B.E. All Branches Second Semester (C.B.S.) / B.E. (Fire Engineering) Second Semester

Engineering Mechanics

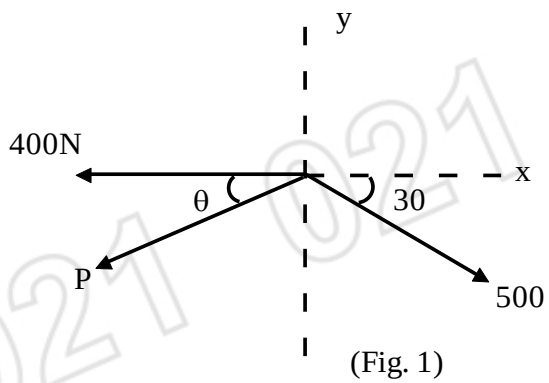
P. Pages : 3 **NJR/KS/18/4345/4999**

Time : Two Hours * 0 7 6 4 * Max. Marks : 40

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Due credit will be given to neatness and adequate dimensions.
7. Assume suitable data whenever necessary.

1. a) What do you understand by "AXIOM'S of MECHANICS" Discuss. **4**

b) The Force system shown in fig. 1 gives a Resultant of 600N down to right at 60º with x-Axis. Compute the values of P & θ. **6**

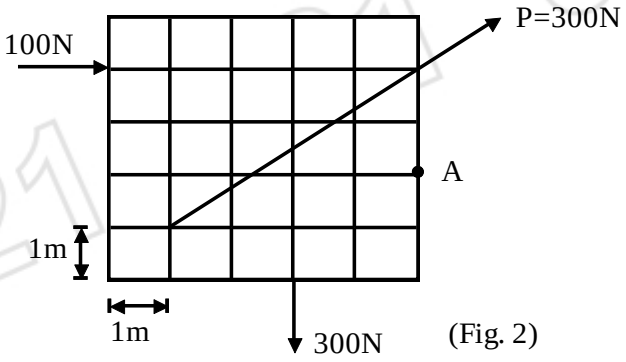


(Fig. 1)

OR

2. a) Discuss the effect of Forces ON. the Bodies. **3**

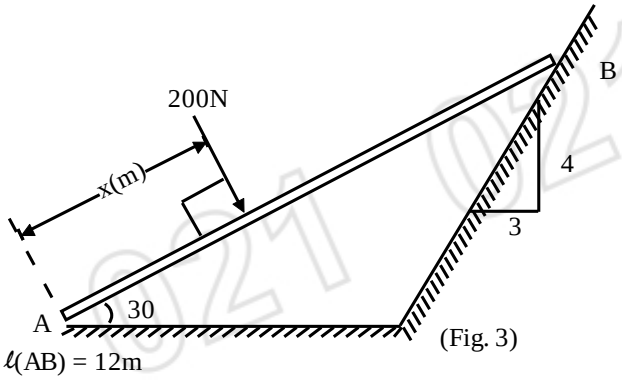
b) The Four forces out of which three are shown on the grid, produce a Resultant of 500N acting down to right with a slope of 4 to 3 through Point A. Determine the Missing Force & x-intercept **7**



(Fig. 2)

3. a) Define free Body Diagram & Explain with neat sketches. **3**

b) A bar AB 12 M long and weighing 150 N to be supported in Position shown in fig. with the help of Forces of Magnitude 200N Applied perpendicular to bar. Assuming Floor and incline to be smooth. Determine distance 'x' at which the Force should be applied (Ref. Fig. No. 3) **7**



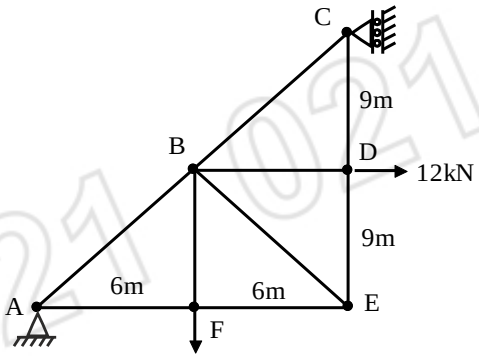
(Fig. 3)

OR

4. a) Define : **3**

i) Sliding Friction ii) Rolling Friction

b) Determine the forces in the members of the given truss. [Refer Fig. no. 4] **7**



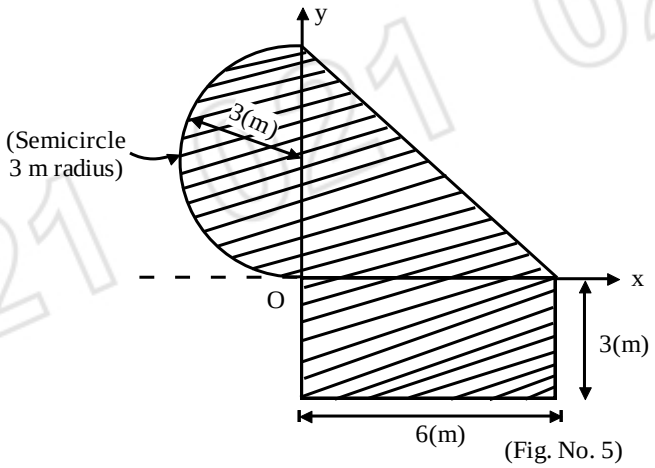
[Fig. No. 4]

5. a) State the parallel Axis theorem of Moment of Inertia. **2**

b) For the shaded area shown in fig. No. 5, determine: **8**

a) Co-ordinates of centroid with respect to X and Y axes.

b) Moment of Inertia about X and Y axes.

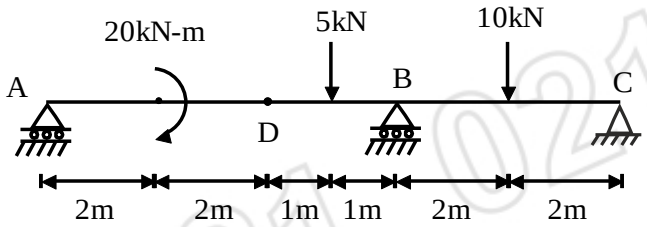


(Fig. No. 5)

OR

6. a) State & explain virtual work principle. **3**

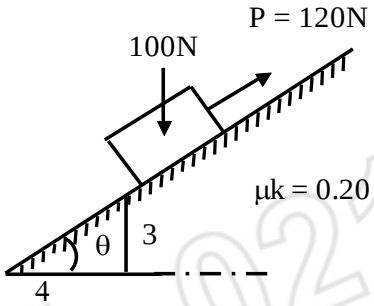
b) Using virtual work method, find the reaction at A, B and C for the Beam loaded as shown in fig. No 6 There is an internal hinge at Point D. **7**



(Fig. No. 6)

7. a) State & Explain 'D' Alembert's Principle. **3**

b) After the block has moved 12(m) from the rest, the constant force P is removed. Find the velocity of block when it returns to its initial Position. (Ref. Fig. No. 7) **7**



(Fig. No. 7)

OR

8. Bullet A of Mass 0.01(kg) moving with a velocity of 100 (m/sec) hits a bob B of a simple Pendulum horizontally. Find the maximum angle though which the pendulum swing when **10**

a) Bullet get embedded in bob.
b) The bullet rebounds from the surface of the bob with velocity of 20(m/sec)
c) The bullet escapes from the other end of bob with a velocity of 20(m/sec)

Assume the mass of bob to be 1 (kg) & length of Pendulum as 1(m) Ref. fig. No. 8.

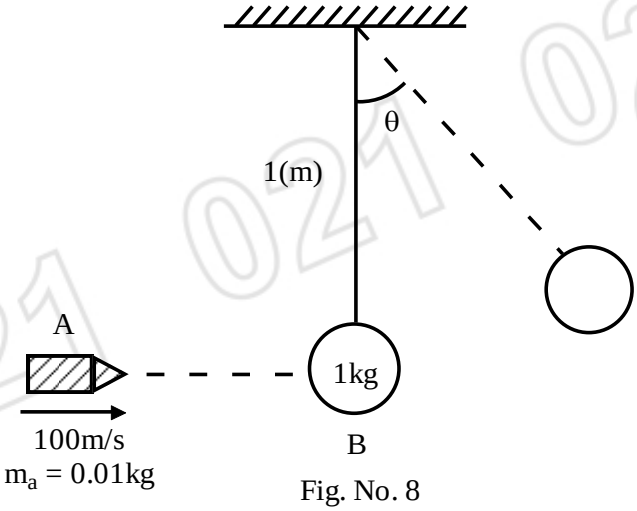


Fig. No. 8

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