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F.E. Semester-I (Revised Course 2007-2008)
EXAMINATION NOV/DEC 2019
Basic Civil Engineering & Engineering Mechanics

[Duration : Three Hours]

[Total Marks : 100]

Instructions:

- 1) Attempt five questions from the following modules, at least one from each module
- 2) Assume suitable data if necessary
- 3) All main questions carry 20 marks each

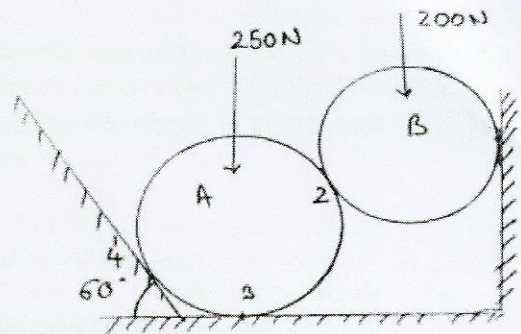
Module I

1. A) Write a note on (Any two) 10
 1. Structural engineering
 2. Geotechnical engineering
 3. Transportation engineering
B) Write a short note on (Any two) 10
 1. Use of aluminium as a building material
 2. Components of roads
 3. Types of steel sections
2. a) Write a note on 10
 1. Components of a super structure of a building
 2. Curing of concrete
b) With help of neat sketches describe any three market available form of steel sections 10

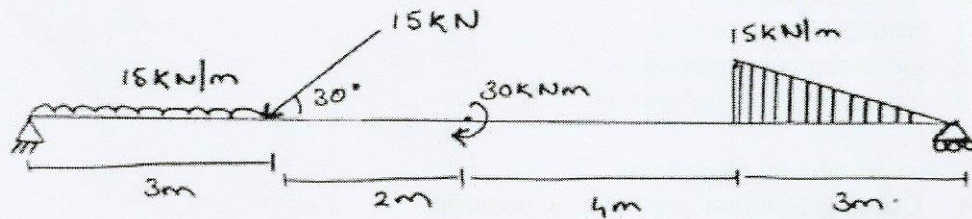
Module II

3. a) Determine the reaction at all the four points of contact for the two spheres placed as shown in the fig. A and B are 250mm and 200mm respectively 10

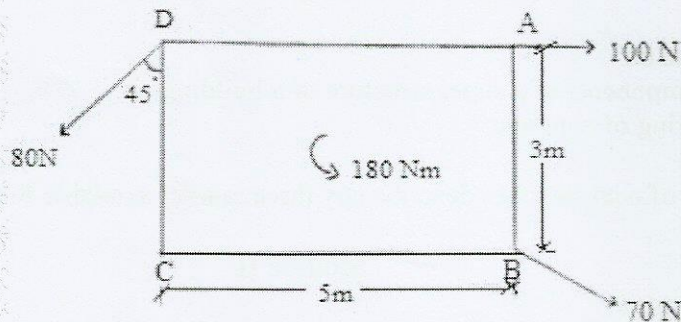




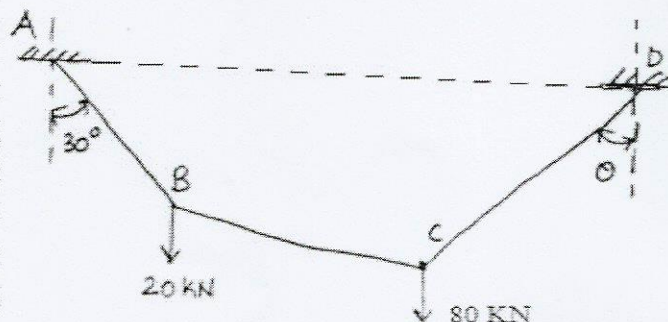
b) Determine the value of reaction on the beam loaded as shown



4. a) Replace the given force system into a single force and a moment at A



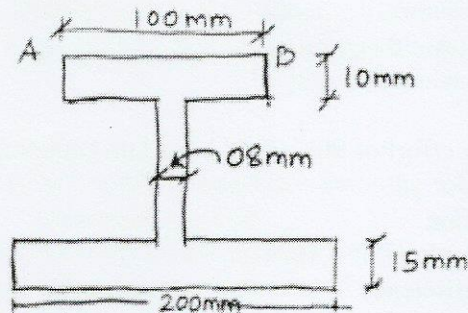
b) Determine the inclination of the wire CD? wires are fixed at point A and D. AB is inclined at 30 and BC is inclined at 50. The wire carry a load of 20 kN and 30 kN at point B and C respectively



Module III

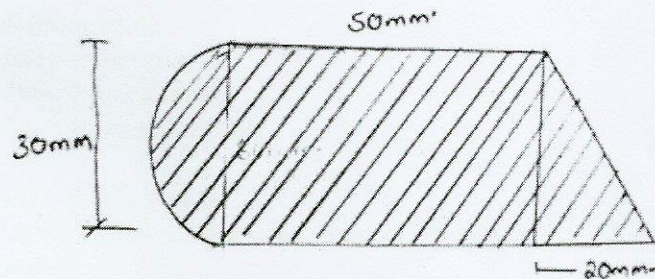
5. a) Determine the moment of inertia of a section about axis AB

10



- b) Find the position of the centroid of the shaded area shown. All dimensions in mm

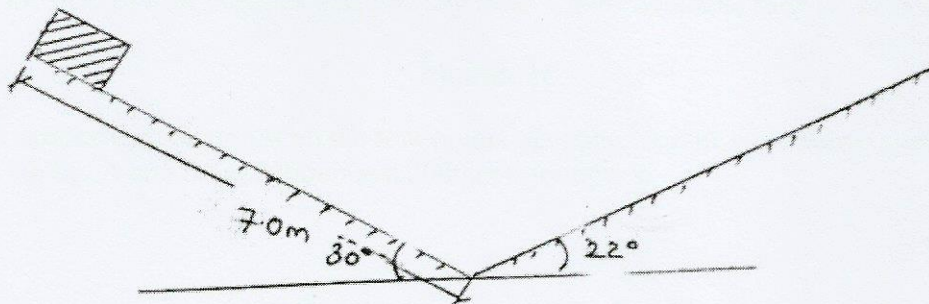
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Module IV

7. a) A 800N body moves along two inclined for which the coefficient of friction is 0.2. If the body starts from rest at A and slides m down the 30 incline, how far will the body move along the other incline? what will be the velocity when it returns to b?

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- b) Determine the time required for the system to attain a velocity of 5m/sec starting from rest. What is the tension in the string? How much distance will be covered by the system in that period? Assume coeff of friction $\mu=0.20$ (assume the pulley to be frictionless). Use Impulse momentum equation.

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8. a) Draw a neat sketch of a single purchase crab and derive an expression for velocity ratio.

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- b) A double purchase winch crab has the following details.

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Diameter of the load drum-160mm

Length of handle-360mm

No. of teeth on pinion -20 and 30

No of teeth on spur wheel -75 and 90

It was found that an effort of 90N lifted a load of 1800N and an effort of 135N lifted a load of 3150N, Find:

1. law of machine
2. Effort to lift a load of 4.5KN
3. Maximum efficiency