

C 31707

(Pages 3)

Name.....

Reg. No.....

**COMBINED FIRST AND SECOND SEMESTER B.TECH. (ENGINEERING)
DEGREE EXAMINATION, JUNE 2007**

EN. 04 107 A—ENGINEERING MECHANICS (A)

(2004 admissions)

[Common for CE, AI, CH, CE, CS, EE, EC, IT, IC, BM, BT, PT]

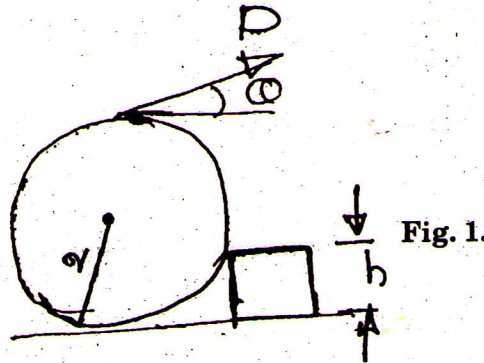
Time : Three Hours

Maximum : 100 Marks

- I. (a) What is Free Body diagram ? Explain.
(b) State and explain Varignon's theorem.
(c) State 'Laws of friction'.
(d) What is product of Inertia ?
(e) Define Perfect, Deficient and Redundant trusses.
(f) What are the different types of supports and what is the form of its reaction ?
(g) State and explain D'Alembert's principle.
(h) Prove work Energy equation.

(8 × 5 = 40 marks)

- II. (a) Find the value of minimum force 'P' so that the body C overcomes obstacle.



Or

- (b) A smooth sphere, radius 15 cm. weighs 2N is supported in contact with smooth vertical wall by a string whose length equals the radius of sphere. The string joins with one end on the wall and other on surface of sphere. Find the inclination of wall and also the tension on string.

Turn over

- III. (a) Two blocks A and B weighing 4 kN and 2 kN respectively are in equilibrium. Let coefficient of friction be .25. Find the force required to move the block :

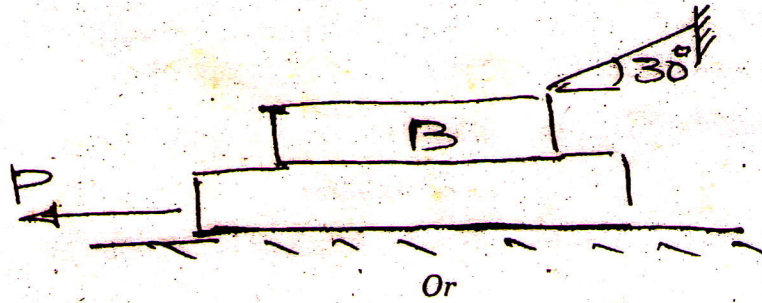


Fig. 2.

- (b) For the given Figure find the moment of inertia about centroidal axis.

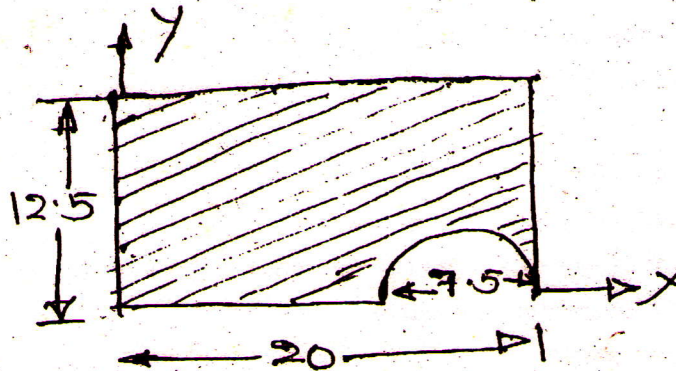


Fig. 3.

- IV. (a) Find the support reaction for the given figure.

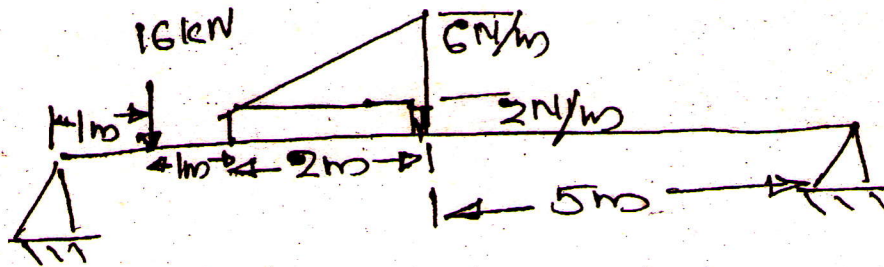


Fig. 4.

Or

- (b) Find the Magnitude and Nature of forces in all the members of given trusses.

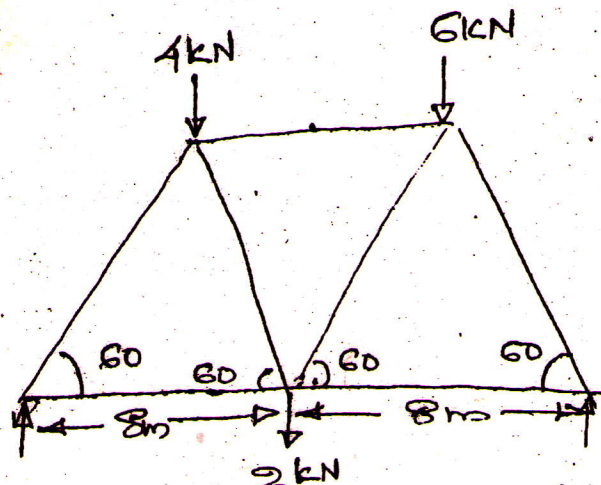


Fig.5.

- V. (a) A projectile is sent from point A at a velocity ' u '. Find least velocity so that it passes through B and C coördinates of A, B and C are $(0, 0)$, $(4.8, 3.6)$, $(8.4, 0)$ respectively.

Or

- (b) A body of 10 kg mass moving right with a speed of 8 m/s strikes with another body of 20 kg mass moving towards left with 25 m/s.

Find :

- (i) Final velocity of two bodies.
- (ii) Loss in kinetic energy due to impact.

(4 × 15 = 60 marks)