



F.E. (Semester - II) Examination, 2011
ENGINEERING MECHANICS
(For Students Admitted during the Academic Year 2008-2009)
(2008 Pattern)

Time : 3 Hours

Max. Marks : 100

- Instructions:** 1) Attempt Q. 1 or Q. 2, Q. 3 or Q. 4 and Q. 5 or Q. 6 from Section - I and Q. 7 or Q. 8, Q. 9 or Q. 10, Q. 11 or Q. 12 from Section - II.
- 2) Answer to the **two** Sections should be written in **separate** answer books.
- 3) Neat diagrams must be drawn **wherever** necessary.
- 4) Figure to the **right** indicates **full** marks.
- 5) Assume suitable data, **if** necessary and **clearly** state.
- 6) Use of cell phone is **prohibited** in the Examination hall.
- 7) Use of electronic pocket calculator is **allowed**.



SECTION - I

1. a) Two forces are shown in Fig. 1 (a). Knowing that the magnitude of P is 600 N, determine
- a) The required angle θ if the resultant R of the two forces is to be vertical. 8
- b) The corresponding value of R. 8
- b) Determine the position of centroid of the shaded area as shown in Fig. 1 (b) with respect to origin O. 8

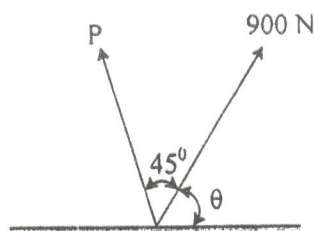


Fig. 1 a

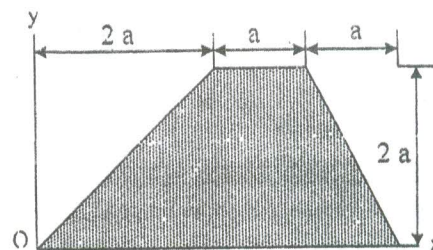


Fig. 1 b

OR

P.T.O.



2. a) Knowing that the tension in cable BC is 145 N, determine the resultant of the three forces exerted at point B of beam AB. Refer Fig. 2 (a). 8

b) Two 24 mm diameter pegs are mounted on a steel plate at A and C, and two rods are attached to the plate at B and D. A cord is passed around the pegs and pulled as shown in Fig. 2 (b). The rods exert a force of 2.5 N on the plate. Determine

a) The resulting couple acting on the plate when $T = 9 \text{ N}$

b) If only cord is used, in what direction should it be pulled to create same couple with the minimum tension in the cord, and

c) Magnitude of minimum tension. 8

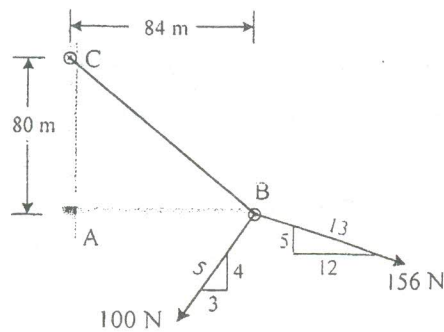


Fig. 2 a

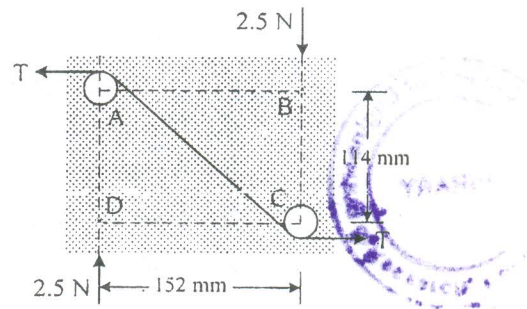


Fig. 2 b

3. a) For the given loading of the beam AB, determine the range of values of the mass of the crate for which the system will be in equilibrium, knowing that the maximum allowable value of the reactions at each support is 2.5 kN and the reaction at E must be directed downward. Refer Fig. 3 (a). 8

b) A tripod support a load of 30 kg as shown in Fig. 3 (b). Determine the forces in the legs of the tripod, if the length of each leg is 5 m and the distance between any two legs at the base in horizontal plane is 3 m. 8

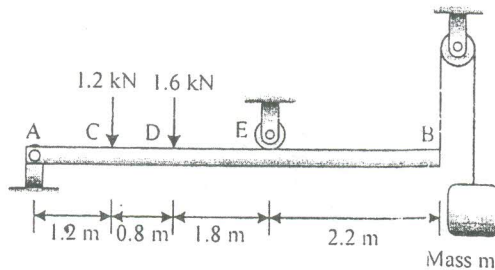


Fig. 3 a

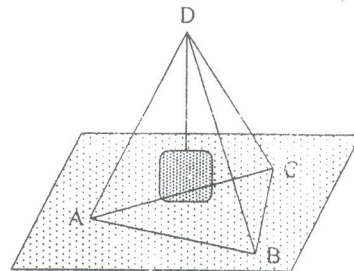


Fig. 3 b

OR

