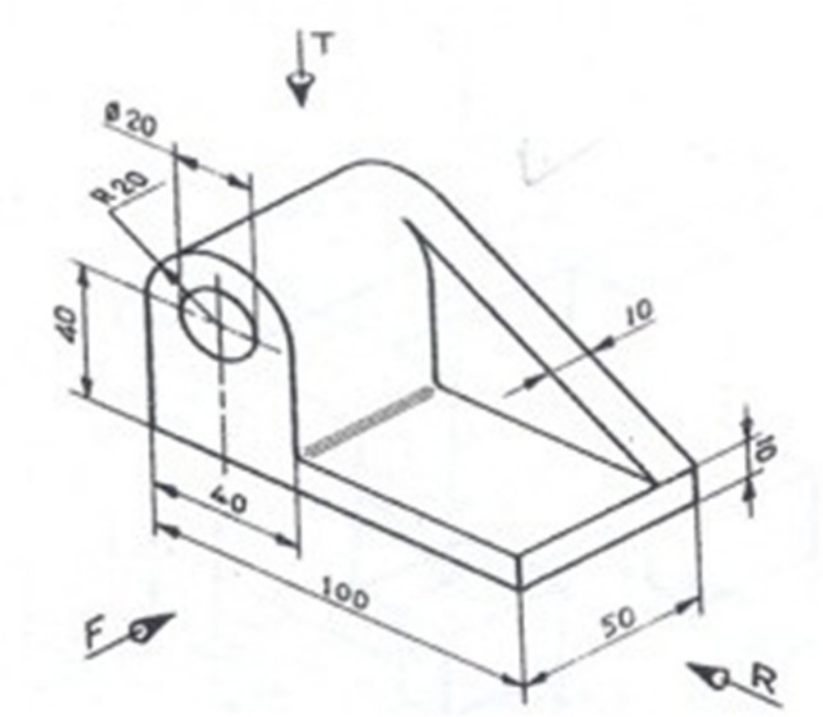
7. A pentagonal pyramid, side of pentagon 30 mm and height 70 mm is resting on HP on one of its base edges such that the triangular face containing that edge is perpendicular to HP and parallel to VP draw the projections. — 14M

(OR)

8. Draw the projections of a pentagonal prism, base 25mm side and axis 50 mm long, resting on one of its rectangular faces on the HP, with the axis inclined at 45□ to the VP. — 14M

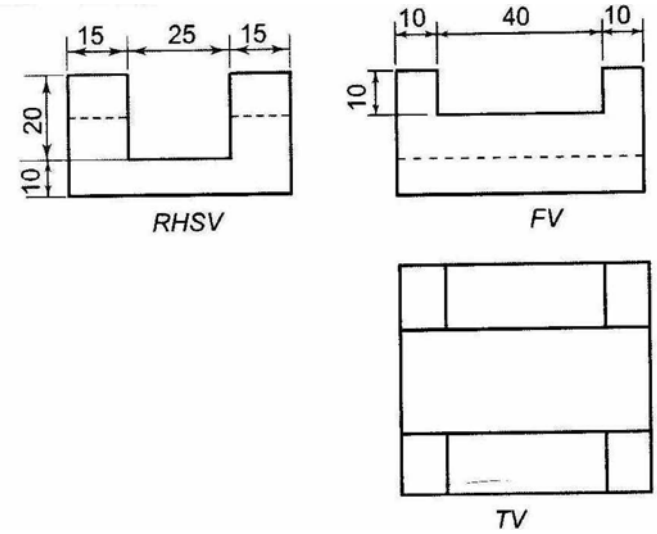
UNIT-V

9. Convert the isometric projection of the given figure into orthographic projections by drawing the front view, top view and side view 14M



(OR)

10. Draw the Isometric View from the views of the object given in figure. All dimensions are in mm. 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, October,2022

ENGINEERINGMECHANICS

(Common to CE, CSE & IT)

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

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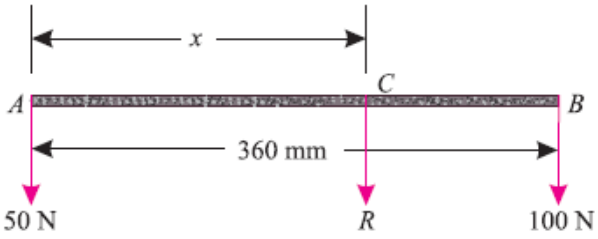
UNIT-I

1. a State and prove the Parallelogram law of forces 7 M
   b Two forces act at an angle of 120°. The bigger force is of 40 N and the resultant is perpendicular to the smaller one. Find the smaller force. 7 M

(OR)

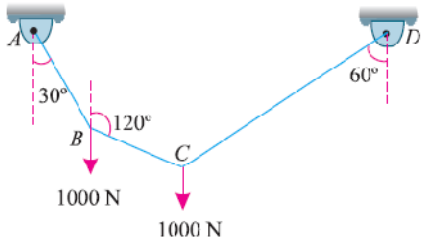
2. a Two like parallel forces of 50 N and 100 N act at the ends of a rod 360 mm long. Find the magnitude of the resultant force and the point where it acts. 6 M



   b Explain the following 8 M
   1. Like parallel forces.
   2. Unlike parallel forces.
   3. Couple
   4. principle of moments

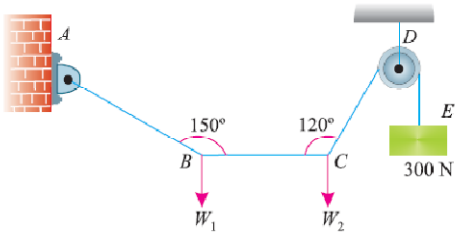
UNIT-II

3. A string ABCD, attached to fixed points A and D has two equal weihts of1000 N attached to it at B and C. The weights rest with the portions AB and CD inclined at angles as shown in Fig. 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



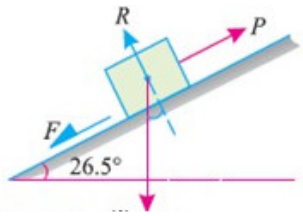
(OR)

4. a State and prove Lami's Theorem 4 M
   b A light string ABCDE whose extremity A is fixed, has weights W1 and W2attached to it at B and C. It passes round a small smooth peg at D carrying a weight of 300 N at the free end E as shown in Fig. 10 M
   If in the equilibrium position, BC is horizontal and AB and CD make 150° and 120° with BC, find (i) Tensions in the portion AB, BC and CD of the string and (ii) Magnitudes of W1 and W2.



UNIT-III

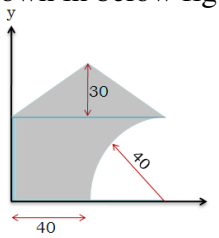
5. a An inclined plane as shown in Fig..is used to unload slowly a body weighing 400 N from a truck 1.2 m high into the ground. The coefficient of friction between the underside of the body and the plank is 0.3. State whether it is necessary to push the body down the plane or hold it back from sliding down. What minimum force is required parallel to the plane for this purpose ? 7 M



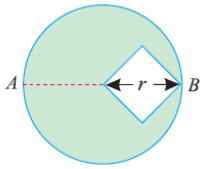
b A screw jack has mean diameter of 50 mm and pitch 10 mm. If the coefficient of friction between its screw and nut is 0.15, find the effort required at the end of 700 mm long handle to raise a load of 10 kN. 7 M

(OR)

6. a Determine centroid of the Lamina Shown in below figure 7 M



b A square hole is punched out of circular lamina, the diagonal of the square being the radius of the circle as shown in Find the centre of gravity of the remainder, if r is the radius of the circle. 7 M

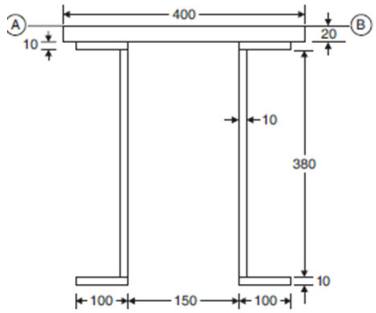


UNIT-IV

7. a State and prove the Parallel Axis Theorem 7 M
   b Find Moment of Inertia of a Triangle about its Base 7 M

(OR)

8. Determine the moment of inertia of the built-up section shown in the Fig. about an axis AB passing through the top most fibre of the section as shown 14 M



UNIT-V

9. a A motor car takes 10 seconds to cover 30 meters and12 seconds to cover42 meters. Find the uniform acceleration of the car and its velocity at the end of 15 seconds. 7 M
   b Write the relation between kinetics of linear motion and kinetics of motion of rotation 7 M

(OR)

10. a A flywheel with a radius of gyration 0.9 m is fitted to a multi cylinder engine, which runs at a mean speed of 360 r.p.m. If the speed varies from 2% above the mean to 2%below it and the fluctuation energy is 30 kN-m, find (i) moment of inertia of the wheel and (ii) mass of the flywheel. 7 M
    b A homogeneous solid cylinder of mass 100 kg and 1 m diameter, whose axisis horizontal, rotates about its axis, in frictionless bearings under the action of a falling block of mass 10 kg, which is carried by a thin rope wrapped around the cylinder. What will be the angular velocity of the cylinder two seconds after the motion? Neglect the weight of the rope. 7 M

AR13

Code: 13ME1001 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B. Tech II Semester Supplementary Examinations, October, 2022
ENGINEERING DRAWING
(Common to EEE & ECE)

Time: 3 hours **Max Marks: 70**

PART-A

Answer all questions **[10X1=10M]**

1. a) How hidden lines are represented?
   b) What is a regular polygon?
   c) What is projection?
   d) When will be the front view of a straight line show the true length of the line?
   e) When are both the views of a plane are straight lines?
   f) What is an edge view of a plane?
   g) What is meant by frustum?
   h) State the shape and number of faces of a Dodecahedron?
   i) How the isometric axes are positioned?
   j) Isometric projection or Isometric view of a square will be a _____

PART- B

Answer one question from each unit **[5X12=60M]**

Unit – I

2. a) Construct a diagonal scale of R.F=1/4000 to show metres and long enough to measure upto 500 metres. **8 M**
   b) Construct a regular hexagon of 35 mm side with one of its side vertical? **4 M**

(OR)

3. Construct an ellipse when the major axis is 120 mm and the distance between the foci is 108 mm. Determine the length of the minor axis. **12 M**

Unit – II

4. a) The top view of a 75 mm long line measures 55 mm. The line is in the V.P, its one end being 25 mm above the H.P. Draw its projections. **6 M**
   b) A point P is 15 mm above H.P and 20 mm in front of the V.P. Another point Q is 25 mm behind the V.P and 40 mm below the H.P. Draw projections of P and Q keeping thedistance between their projectors equal to 90 mm. Draw straight lines joining (i) their top views and (ii) their front views. **6 M**

(OR)

5. a) The front view of a line inclined at 30^0 to the V.P is 65 mm long. Draw the projections of the line, when it is parallel to and 40 mm above the H.P, its one end being 30 mm in front of the V.P. **6 M**
   b) Mark the projections of the following points on a common reference line, keeping theprojectors 35 mm apart.
      i) A, 25mm above H.P and 35mm in front of V.P
      ii) B, 25mm above H.P and 40 mm behind V.P
      iii) C, 30mm below H.P and 45 mm behind V.P **6 M**

Unit – III

6. A square plate PQRS of negligible thickness having 35 mm side is lying on a corner R on H.P. One of the diagonals RP is inclined at 35^0 to H.P and 40^0 to V.P. The two sides QR and RS containing the corner R are equally inclined with H.P. Draw its projections. **12 M**

(OR)

7. A 60^0 set-square of 125 mm longest side is so kept that the longest side in the H.P making an angle of 30^0 with the V.P and the set-square itself inclined at 45^0 to the H.P. Draw the projections of the set- square. **12 M**

Unit – IV

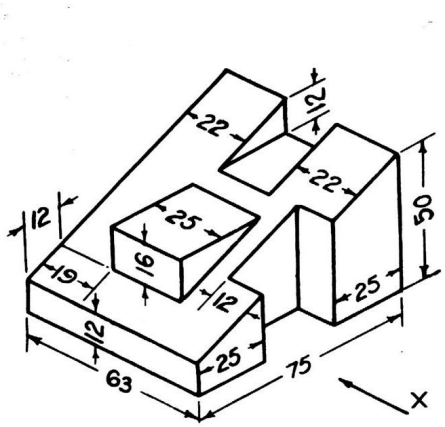
8. Draw the projections of a pentagonal pyramid of base 25 mm side and axis 60 mm longwhen it is lying on H.P on one of its base edges, such that the axis is parallel to VP and inclined at 30^0 to HP. **12 M**

(OR)

9. Draw the projections of a cylinder 75mm diameter and 100 mm long, lying on the ground with its axis inclined at 30^0 to the V.P and parallel to the ground. **12 M**

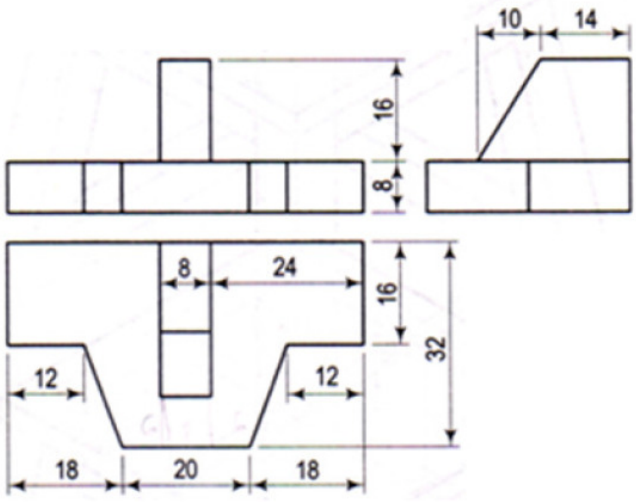
Unit – V

10. Draw (i) front view (ii) side view from the left (iii) top view **12 M**



(OR)

11. Draw the isometric view **12 M**



Note: All dimensions are in mm