



Answer any FIVE Questions

(5 X 20 = 100 Marks)

1. a) The beam AB of span 12 m is hinged at A and is on rollers at B. Determine the reactions developed at A and B due to loading shown in Fig. 1 [10]

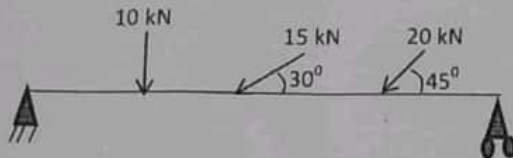


Fig. 1

SEARCH VIT QUESTION PAPERS
ON TELEGRAM TO JOIN

- b) Three links PQ, QR and RS connected as shown in the Fig.2, supports loads W and 50 N. Find the weight and force in each link if the system is in equilibrium [10]

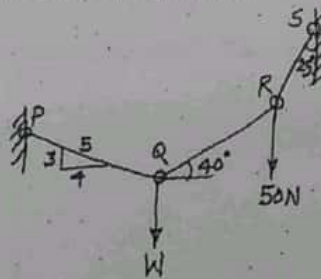


Fig. 2

Draw the free body diagram point Q and R

2. Determine the forces in the members AC, CD, DF, BD and GE of the plane truss as shown in Fig.3. Indicate the nature of forces using the appropriate sign convention.

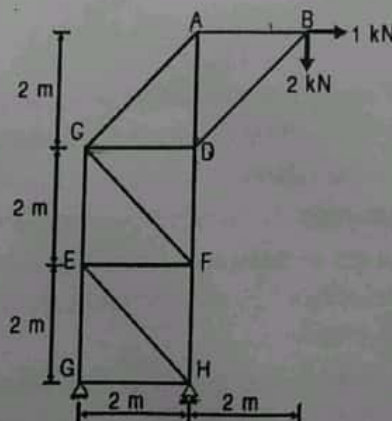


Fig.3

3. Two identical planes AC and BC, inclined at 60° and 30° to the horizontal meet at C as shown in Fig.4. A load of 1000 N rests on the inclined plane BC and is tied by a rope passing over a pulley to a block weighing W newtons and resting on the plane AC. If the coefficient of friction between the load and the plane BC is 0.28 and between the block and the plane AC is 0.20, find the least and greatest values of W for the equilibrium of the system.



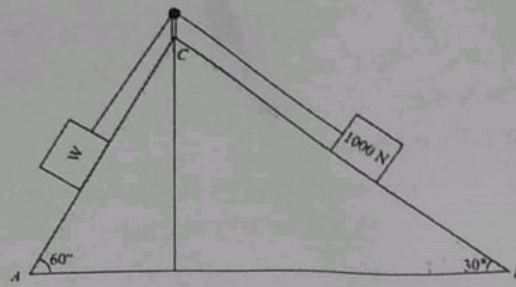
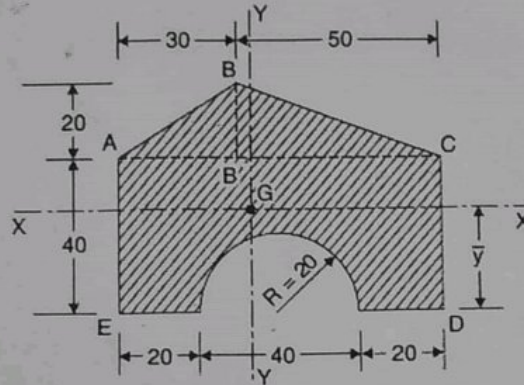


Fig. 4

4. Find the moment of inertia of the shaded portion shown in the Fig. 5 about its centroidal axis.



All dimensions are in mm

Fig. 5

5. Two uniform rods each of length l and weight W are connected as shown in Fig. 6. Using the method of virtual work, determine the reactions at pin B.

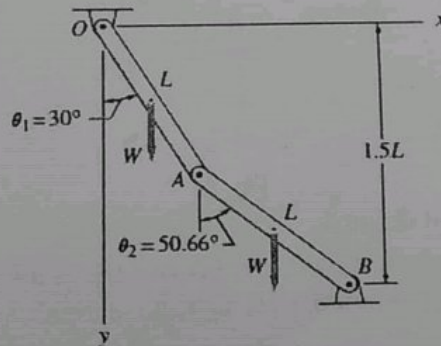


Fig. 6

6. a) A car travelling at a speed of $v = 60$ kmph is braked and comes to rest in 8sec after the brakes are applied. Find the minimum coefficient of friction between the wheels and the road. [10]
 b) The motion of a particle is defined by the relation $x = t^3 - 12t^2 + 36t + 30$ where x is expressed in meters and t is in sec. Determine the time, position and acceleration, when $v = 0$. [10]
7. a) A stone is dropped from the top of a tower 50 m high. At the same time another stone is thrown up from the foot of the tower with a velocity of 25 m/s. At what distance from the top and after how much time the two stones cross each other? [10]
 b) A car starts from rest on a curved road of 250 m radius and accelerates at a constant tangential acceleration of 0.6 m/s^2 . Determine the distance and the time for which that car will travel before the magnitude of the total acceleration attained by it becomes 0.75 m/s^2 . [10]

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