Roll No:

Department of Civil Engineering

NATIONAL INSTITUTE OF TECHNOLOGY CALICUT

Test-II, First Semester B.Tech., Monsoon Semester, 2012-13

ZZ1001 ENGINEERING MECHANICS

Duration: 1 Hour *Maximum Marks: 20*

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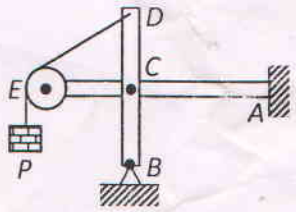
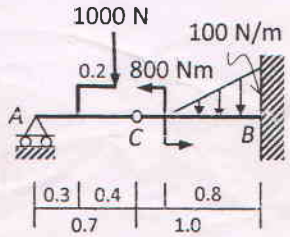
1. Draw free body diagrams for all members and pulley of the system shown in Fig. 1. Neglect the weights of the members. The self weight of the frictionless pulley is W. The suspended weight over the pulley is P. (2)

Fig. 1



2. Find the support reactions at A and B for the beams shown in Fig. 2. Note that there is a *pin connection* at C. Neglect the weights of the beams. (5)

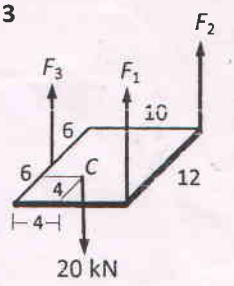
Fig. 2



All dimensions are in meters

3. A 20 kN block is being raised at constant speed as shown in Fig. 3. What are the three parallel vertical forces F_1, F_2, and F_3 needed for the job? The block is not rotating in any direction. The line of action of the weight vector passes through point C as shown in figure. (4)

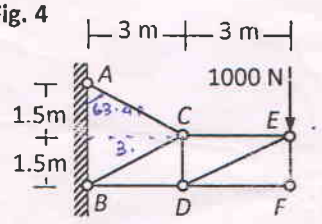
Fig. 3



All dimensions are in meters

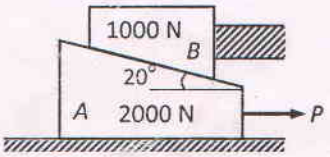
4. Using *method of joints*, determine the force in each member of the truss shown in Fig. 4. Tabulate the results indicating the magnitude and nature of the member forces. (5)

Fig. 4



5. Given that the coefficient of static friction μ is 0.2 for all surfaces, find the force P needed to start the block A to the right (Fig. 5). (4)

Fig. 5



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