

Seat No.

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AOI1305

Elements of Civil Engg. & Engg. Mechanics (101104)

P. Pages : 4

Time : Three Hours

Max. Marks : 80

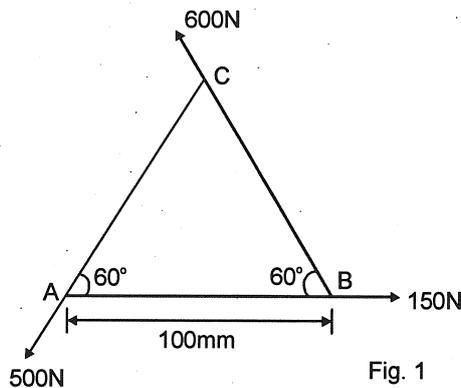
Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **any two** sub question from each unit.
5. Figures to the right indicate full marks.
6. Use of non-programmable calculator is allowed.
7. Assume suitable data if necessary.

UNIT - I

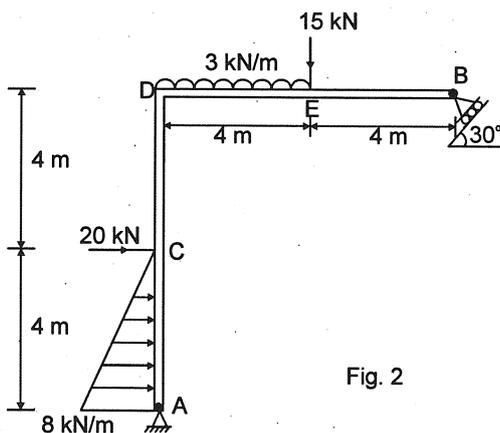
1. a) Explain polygon law of addition of forces and find magnitude, direction and position of resultant for the following system of forces. Refer fig. 1

8



- b) Determine the reactions at supports for the bent beam loaded as shown in fig.2.

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- c) Explain free body diagram and solve two identical rollers each of weight 100N are supported by an inclined plane and vertical wall as shown. Find reactions at A, B and C. Refer fig. 3.

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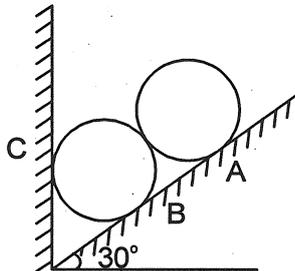


Fig. 3

UNIT - II

2. a) Find the centroid of shaded area shown in fig. 4.

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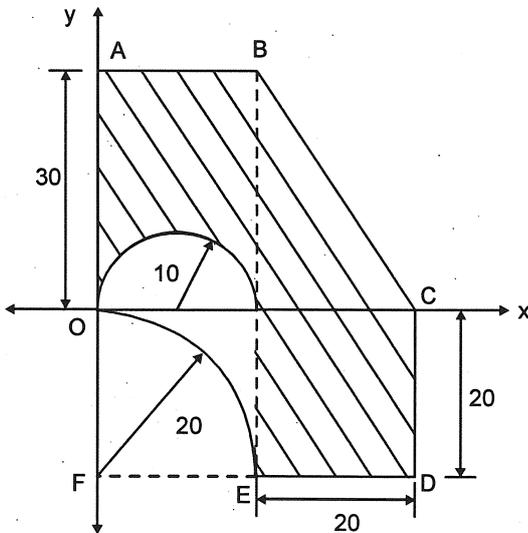


Fig. 4

All dimensions are in mm.

- b) A truss is loaded and supported as shown in fig. 5. Find axial forces in members BD, DE & EG.

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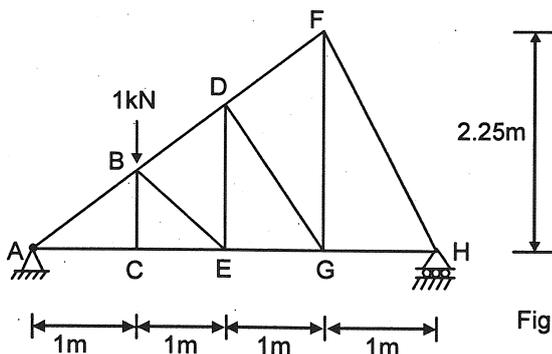


Fig. 5

- c) State laws of friction and solve. A uniform ladder 3m long is placed against vertical wall making an angle of 60° with horizontal. The coefficient of friction between ladder and floor is 0.35 and between ladder and wall is 0.25. The ladder also supports a weight of 1000 N at it's top. Determine horizontal force P to be applied to the ladder at floor level to prevent slipping the wt of ladder is 200 N.

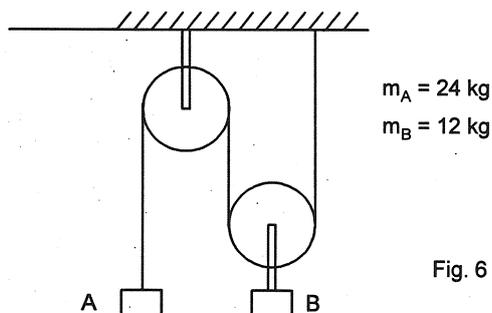
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UNIT - III

3. a) i) Derive the equations of motion for uniformly accelerated rectilinear motion. 4
- ii) A motor car takes 10 sec to cover 30 m and 12 sec to cover 42 m. Find uniform acceleration of the car and velocity at end of 15 sec. 4
- b) Define normal and tangential acceleration and solve a Car enters a curved road in form of quarter of a circle at speed of 20 kmph and leaves the curve at 40 kmph. Assuming uniform acceleration along curve, determine resultant acceleration at both end. Length of curve road is 300 m. 8
- c) Differentiate between displacement and position of a particle and solve. A stone is dropped from top of tower 50m high at the same time another stone is thrown up from the foot of tower with velocity of 25 m/sec. At what distance from the top and after how much time the two stones will cross each other. 8

UNIT - IV

4. a) Explain D'Alemberts principle and solve for the system shown in fig. 6. Determine acceleration of each block neglect mass of strings and pulleys. Also find tension in string. 8



- b) i) Explain principle of
 a) Work and energy. b) Impulse and momentum 4

- ii) Draw the neat sketch of prismatic compass and explain function of each part in one line. **4**
- c) The following bearings were taken in a traverse survey conducted with the prismatic compass. At what station do you suspect local attraction ? Also find correct bearings of the lines. **8**

SR	Line	FB	BB
1	AB	44° 30'	226° 30'
2	BC	124° 30'	303° 15'
3	CD	181° 00'	1° 00'
4	DA	289° 30'	108° 45'

UNIT - V

5. a) i) Write various branches of civil engineering and explain any one in detail. **4**
- ii) Give classification of Dams with sketches. **4**
- b) Write a notes on :
- i) Elevated storage reservoir. **4**
- ii) Load bearing structure. **4**
- c) i) Explain following principles of planning in short.
- a) Roominess b) Criculation. **4**
- ii) Draw neat sketch of bridge structure and list the various parts with there function. **4**
