Code No. 3395 / N

FACULTY OF ENGINEERING

B.E. I - Semester (Main) Examination, December 2016

Subject : Engineering Mechanics – I

Time : 3 Hours **Max. Marks: 70**

Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (20 Marks)

1 State the Varignon's theorem. (2)

2 Following forces act at a point P, F1 = 50i, F2= 30i – 15j ,F3= -20i+10j-5k. Determine the resultant. (2)

3 Define a free Body Diagram. Illustrate with an example. (2)

4 What are the different conditions of equilibrium? (2)

5 Method of joints is applicable if the number of unknown forces not more than_____. (2)

6 Find out the forces in the members AC & BC of the truss shown in *Fig. 1*, (2)

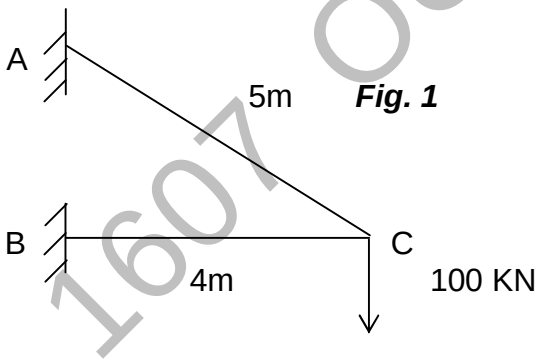

Fig. 1

7 Define the terms angle of friction. and angle of repose. (2)

8 State laws of friction. (2)

9 State the PAPPU's theorems. (2)

10 The radius of the base of the right circular cone is 'r' and its altitude is 'h'. The centroid of volume of the cone from its vertex is _____. (2)

PART – B (50 Marks)

11. Three cylinders are piled in a rectangular ditch as shown *Fig.2*. Neglecting friction, determine the reaction between cylinder A and the vertical wall. (10)

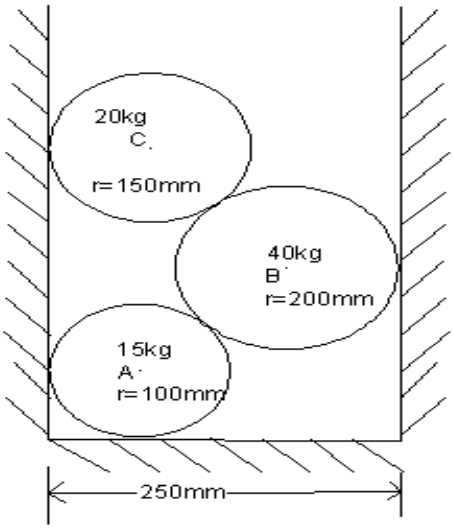

Fig.2

12.In *Fig.3*, a force P acts from A toward D. Determine the magnitude of P to cause a moment of 2000 N.m about the line directed from B toward E. (10)

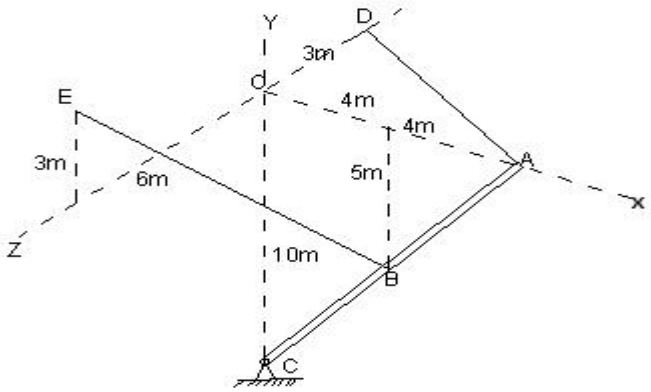

Fig.3

13.Find out the forces in all the members of the truss shown in *Fig 4.*and make a tabular form mentioning forces and nature of the force in each member. (10)

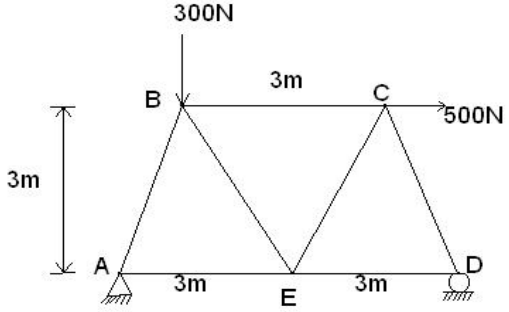

Fig 4.

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14. Determine the value of P required tostart the wedge shown in *Fig. 5*. The angle of friction at all surfaces in contact is 15^0. Assume the block as weightless. (10)

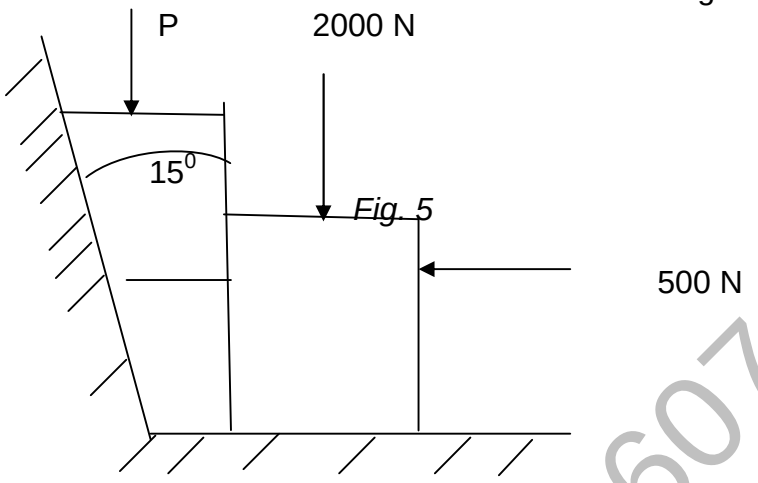

Fig. 5

15. Locate the centroid of the shaded area from x-y axes as shown in *Fig.6* below. (10)

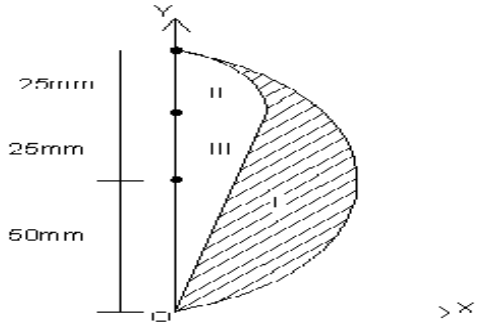

Fig.6

16. Find the moment of inertia of the shaded portion as shown in *Fig. 7(In between Quarter circle and Semicircle),* about the indicated xx axis and also about yy axis. (10)

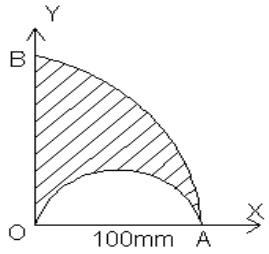

Fig. 7

17.A bar AB, 12 m long of negligible weight rests in a horizontal position on the smooth inclines in *Fig.8*. Compute the distance x at which load T = 100N should be placed from point B keep the bar horizontal. (10)

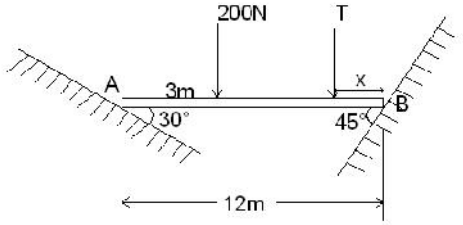

Fig.8

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