Code No. 6007

FACULTY OF ENGINEERING & INFORMATICS

B.E. I — Year (Suppl.) (Common to all Branches) Examination, December 2013

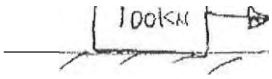
Subject: Engineering Mechanics

Time: 3 Hours **Max. Marks: 75**

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

PART — A (25 Marks)

1. State and prove the parallelogram law. (3)
2. State the Lami's theorem. (2)
3. Determine the force 'p' required for the block has to move towards right, if the co-efficient of friction between block and surface is 0.3. (2)



4. Differentiate between static and dynamic friction. (2)
5. Acceleration of a particle is given by a = 6 -\ iwherelvl is velocity derive the expression for displacement of the particle. (3)
6. State the Pappu's theorem. (3)
7. Motion of the particle is given by $s = t^3 — 12t^2 + 40$. Find out the acceleration of the particle in 10 sec. (3)
8. State D'Alember'ts principle. (2)
9. Derive the work-energy principle. (2)
10. Differentiate direct and oblique impact. (3)

PART _ B (50 Marks)

11 (a) Find the reactions of the simply supported beam as shown in Fig. 1 (5)

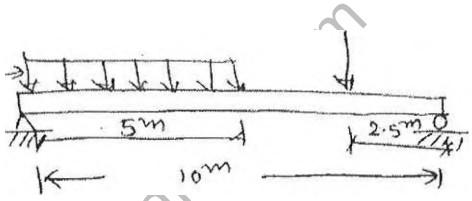


Fig. 1

(b) Find the magnitude of `T' required for the beam to be in equilibrium, if it is resting on smooth surfaces. (5)

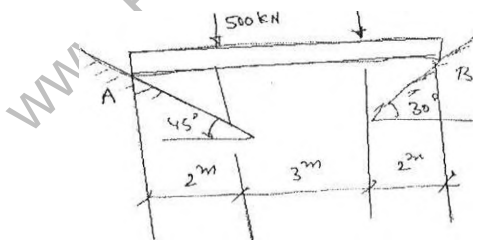


Fig 2

12. Locate the centroid of a non-linear plate as shown in Fig. 3. (10)

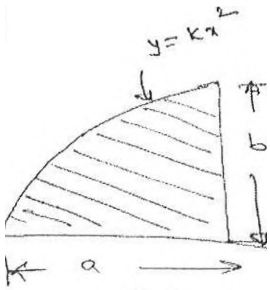


Fig 3

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13. Find the force 'pl required for the wedge block as shown in Fig. 4 if the co-efficient of friction at all the contact surfaces is 0.3. (10)

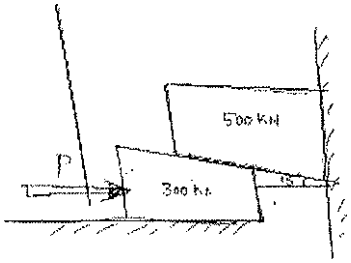

Fig 4

14. Calculate the moment of inertia for a hatched area about XX. (10)

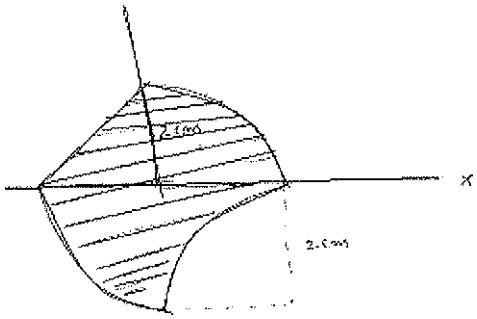

Fig 5

15. Find out the acceleration of block 'B' required for the connecting bodies as shown in Fig. 6 if the kinetic friction under 200 kN block is 0.2. (10)

Fig 6

16. Determine the deformation of the spring as shown in Fig. 7, if 50 N weight of block is releases from the rest. (Use work-energy principle) (10)

Fig 7

17 (a) State the principle of impulse momentum **(2)**

(b) A bullet weighing 0.3 N and moving with a velocity 660 nips, penetrates a wooden block of weight 45 N and emerges with a velocity of 180 mps as shown. How long the block moves?

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