St. Francis Institute of Technology (Engg. College)

Internal Assessment Test-I

Academic Year 2019-2020

Branch: Common to all

Subject: Engineering Mechanics

Date: 03/10/2019

Marks: 20 Marks

Year: FE Semester: I

Time: 02:00pm – 03:00 pm

No. of Pages: 03

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

Note the following instructions.

1. All questions are compulsory.
2. Draw neat diagrams wherever possible.
3. Write everything in ink (no pencil) only.
4. Take acceleration due to gravity, g = 9.81 m/s^2.

Q.1. Attempt any five.	*Marks*	*Course Outcome*	*Blooms Taxonomy Level*
a. State: (i) Varignon's Theorem and (ii) Lami's Theorem	*2M*	*CO 1*	*BL 1*
b. A force of magnitude 650 N passes from B towards A as shown in *Fig. 1.* represent this force in vector form.	*2M*	*CO 1*	*BL 2*

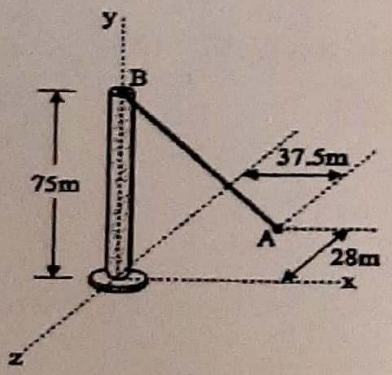

Fig. 1

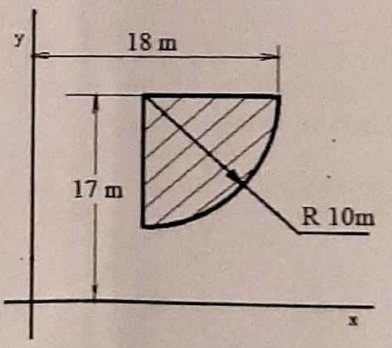

Fig. 2

c. Locate the centroid for the shaded plane lamina (Refer *Fig. 2*)	*2M*	*CO 1*	*BL 2*
d. Draw the free body diagram (FBD) for the cantilever beam shown in *Fig. 3.*	*2M*	*CO 2*	*BL 2*

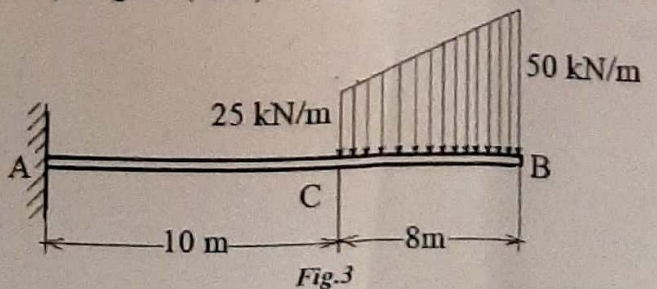

Fig.3

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e. Calculate the force transmitted by a cable AB shown in *Fig. 4*. C is a frictionless pulley whereas B is a weightless ring. Assume the string BC as horizontal. **2M** *CO 2* *BL 2*

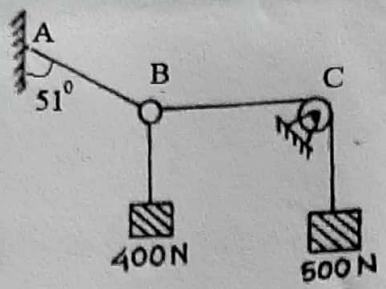

Fig.4

f. Determine the resultant of the force system shown in *Fig.5* **2M** *CO 1* *BL 3*

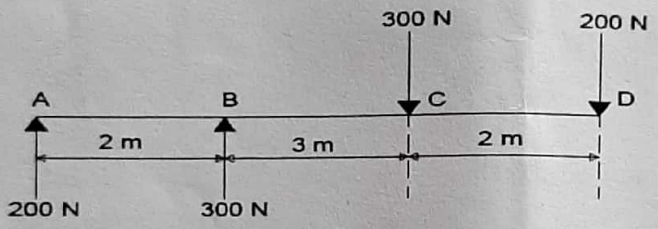

Fig.5

Q.2.

a. Two spheres A and B of weight 1000N and 750N respectively are arranged as shown in the *Fig.6.* Calculate the reactions at all the contact surfaces. Take radius of sphere A as 400 mm and that of B as 300 mm. **5M** *CO 2* *BL 3*

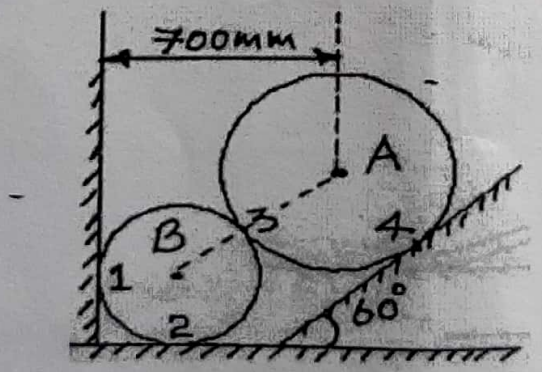

Fig.6

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b. Calculate the support reactions for the beam shown in *Fig.7* assuming the pulley to be smooth. **5M** CO2 BL3

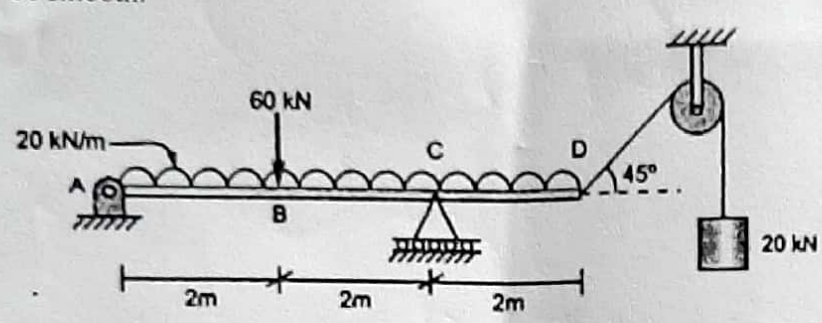

Fig.7

Q.3

a. The forces acting on a dam are as shown in *Fig. 8*. Determine the resultant force acting on the dam. Locate the same with respect to point D. *5M* *CO 1* *BL4*

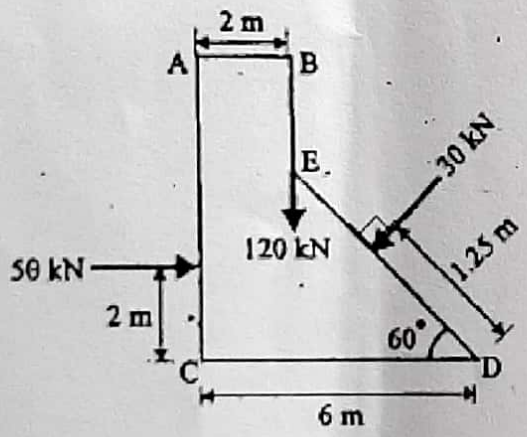

Fig.8

b. Determine the coordinates of the centroid of the shaded area. (Refer *Fig.9*) *5M* *CO1* *BL 4*

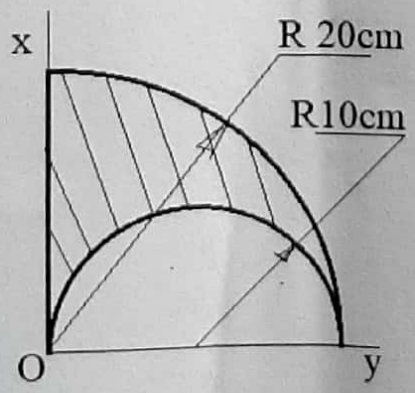

Fig.9

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