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ET-202(A)

B.Tech. Civil (Construction Management) / B.Tech. Civil (Water Resources Engineering) / BTCLEVI/BTMEVI/BTELVI/BTECVI/BTCSVI

Term-End Examination

00105

June, 2017

ET-202(A) : ENGINEERING MECHANICS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any* ***five*** *questions. Use of scientific calculator is allowed. Assume any suitable data, if required.*

1. (a) Describe the Law of Parallelogram of Forces with a neat sketch. 7

(b) A force of 80 N is acting on a bolt shown in Figure 1. Find the horizontal and vertical components of the force. 7

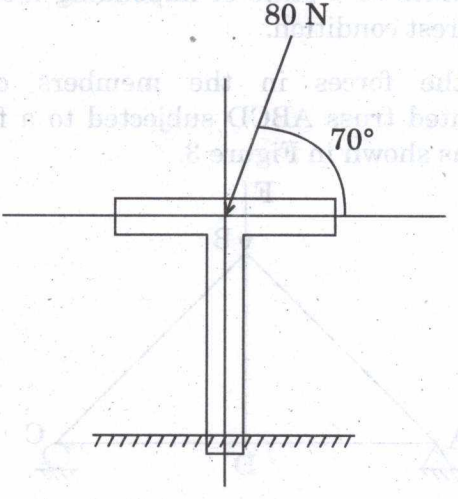

Figure 1

2. (a) What is a free body diagram ? Draw the free body diagram of a simply supported beam subjected to a point load 'F' at the centre of its span. 7

(b) Determine the minimum value of force P required just to move the wheel over a step 400 mm high as shown in Figure 2. The diameter of the wheel is 1·5 m and weight is 800 N. Also find the direction of P. 7

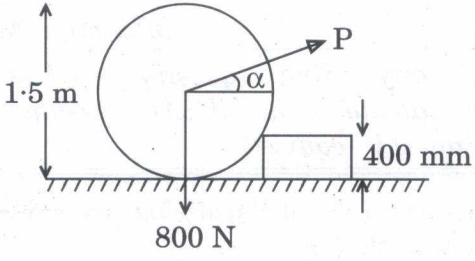

Figure 2

3. (a) Discuss the mechanism of static friction as a body comes to a state of impending motion from a rest condition. 7

(b) Find the forces in the members of a pin-jointed truss ABCD subjected to a force F and as shown in Figure 3. 7

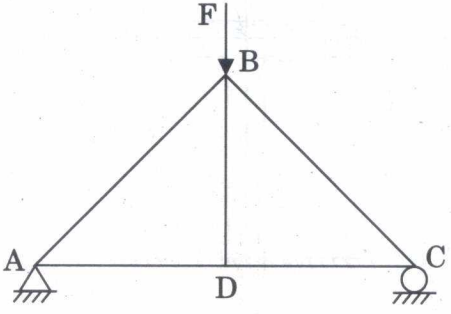

Figure 3

4. (a) Determine the position of the centroid of a semicircular area. 7

(b) Determine the C.G. of a wire of uniform cross-section bent into the shape of a semicircle of radius r as shown in Figure 4. 7

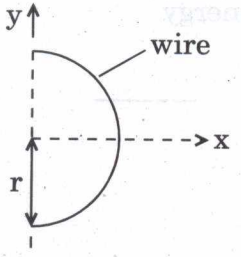

Figure 4

5. (a) Explain D'Alembert's Principle. 7

(b) Calculate the centroidal moment of inertia of a thin homogeneous bar AB of length l and having a mass of m. 7

6. (a) Differentiate between a fixed support and a roller support with the help of neat sketches. 7

(b) Draw the SFD and BFD for the beam shown in Figure 5. 7

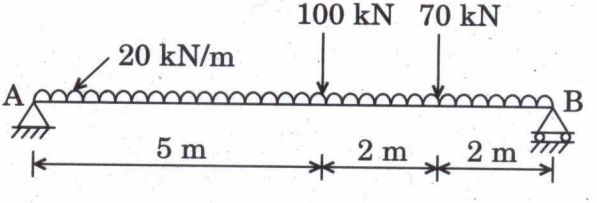

Figure 5

7. Write short notes on any ***two*** of the following topics : *2×7=14*

(a) Moment of Inertia

(b) Uniformly Distributed Load

(c) Work and Energy

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