Total No. of Questions : 4]

SEAT No. :

PD6

[Total No. of Pages : 2

[6408]-106
F.E. (Insem)
ENGINEERING MECHANICS
(2019 Pattern) (Semester - II) (Credit System) (101011)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4.***
2) ***Neat sketches must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Use of cell phone is prohibited in the examination hall.***

Q1) a) State and explain resultant & equilibrant force. **[4]**

b) Find the magnitude and direction of the resultant force for parallel force system as shown in Fig. 1 b. **[5]**

c) Determine the magnitude and direction of resultant with reference to point A for the force system as shown in Fig. 1 c. **[6]**

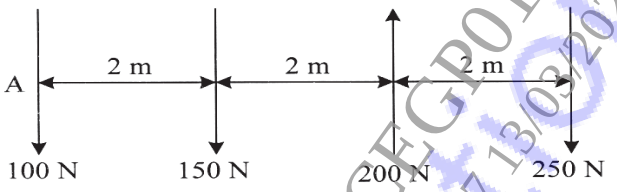

Fig. 1 b

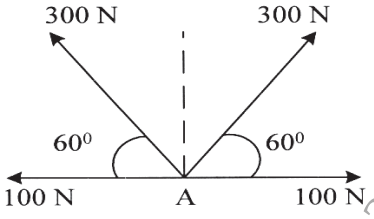

Fig. 1 c

OR

Q2) a) Define concurrent, parallel and general force system with suitable sketches. **[4]**

b) Two forces of magnitude 295 and 395 kN are acting at an angle of 60º, find the magnitude and direction of resultant force. **[5]**

c) Forces are acting along the 100 mm side of regular hexagon as shown in Fig. 2 c. Determine the magnitude, direction and point of application of resultant force with respect to point A. **[6]**

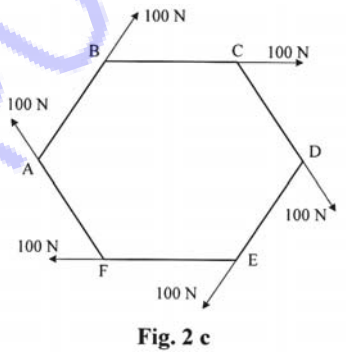

Fig. 2 c

P.T.O.

Q3) a) Define angle of repose, angle of friction and coefficient of friction. **[4]**

b) Locate the centroid of the shaded area as shown in Fig. 3 b with respect to origin O. **[5]**

c) A 45 kg block is resting on a rough incline surface as shown in Fig. 3 c. If the coefficient of static friction, $\mu_s = 0.20$, determine the force P required to cause motion. **[6]**

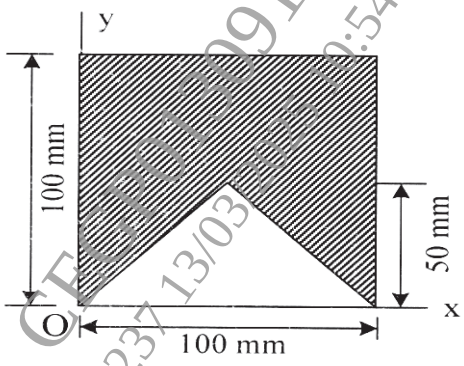

Fig. 3 b

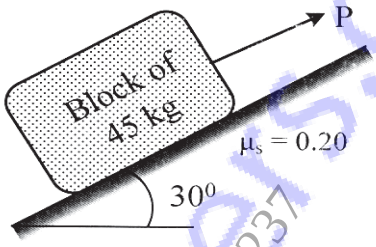

Fig. 3 c

OR

Q4) a) Explain in brief parallel and perpendicular axis theorem. **[4]**

b) Determine the moment of inertia of T-section about centroidal x-x axis as shown in Fig. 4 b. **[5]**

c) A cable is passing over the disc of belt friction apparatus at a lap angle 540º as shown in Fig. 4 c. If coefficient of statics friction is 0.15 and the mass of the block is 50 kg, determine the range of force P to maintain equilibrium. **[6]**

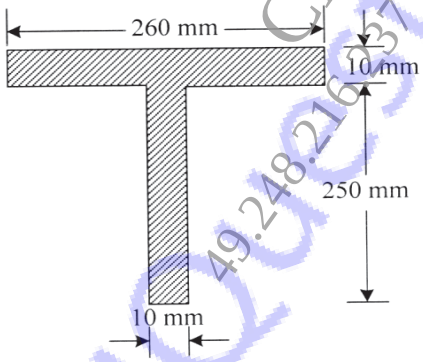

Fig. 4 b

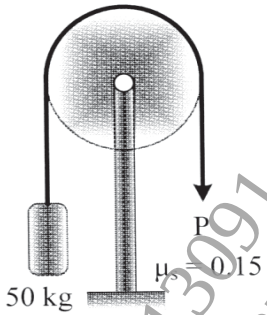

Fig. 4 c

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