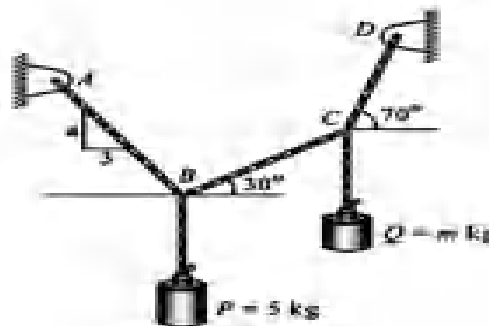


Time: 3 Hours**Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

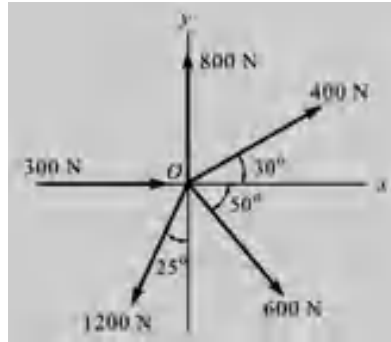
1. a) What are the limitations of parallelogram law?
- b) Explain free body diagram
- c) State equilibrium law of forces.
- d) What is meant by angle of repose?
- e) State parallel axis theorem with a neat sketch?
- f) The motion of a particle is defined by the relation $x = t^3 - 15t^2 - 20$, where 'x' is expressed in meters and 't' in seconds. Determine the acceleration of the particle at $t = 3$ seconds.
- g) A pulley 2 m in diameter is keyed to a shaft which makes 240 rpm. Find the angular and linear velocities of a particle, on the periphery of the pulley.
- h) Write down the equations of equilibrium.
- i) The moment of inertia of a triangular section of base 'b' and height 'h' about an axis through its centre of gravity and parallel to the base is _____
- j) What are the necessary and sufficient conditions for equilibrium of general system of forces?

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2. (a) Explain the concept of moment of a force about a point. For what condition the moment of a force will be zero ? **4M**
- (b) Block P = 5kg and block Q of mass m kg is suspended through the chord is in the equilibrium position as shown in figure. Determine the mass of block Q. **8M**

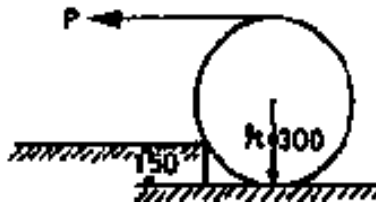


3. Determine magnitude and direction of the resultant of the five coplanar concurrent forces acting at point O as shown in figure. **12M**



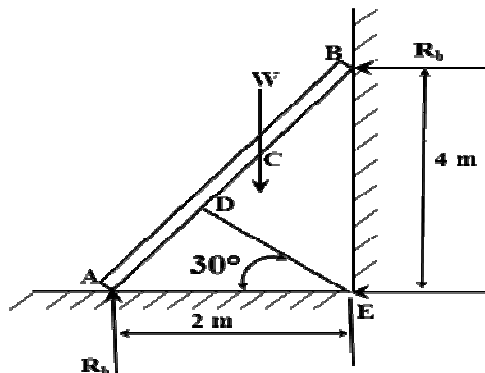
UNIT-II

4. A roller of radius $r = 300$ mm and weight 2000 N is to be pulled over a curb of height 150 mm by a horizontal force P applied to the end of a string wound tightly around the circumference of the roller. Find the magnitude of P required to start the roller move over the curb. What is the least pull P through the centre of the wheel to just turn the roller over the curb as shown in Fig. **12M**



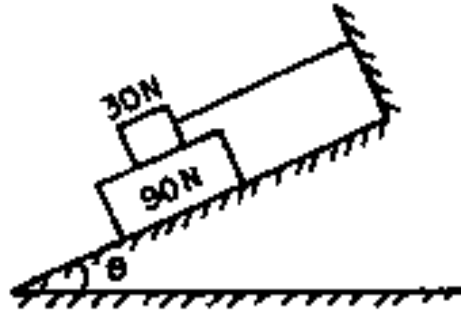
(OR)

5. A 750 N man stands on the middle rung of a 300 N ladder, as shown in the figure. Assuming that the floor and wall are perfectly smooth and that slipping is prevented by string DE , find the tension S in the string and also the reactions R_a and R_b at A and B . **12M**



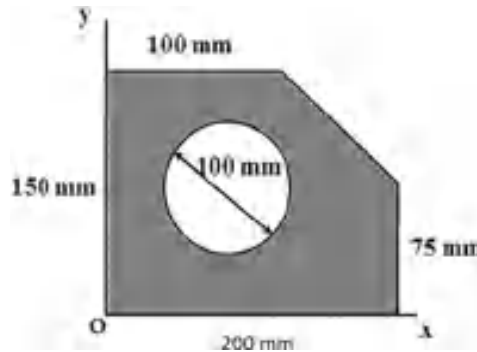
UNIT-III

6. What should be the value of the angle θ in Fig. so that the motion of the 90 N block impends down the plane? The coefficient of friction μ for all the surfaces is $1/3$. **12M**



(OR)

7. Referring to the Figure, determine the coordinates x_c and y_c of the center of a 100mm diameter, circular hole cut in a thin plate so that this point will be the centroid of the remaining shaded area. **12M**

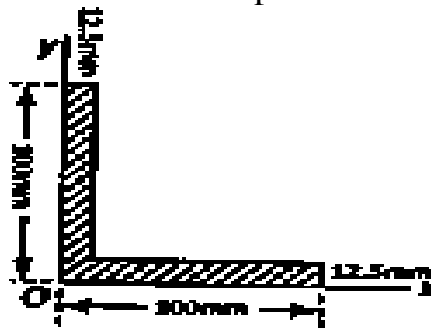


UNIT-IV

8. Find the Moment of Inertia of a square with sides of length “a” with respect to diagonal. **12M**

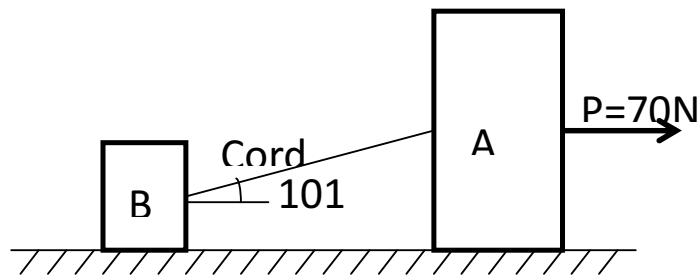
(OR)

9. Find I_{xx} and I_{yy} for the unequal angle section $100 \times 100 \times 12.5$ mm shown in Fig. if the total mass of the plate is 50 kg. **12M**



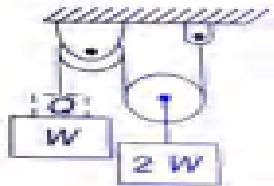
UNIT-V

10. (a) A car moving with uniform acceleration covers 450 m in a 5 second interval, and covers 700 m in the next 5 second interval. Find the acceleration of the car. **4M**
- (b) A horizontal force $P = 70 \text{ N}$ is applied on mass $A = 16 \text{ kg}$ as shown in figure. The coefficient of friction between A and the horizontal plane is 0.25. B has a mass of 4 kg and coefficient of friction between it and the plane is 0.50. The cord between the A and B makes an angle of 10° with the horizontal. What is the acceleration of the system and tension in the cord? **8M**



(OR)

11. (a) Weight W and $2W$ are supported in a vertical plane by a string and pulleys arranged as shown in Fig.2. Find the magnitude of an additional weight Q applied on the left which will give a downward acceleration $a = 0.1g$ to the weight W . Neglect friction and inertia of Pulleys **6M**



- (b) A baseball player hits a 160 g baseball with an initial velocity of 40 m/s at an angle of 40° with the horizontal as shown. Determine (i) the kinetic energy of the ball immediately after it is hit, (ii) the kinetic energy of the ball when it reaches its maximum height, (iii) the maximum height above the ground reached by the ball **6M**



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

I.B. Tech II Semester Supplementary Examinations, April, 2017

ENGINEERING DRAWING

(Common to EEE & ECE)

Time: 3 hours

Max Marks: 70

PART- A

Answer all questions

[10 x 1=10M]

1.
 - a) Measurements from scale to drawing are transferred with the aid of -
 - b) The size of a letter is described by its-----
 - c) Eccentricity $e = \frac{5}{4}$ name the conical curve-----
 - d) The two systems of placing dimensions are----- and-----
 - e) When drawing is drawn of the same size as that of the object, the scale used -----
 - f) Draw the symbol for first - angle projection.
 - g) A point 30 mm above xy line is the top view of point P. The front view 10 mm below the top view state in which quadrant the point is.
 - h) If the surface of the plane is inclined to the HP. And an edge is parallel to HP, what is its initial position-----
 - i) In a right regular pyramid, the lateral faces are-----
 - j) Isometric lengths are ----- that of the true length.

PART-B

Answer one question from each unit

[5 x 12 = 60 M]

UNIT – I

2. An area of 144 sq.cm on a map represents an area of 36 sq.Km on the field. Find the R.F of the scale for this map and draw a diagonal scale to show kilometers, hectameters and decameters and to measure up to 10 kilometers. Indicate on the scale a distance of 7 kilometers, 5 hectometers and 6 decameters.

(OR)

3. Two fixed points A and B are 100 mm apart. Trace the complete path of a point P moving in such a way that, the sum of its distances from A and B is always the same and equal to 125 mm. name the curve. Draw another curve parallel to and 25 mm away from this curve.

UNIT – II

4. a) Two points A and B are in HP. The point A is 30 mm in front of the VP., while B is behind the VP. The distance between their projectors is 75 mm and the line joining their top views makes an angle of 45^0 with xy. Find the distance of the point B from the VP.
- b) Draw the projections of the following points on the same ground line, keep the projectors 25 mm apart
- A, in the HP. And 20 mm behind the VP
 - B, 40 mm above HP, and 25 mm in front of the VP.
 - C, 40 mm below the HP. And 25 mm in front of the VP.

(OR)

5. a) A line PQ, 90 mm long, is in the HP. And makes an angle of 30^0 with the VP. Its end P is 25 mm in front of the VP. Draw its projections.
- b) A vertical line AB, 75 mm long, has its end A in the HP. And 25 mm in front of VP. A line AC 100 mm long, is in the HP. and parallel to the VP. Draw the projections of the line. Join B and C and determine its inclination with the HP.

UNIT-III

6. A regular hexagon of side 30 mm side has a corner in the HP. Its surface is inclined at 45^0 to the HP, and the top view of the diagonal through the corner which is in the HP makes an angle of 60^0 with the VP. Draw its projections.

(OR)

7. A plate having a shape of an isosceles triangle has base 50 mm and altitude 70 mm. it is so placed that in front view it is seen an equilateral triangle of 50 mm sides and one side inclined at 45 degrees to xy. Draw its top view.

UNIT – IV

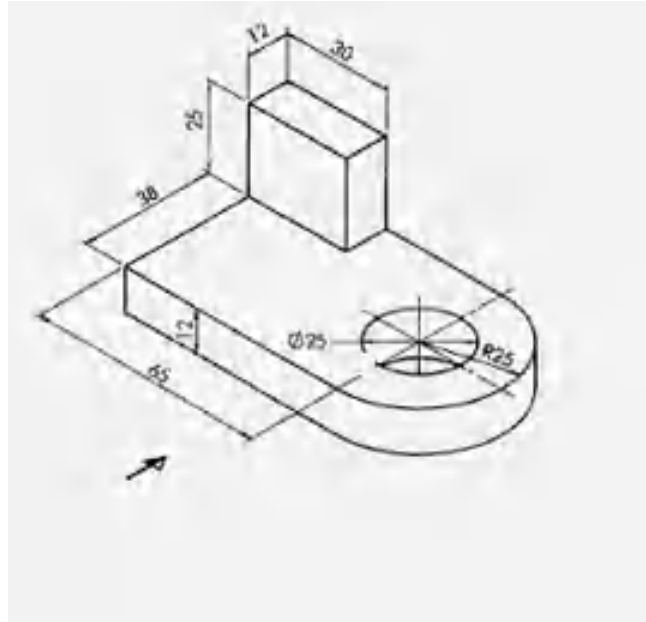
8. Draw the projections of a pentagonal prism, base 25 mm side and axis 50 mm long, resting on one of its rectangular faces on the HP. with the axis inclined at 45^0 to the VP.

(OR)

9. Draw the projections of a cone, base 45 mm diameter and axis 50 mm long, when it is resting on a point on its base circle with the axis making an angle of 30^0 with the HP.

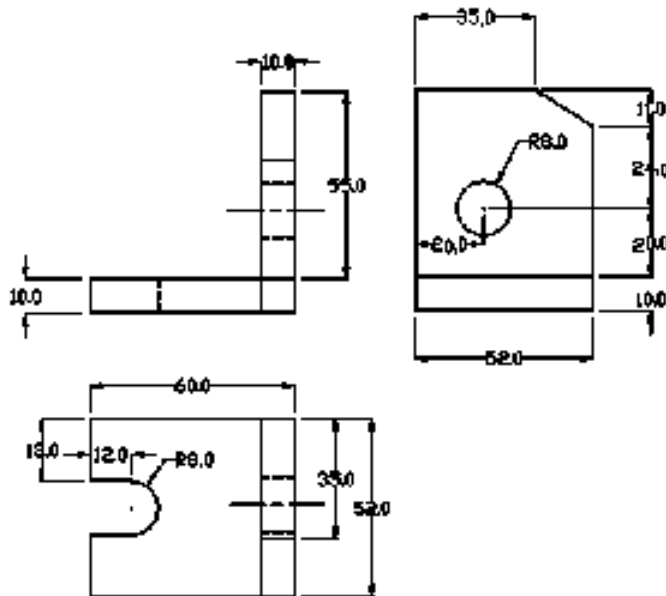
UNIT – V

10. Draw the front view, top view and side view of the block shown in figure shown below.



(OR)

11. Draw the isometric view of the object whose orthographic views are shown in the figure.



13ME1001

AR13/SET-1

AR13

Code: 13ME1002

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I B.Tech. II Semester Supplementary Examinations, April, 2017

CLASSICAL MECHANICS

(Mechanical Engineering)

Time: 3 hours

Max Marks: 70

PART-A

Answer all questions

[10X1=10M]

1.
 - a) State the different types of supports.
 - b) Define concurrent forces in space.
 - c) Define free body diagram.
 - d) Write about method of sections.
 - e) Define virtual work.
 - f) State Pappus theorems.
 - g) Differentiate polar moment of inertia and product of inertia.
 - h) What is meant by general plane motion?
 - i) Derive the relation between angular velocity and linear acceleration.
 - j) A flywheel has a mass moment of inertia of 10 kg-m^2 about the axis of rotation. It runs at a constant angular velocity of 94.3 rad/sec . Find the kinetic energy of the flywheel.

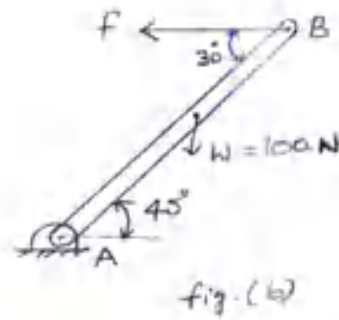
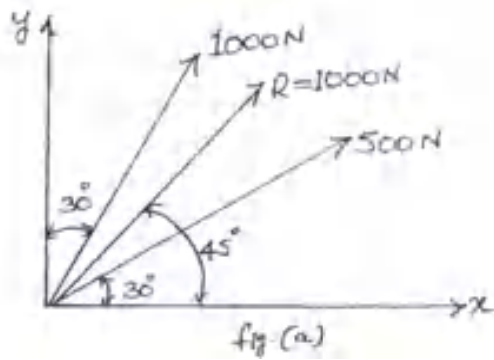
PART- B

Answer one question from each unit

[5X12=60M]

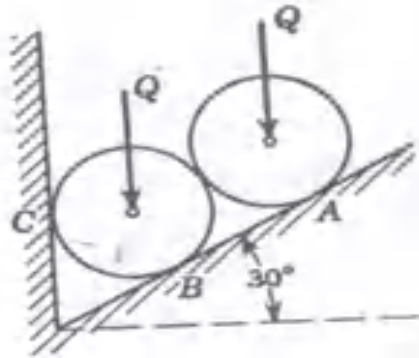
UNIT - I

2.
 - a) Two forces acting on a body are 500N and 1000N as shown in the fig. (a). Determine the third force F such that the resultant of all three forces is 1000N directed at 45° to x-axis.
 - b) A bar AB of weight 100N is hinged at A and is pulled by a cable attached at B by a force F . Find the force F and the magnitude and direction of the reaction at A if the bar is in equilibrium position as shown in the fig. (b).



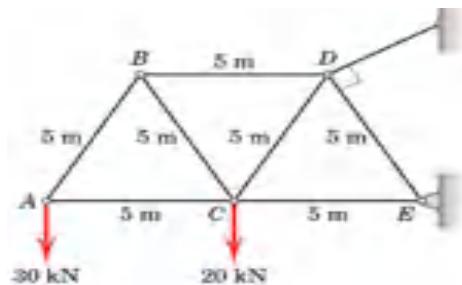
(OR)

3. Two identical rollers, each of weight $Q=100\text{ N}$, are supported by an inclined plane and a vertical wall as shown in the following figure. Assuming smooth surfaces, find the reactions induced at the points of support A, B and C.



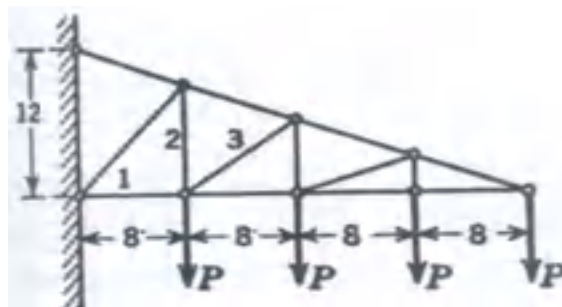
UNIT - II

4. Determine the forces in each member of the loaded truss as shown in the following figure.



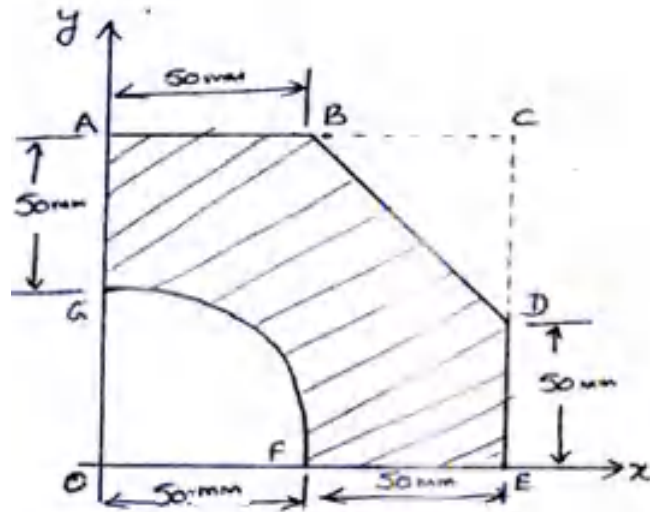
(OR)

5. Determine the axial forces induced in the members 1, 2 & 3 of the plane cantilever truss loaded as shown in the following figure.



UNIT - III

6. Determine the coordinates of the centroid of the shaded area as shown in the following figure.



(OR)

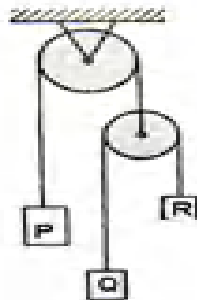
7. Derive an expression for the moment of inertia of a uniform solid sphere about its diameter.

UNIT - IV

8. A stone is dropped into a well with no initial velocity and the sound of flash is heard after 4 seconds. Then a second stone is thrown into the well with an initial velocity 'v' and the splash is heard in 4 seconds. If the velocity of sound is constant at 330 m/s, determine the initial velocity of the second stone.

(OR)

9. Determine the acceleration of each weight for the following weights connected over a frictionless pulley as shown in figure. Given $P=30\text{N}$, $Q=20\text{N}$ and $R=10\text{N}$.

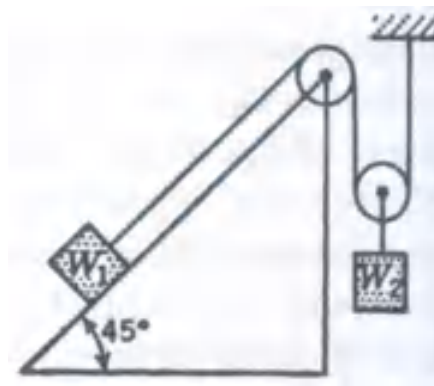


UNIT - V

10. (a) A projectile is aimed at a target on the horizontal plane and falls 12 m short when the angle of projection is 15° , while it overshoots by 24 m when the angle is 45° . Find the angle of projection to hit the target.
- (b) A block of weight 130 N is on an incline, whose slope is 5 vertical to 12 horizontal. Its initial velocity down the incline is 2.4 m/s. What will be its velocity 5 seconds later? Take coefficient of friction at contact surface = 0.3.

(OR)

11. Find the tension S in the string during motion of the system shown in the following figure. If $W_1 = 200$ N, $W_2 = 100$ N. The system is in a vertical plane, and the coefficient of friction between the inclined plane and the block W_1 is 0.2. Assume the pulleys to be without mass.



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AR13

Code: 13ME1002

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I B.Tech. II Semester Supplementary Examinations, November, 2016

CLASSICAL MECHANICS

(Mechanical Engineering)

Time: 3 hours

Max Marks: 70

PART-A

Answer all questions

[10X1=10M]

1.
 - a) State the different types of supports.
 - b) Define concurrent forces in space.
 - c) Define free body diagram.
 - d) Write about method of sections.
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 - g) Differentiate polar moment of inertia and product of inertia.
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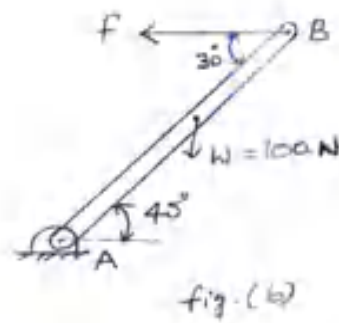
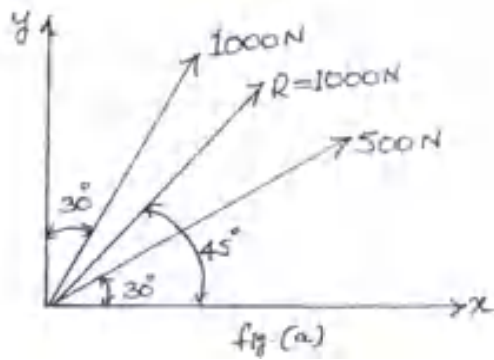
PART- B

Answer one question from each unit

[5X12=60M]

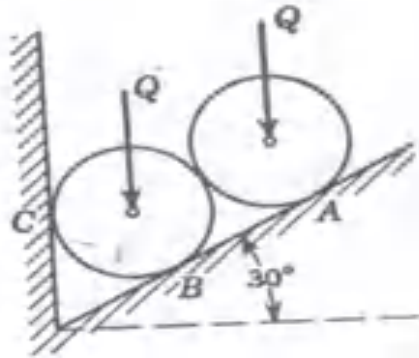
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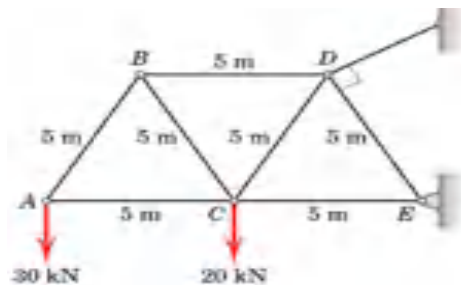
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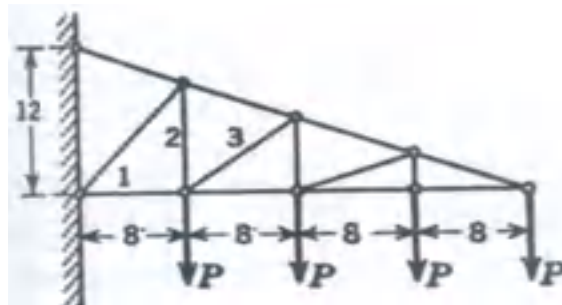
UNIT - II

4. Determine the forces in each member of the loaded truss as shown in the following figure.



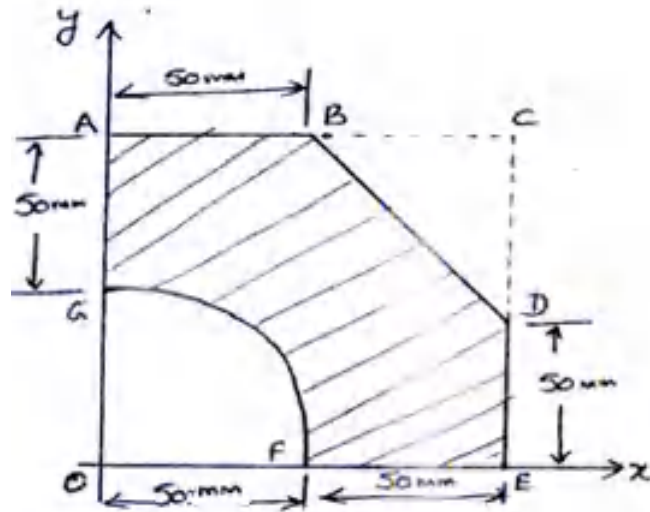
(OR)

5. Determine the axial forces induced in the members 1, 2 & 3 of the plane cantilever truss loaded as shown in the following figure.



UNIT - III

6. Determine the coordinates of the centroid of the shaded area as shown in the following figure.



(OR)

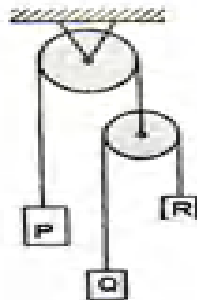
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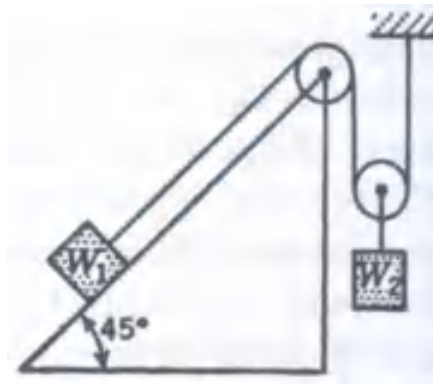


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4 of 4
