AR18

CODE: 18EST105   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech II Semester Supplementary Examinations, July, 2023
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 PN junction diode formation with neat diagram and discuss its forward and reverse characteristics.	6M
	b)	Explain the concepts of Avalanche breakdown and Zener break down.	6M

(OR)

2.	a)	Draw the V-I characteristics of PN diode and explain the temperature dependency of the characteristics.	6M
	b)	Explain the operation of full wave rectifier and derive the expression for ripple factor.	6M

UNIT-II

3.	a)	Discuss different current components in an NPN transistor and explain its operation.	6M
	b)	What is base width modulation? Explain it from BJT characteristics.	6M

(OR)

4.	a)	What is an operating point? Explain the need for stabilizing the operating point.	6M
	b)	Explain the construction and operation of N-channel JFET with neat diagram.	6M

UNIT-III

5.		Explain the operation of CE amplifier with necessary diagrams and state the importance of bypass and coupling capacitors.	12M

(OR)

6.	a)	Derive the expressions for voltage gain and output admittance of CE amplifier.	6M
	b)	For a CB transistor amplifier driven by a voltage source of internal resistance RS=600Ω, the load impedance is a resistor RL=1200Ω. The h-parameters are hib= 22Ω, hrb= 4x10-4, hfb= -0.98 and hob=0.25uA/V. Compute the Input impedance R_I and output admittance R_O.	6M

UNIT-IV

7.	a)	Explain the basic concept of feedback in amplifiers and evaluate the expression for gain with negative feedback.	6M
	b)	Explain BJT based RC-phase shift oscillator with neat diagram and deduce the expression for frequency of oscillation.	6M

(OR)

8.	a)	Discuss the effects of negative feedback in amplifiers.	6M
	b)	What is barkhausen criterion for oscillation? Discuss different types of oscillators.	6M

UNIT-V

9. a) What are the features of 741 Op - Amp and also draw the pin diagram.   6M

    b) What are the differences between the inverting and non-inverting terminals? 6M
       What do you mean by the term "`?

(OR)

10. a) List out the applications and Temperature ranges of IC 741 Op-amp.   6M

    b) List out the AC characteristics of an Op - Amp and discuss about them?   6M

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech II Semester Regular Examinations, July, 2023
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   6M
   b) A block is resting on an inclined plane of 15^0 as shown in   6M
      Fig. 1. A force of 20kN acts at 20^0 with the plane. Determine
      the horizontal and vertical components of the force to the
      plane.
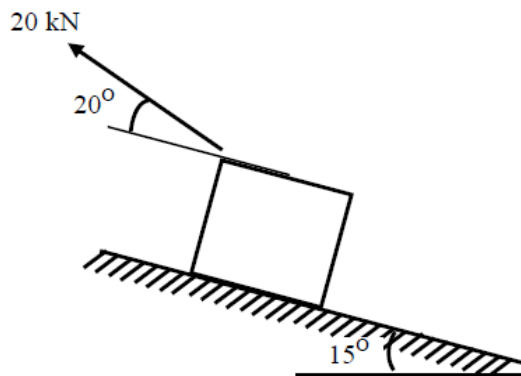
Figure1

(OR)

2. a) What is the principle of transmissibility of forces   3M
   b) A System of four forces acting on a body as shown in Fig.2.   9M
      Determine the resultant
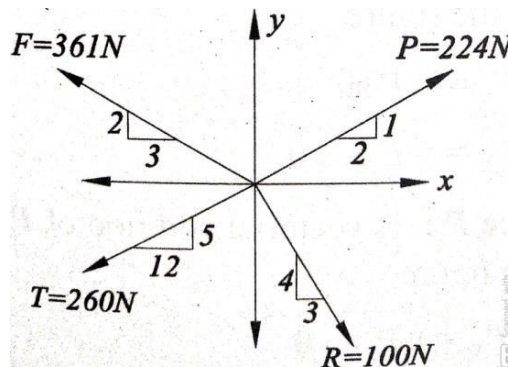
Figure 2

UNIT-II

3. a) State Lami's theorem for the equilibrium of a body under the action of three coplanar forces   3M

   b) A ball of weight W=100N rests in a channel as shown in Fig.3. Determine force exerted on sides of channel at points of contact if all surfaces are perfectly smooth   9M
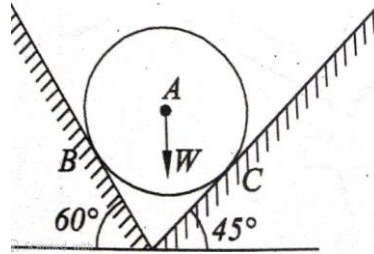

Figure 3

(OR)

4. a) State and prove Varignon's theorem   6M

   b) Two strings PR and QR are used to hang an electric light of fixture weighting 80N, as shown in Fig.4. PR is inclined 30^0 to horizontal and QR at 45^0 to vertical. Determine forces in strings PR and QR.   6M
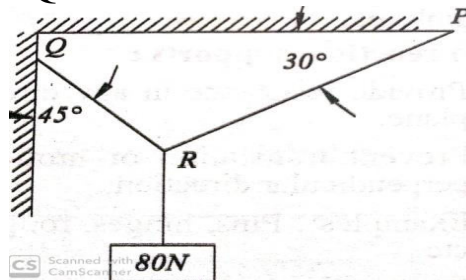
Figure 4

UNIT-III

5. a) State laws of friction   3M

   b) Determine the force P to be applied to the weightless wedges to start them under a 500 N block, as shown in Fig.5. The coefficient of friction at all contact surfaces is 0.30.   9M
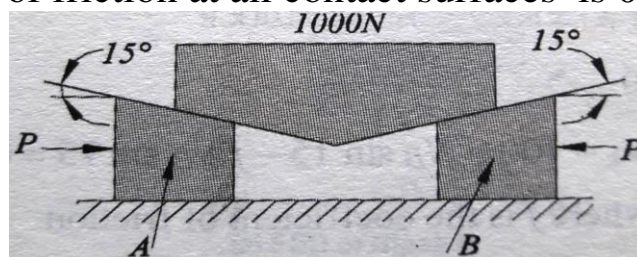

Figure .5

(OR)

6. a) Define the terms angle of friction and angle of repose   3M
   b) Determine the forces in all members of the truss shown in   9M
   Fig.6 and indicate the magnitude and nature of forces on the
   diagram of the truss . All inclined members are at 60^0 to the
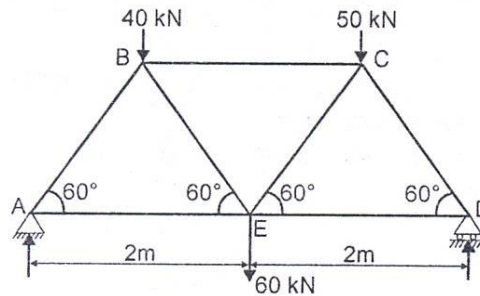   horizontal and length of each member is 2 m.

Figure 6

UNIT-IV

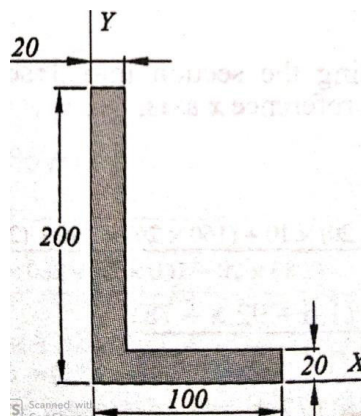7. a) Determine the centroid of the plane lamina as shown in Fig. 7
            6M

Figure 7

   b) Determine the area moment of inertia of a circle about its   6M
   diametric axis

(OR)

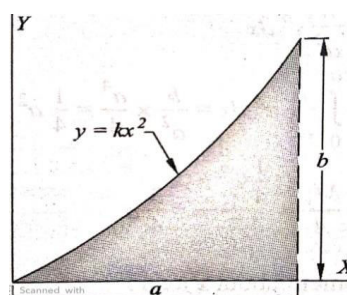8. a) Determine the centriod of a spndrel as shown in Fig. 8   6M

Figure 8

b) Determine the moment of inertia and radius of gyration for the plane lamina as shown in Fig. 9 about centroidal x - axis **6M**
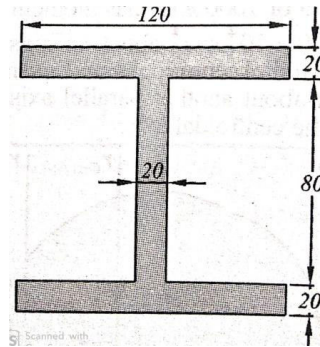

Figure 9

UNIT-V

9. a) If a stone falls past a window of 2.45m height in half a second, find the height from which the stone fell **6M**

   b) An elevator has a downward acceleration of $1m/s^2$. What pressure will be transmitted to the floor of the elevator by a man weighing 500N going in the lift? Find the pressure if the elevator had an upward acceleration of $1m/s^2$. **6M**

(OR)

10. a) An automobile starts from rest and increases its speed from zero to 9 m/s with a constant acceleration 3 m/s^2, runs at this speed for some time and finally comes to rest with a constant deceleration $2m/s^2$. If the total distance travelled is 100 m, find the total time required for the journey. **6M**

   b) A small block of weight 'W' starts from rest and slides down the inclined plane as shown in Fig.10. What distance along the horizontal plane will it travel before coming to rest? Adopt the coefficient of kinetic friction between the horizontal plane and the block is 0.25. **6M**
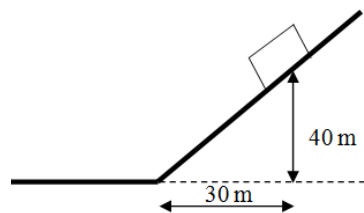

Figure 10

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech II Semester Supplementary Examinations, July,2023
ELECTRIC CIRCUIT THEORY
(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3 Hours   **Max Marks: 60**
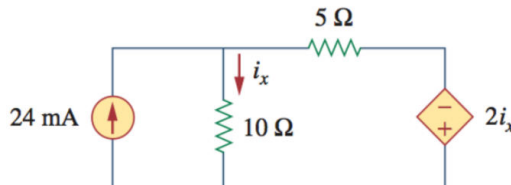
Answer ONE Question from each Unit
All Questions Carry Equal Marks
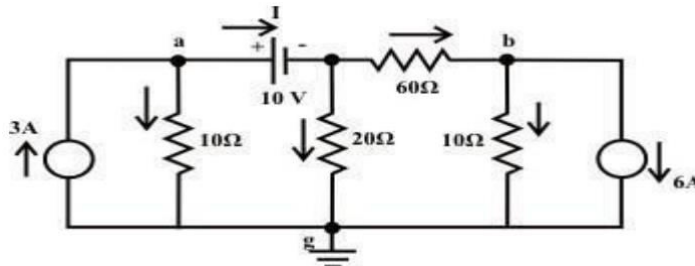All parts of the Question must be answered at one place

UNIT-I

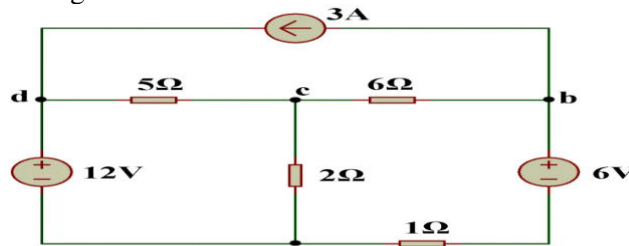1. a) Use Source transformation find current i_x in the circuit shown in fig.   6M

    b) Find the value of the current I flowing through the battery using 'Node voltage'   6M
method.

(OR)

2. a) Write the different between an ideal source and a practical source   6M
    b) Determine the node voltages and the current through the resistors using mesh method for   6M
    the network shown in figure
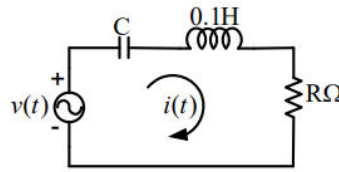

UNIT-II

3. a) Obtain the expression for resonant frequency, bandwidth and Q-factor for parallel   6M
    R-L-C circuit
    b) For the circuit shown in Figure find the resonant frequency, quality factor and   6M
    bandwidth for the circuit. Determine the change in Q and the bandwidth if R is
   changed from R = 2 Ω to R = 0.4 Ω
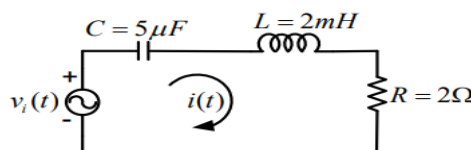
(OR)

4. a) Obtain the expression for resonant frequency, bandwidth and Q-factor for Series R-   6M
    L-C circuit.

b) For the circuit shown in Figure the maximum amplitude of current is 10A, circuit quality factor Q is 100 and L=0.1H. If the applied voltage is 100 V find the value of capacitance. **6M**
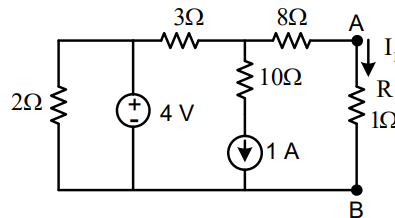

UNIT-III

5. a) State and explain Superposition theorem? **6M**
   b) Find Current flowing through 1Ω resistor by using superposition theorem. **6M**
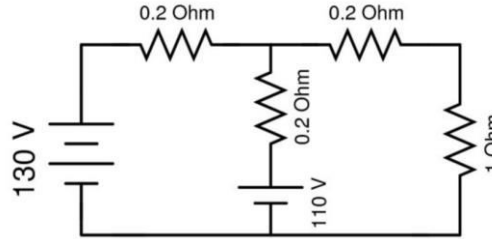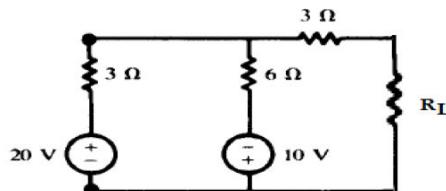

(OR)

6. a) State and explain Norton's theorem? **6M**
   b) Determine the current through the load resistance using Norton's theorem for the circuit shown in Figure. **6M**
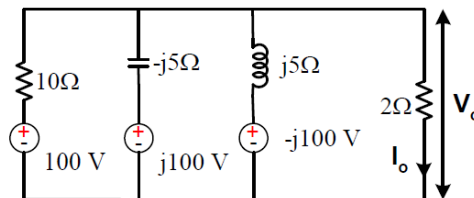

UNIT-IV

7. a) What is the condition for maximum power transfer to the load? Explain. **6M**
   b) Find the value of R_L for maximum power transfer and find the maximum power **6M**

(OR)

8. a) State and explain milliman's theorem. **6M**
   b) Apply Millman's theorem to find V_0 and I_0 for the circuit shown in Figure. **6M**

UNIT-V

9. a) Explain Delta(Δ)-Star(Y) conversion and Star-Delta conversion in DC Circuits **6M**
   b) The input power to a 3-phase a.c. motor is measured as 5kW. If the voltage and current to the motor are 400V and 8.6A respectively, determine the power factor of the system? **6M**

(OR)

10. a) Explain relationship of Line and Phase Voltages and Currents in a Star Connected System. **6M**
    b) Three loads, each of resistance 30, are connected in star to a 415 V, 3-phase supply. Determine(a) the system phase voltage, (b) the phase current and (c) the line current. **6M**

AR18

CODE: 18ECT102   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech II Semester Supplementary Examinations, July, 2023
NETWORK THEORY
(ELECTRONIS AND COMMUNICATION ENGINEERING)

Time: 3 Hours   **Max Marks: 60**
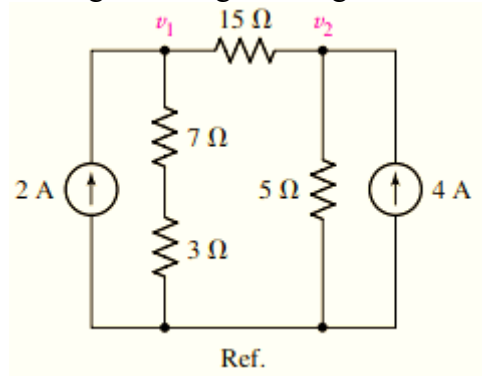
Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place
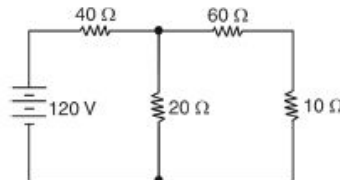
UNIT-I

1. a) Explain the classification of electrical sources in detail.   3M
    b) Determine the current flowing left to right through the 15 Ω resistor of Fig   9M

(OR)

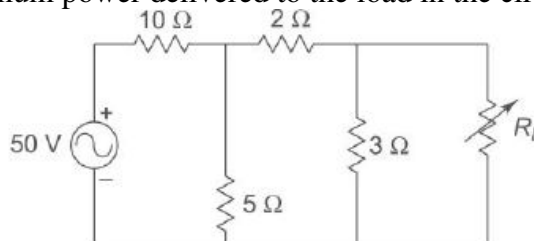2. a) State Kirchhoff's laws. What are its limitations?   3M
    b) Determine the Power delivered by the 120 Volt source   9M

UNIT-II

3. a) State and explain Maximum power transfer theorem.   3M
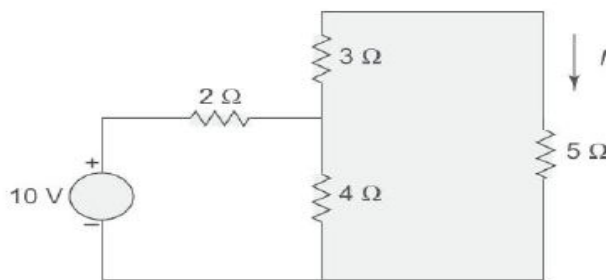   b) Determine the maximum power delivered to the load in the circuit shown   9M

(OR)

4. a) State and explain Reciprocity Theorem.   3M
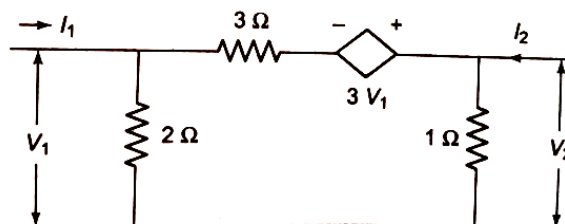
b) Verify the reciprocity theorem for the given circuit shown.   9M

UNIT-III

5. a) Brief about two port networks and list various two port parameters.   5M
    b) Determine the Z-parameters for the network shown in fig   7M


(OR)

6. a) Express Y-parameters in terms of Z-parameters.   6M
    b) The impedance parameters of a two-port network are $Z_{11}=6\Omega$; $Z_{22} = 4\ \Omega$; Z_{12} 6M
        $=Z_{21}=3\ \Omega$. Compute the Y-parameters and write the describing equations.

UNIT-IV

7. a) Define Resonance, Bandwidth, Q-factor with necessary expressions for RLC series   5M
        circuit.
    b) For the network shown in the figure, determine (i) Resonance frequency (ii) input   7M
        admittance at resonance (iii) quality factor (iv) band width.
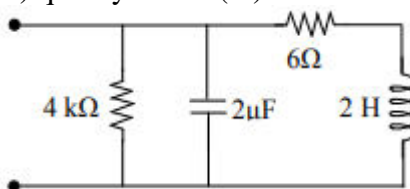
(OR)

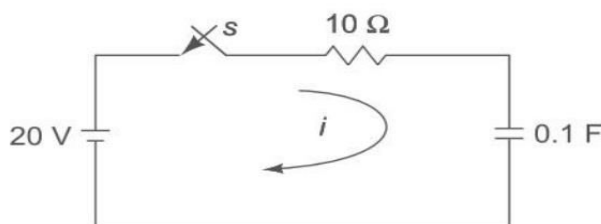8. a) Elaborate on Locus Diagrams.   3M
    b) Show that the resonant frequency ω_0 of an RLC series circuit is the geometric   9M
        mean of ω_1 and ω_2, the lower and upper half-power frequencies respectively.

UNIT-V

9. a) Derive the expression for transient current for RC circuit when the DC excitation.   6M
    b) A series RC circuit consists of a resistor of 10 V and a capacitor of 0.1 F as shown   6M
        in Fig. A constant voltage of 20 V is applied to the circuit at t = 0. Obtain the
        current equation. Determine the voltages across the resistor and the capacitor

(OR)

10.   Derive the expression for transient current for RLC circuit when the excitation in   12M
        AC

AR16

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. The major axis of an ellipse is 150mm long and the minor axis is 100mm long. Draw the ellipse by concentric circle method. **14M**

(OR)

2. Construct a Hyperbola using general method when the distance of the focus from the directrix is 65mm and the eccentricity is 3/2. Draw a normal and a tangent at a point on the curve 75mm from the directrix. **14M**

UNIT-II

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

(OR)

4. a. The length of the top view of a line parallel to the V.P and inclined at 45° to the H.P is 50mm. One end of the line is 12mm above the H.P and 25mm in front of the V.P. Draw the projections of the line and determine its true length? **7M**

   b. The front view of a 75mm long line measures 55mm. The line is parallel to the H.P and one of its ends is in the V.P and 25mm above the H.P. Draw the projections of the line and determine its inclination with the V.P? **7M**

UNIT-III

5. A Pentagonal plate of 45mm has a circular hole of 40mm diameter in its centre. The plane stands on one of its sides on the H.P with its plane perpendicular to V.P and 45° inclined to the H.P. Draw its projections. **14M**

(OR)

6. A Square ABCD of 50mm side has its corner A in the H.P, its diagonal AC inclined at 30° to the H.P and the diagonal BD inclined at 45° to the V.P and parallel to the H.P. Draw its projections. **14M**
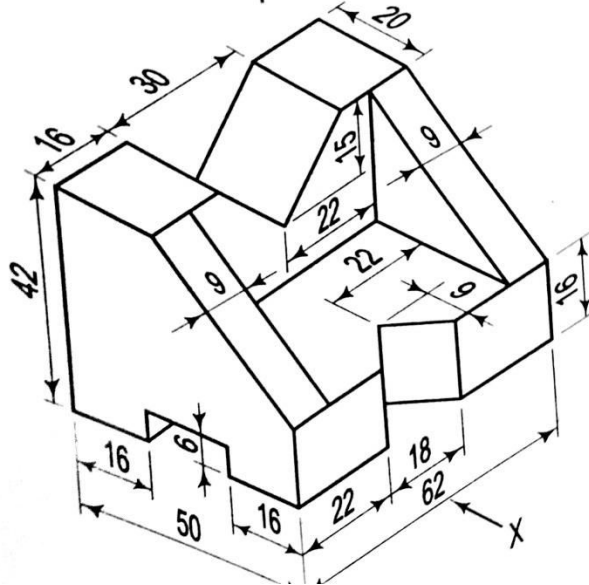
UNIT-IV

7. 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**

(OR)

8.　　Draw the projections of a cone, base 40mm diameter and axis 60mm long, when it　**14M**
　　　is resting on the ground on a point on its base circle with
　　　a)The axis making an angle of 45° with the H.P and 30° with the V.P.
　　　b)The axis making an angle of 45° with the H.P and its top view making 30° with
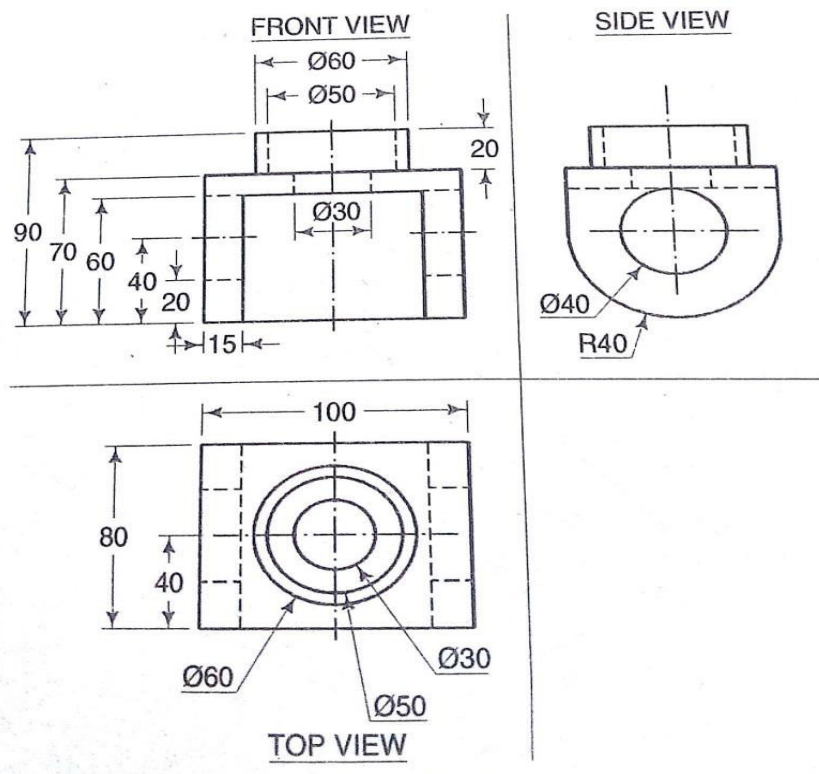　　　the V.P.

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　**14M**
　　　shown figure?

AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech II Semester Supplementary Examinations, July, 2023
ENGINEERING DRAWING
(Common to EEE & ECE Branches)

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. The major axis of an ellipse is 150mm long and the minor axis is 100mm long. Draw the ellipse by concentric circle method. **14M**

(OR)

2. Construct a Hyperbola using general method when the distance of the focus from the directrix is 65mm and the eccentricity is 3/2. Draw a normal and a tangent at a point on the curve 75mm from the directrix. **14M**

UNIT-II

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

(OR)

4. a. The length of the top view of a line parallel to the V.P and inclined at 45° to the H.P is 50mm. One end of the line is 12mm above the H.P and 25mm in front of the V.P. Draw the projections of the line and determine its true length? **7M**

   b. The front view of a 75mm long line measures 55mm. The line is parallel to the H.P and one of its ends is in the V.P and 25mm above the H.P. Draw the projections of the line and determine its inclination with the V.P? **7M**

UNIT-III

5. A Pentagonal plate of 45mm has a circular hole of 40mm diameter in its centre. The plane stands on one of its sides on the H.P with its plane perpendicular to V.P and 45° inclined to the H.P. Draw its projections. **14M**

(OR)

6. A Square ABCD of 50mm side has its corner A in the H.P, its diagonal AC inclined at 30° to the H.P and the diagonal BD inclined at 45° to the V.P and parallel to the H.P. Draw its projections. **14M**
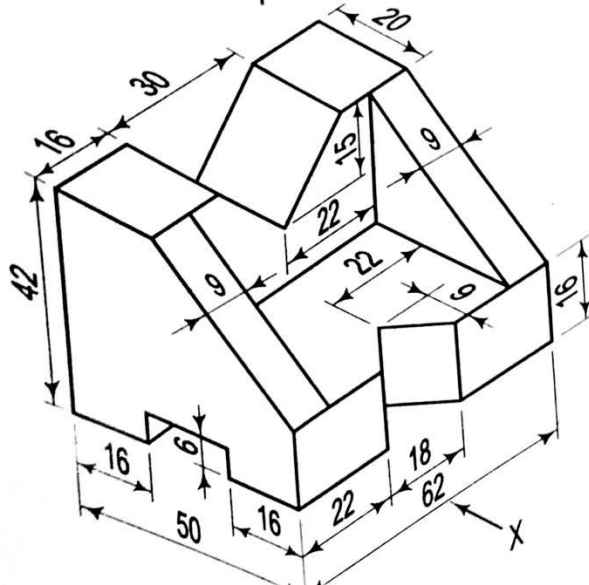
UNIT-IV

7. 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**

(OR)

8. Draw the projections of a cone, base 40mm diameter and axis 60mm long, when it **14M** is resting on the ground on a point on its base circle with
a)The axis making an angle of 45° with the H.P and 30° with the V.P.
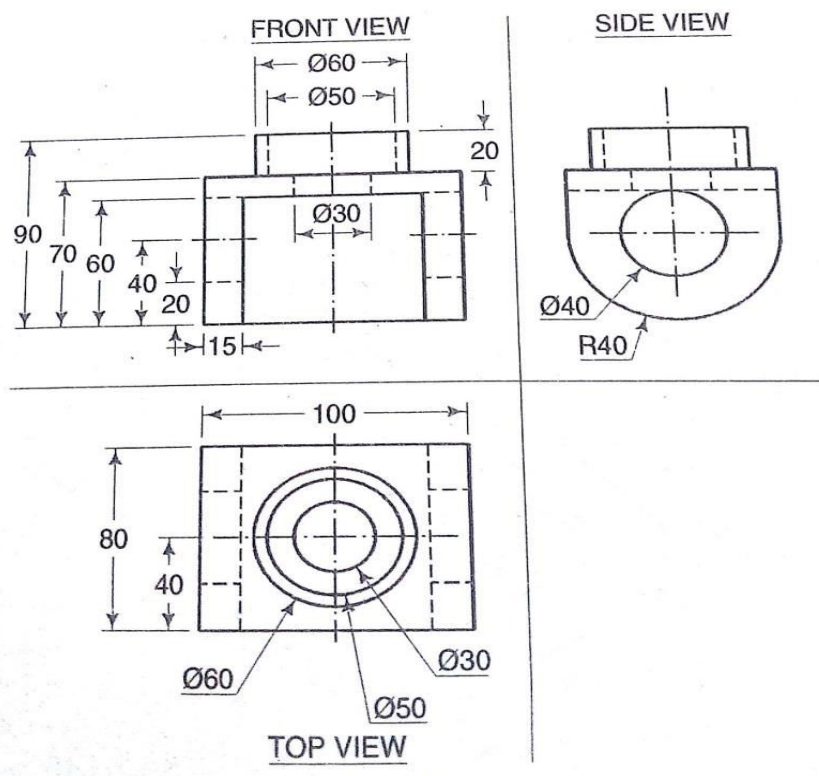b)The axis making an angle of 45° with the H.P and its top view making 30° with the V.P.

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 **14M** shown figure?

AR13

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.TECH II SEM SUPPLEMENTARY EXAMINATIONS, July, 2023
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. The major axis of an ellipse is 90 mm and the minor axis is 65 mm long. Draw the ellipse by concentric circles method.   **12M**

UNIT-II

4. A point P is 15 mm above the H.P. and 20 mm in front of the V.P. Another point Q is 25 mm behind the VP and 40 mm below the H.P. Draw the projections of P and Q keeping the distance between their projectors equal to 90 mm. draw 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   12M
    the H.P. on one of its generators with the axis parallel to the V.P.

(OR)

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

UNIT-V

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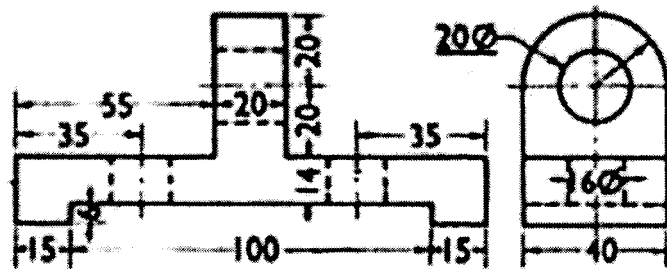
(OR)

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

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