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Total No. of Questions : 10]

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**B.E. IIInd Semester (CGPA)  
Examination, 2017**

**EF-318**

**CIVIL ENGG.  
(Engg. Mechanical)  
Paper : CE-204**

**Time : 3 Hours]**

**[Maximum Marks : 60**

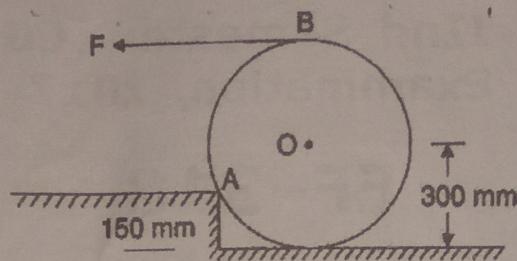
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**Note :-** Attempt all questions. Assume missing data, if any, suitably.

**Unit-I**

1. (a) What are the various assumptions made in the analysis of truss ?
- (b) A roller of radius  $r = 300$  mm and weighing 2000 N is to be pulled over a curb of height 150 mm, as shown in Fig. by applying a horizontal force F applied to be the end of a

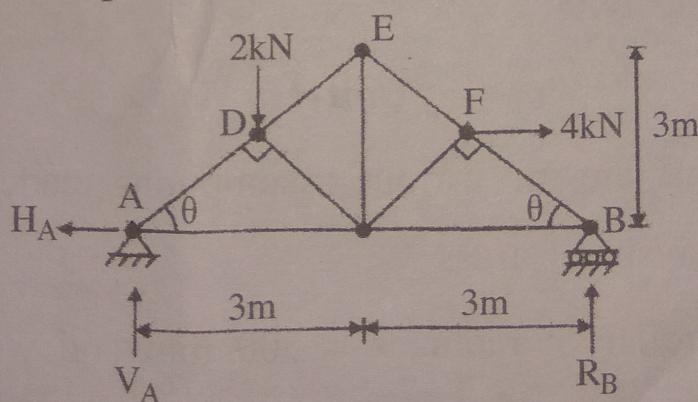
string wound around the circumference of the roller. Find the magnitude of force  $F$  required to start the roller move over the curb. What is the least pull  $F$  through the centre of the wheel to just turn the roller over the curb ?



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*Or*

2. (a) What is a truss ? Explain with its classification.
- (b) Determine force in each member of truss as shown in Fig. D and F are the respective middle points of AE and BE.

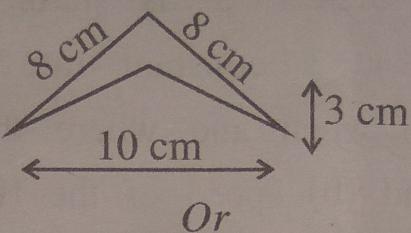


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### Unit-II

3. (a) Derive the equation for finding centroid for a semi-circular section.

- (b) Determine the Moment of inertia of a triangular section as shown in fig. about its horizontal centroidal axes.



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*Or*

4. (a) Define principal moment of inertia.  
 (b) Find the moment of inertia of a equal leg angle section of size  $150 \text{ mm} \times 150 \text{ mm} \times 10 \text{ mm}$  about its horizontal centroidal axes.

4,8

### Unit-III

5. (a) Define friction in brief.  
 (b) A block of 50 kg mass rest on  $35^\circ$  incline. Find the horizontal force required to just push the block up the plane. The coefficient of friction between contact surfaces is 0.2.

12

*Or*

6. (a) If the ratio of the greatest to the least force which acting parallel to a rough inclined plane, can support a weight on it, is equal to that of the weight to the pressure on the plane then prove that the coefficient of friction is  $\tan \alpha \cdot \tan^2(\alpha/2)$ , where  $\alpha$  is the inclination of the plane to the horizontal.

12

### Unit-IV

7. In a car race, the car 'A' starts and accelerates at a constant rate of  $3 \text{ m/s}^2$ . Car 'B' starts 2 seconds later but accelerates at a constant rate of  $4.6 \text{ m/s}^2$ . Determine: (a) when and where the car B will overtake A, and (b) speed of the two car at that instant.

12

*Or*

8. A lift can operate under a maximum of 8 persons. Mass of the lift is 800 kg. determine the limits of tension if the lift accelerates at a constant rate of  $1 \text{ m/s}^2$  either upwards or downwards. Take average weight of a person equals to 750 N.

12

### Unit-V

9. Draw SFD and BMD for a simple supported beam subjected to a uniformly distributed load over its entire span.

12

*Or*

10. A simply supported beam of length 6 m, carries point load of 3 kN and 6 kN at distance of 2 m and 4 m from the left end. Draw the SFD and BMD for the beam.

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