

Seat No.	
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**F.E. (All Branches) (Semester - I & II)**

**Examination, December- 2019**

**APPLIED MECHANICS**

**Sub. Code : 59185**

**Day and Date : Friday, 6 - 12 - 2019**

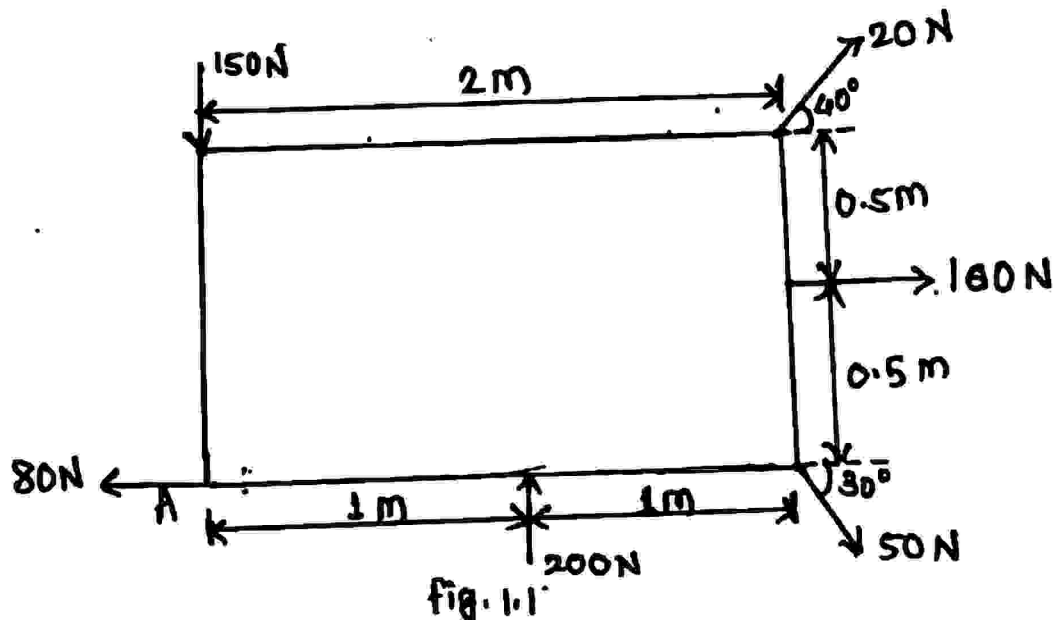
**Total Marks : 100**

**Time : 2.30 p.m. to 5.30 p.m.**

- Instructions :**
- 1) All questions are compulsory.
  - 2) Figures to the right indicates maximum marks for the question.
  - 3) Neat sketches should be drawn whenever necessary.
  - 4) Use of non - programmable calculator is allowed.

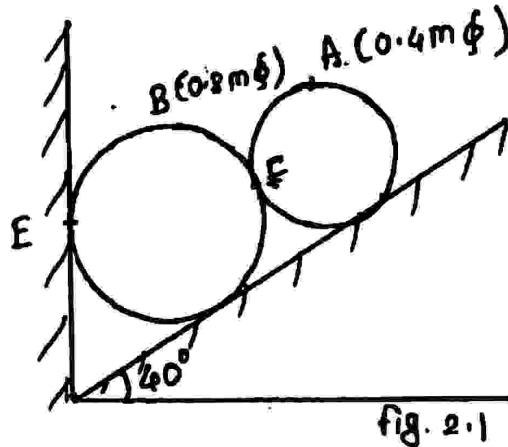
**SECTION - I**

- Q1) a) Define force and explain characteristics of force. [4]**  
**b) A force system acting on a rigid body is shown in fig. 1.1. Find magnitude direction of resultant and its position with respect to point A. [12]**



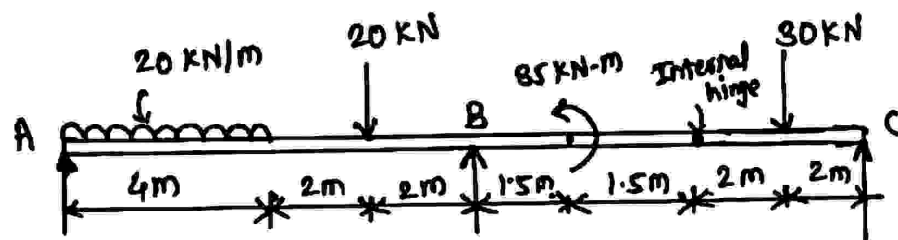
**P.T.O.**

- Q2) a) Describe the types of loading on the beam. [6]  
 b) Two smooth cylinders A and B rest on a smooth inclined plane and supported by smooth vertical plane as shown in fig. 2.1. Determine reactions at point of contacts. Cylinder A weight 800N and is 0.4m in diameter, cylinder B weights 1500N and is 0.8m in diameter. [12]



OR

- b) Determine support reaction for the beam shown in fig.2.2 by using virtual work method. [12]



- Q3) a) Differentiate between method of joint and method of section. [4]  
 b) Find out the forces in all the member of the truss as shown in fig. 3.1 [12]

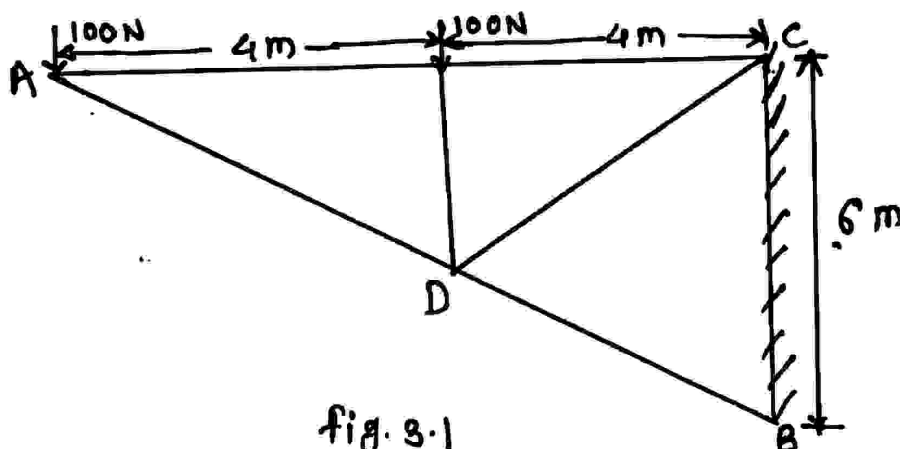
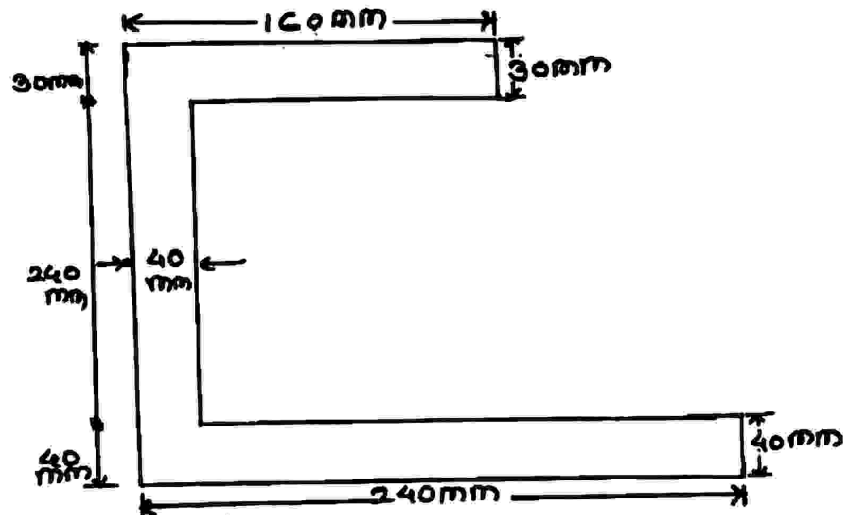


fig. 3.1

**SECTION - II**

- Q4) a)** Derive expression of M.I. of triangular section about the base of the triangle. [4]
- b)** Find the moment of inertia of a section shown in fig. 4.1. about both mutually perpendicular centroidal axes. [12]



- Q5) a)** Write note on: [6]
- Mass moment of inertia.
  - Impulse
- b)** A 50KN vehicle is moving with a speed of 80Km/hr. When breaks are applied causing all four wheels to skid. Determine time required to stop the vehicle. If [12]
- on concrete road for which  $\mu = 0.75$
  - on ice for which  $\mu = 0.08$

Use impulse momentum principle

OR

- b)** A bullet weighing 0.3N is fired horizontally into a body weighing 100N which is suspended by a string 0.8m long. Due to this impact the body swings through an angle of  $30^\circ$ . Find the velocity of the bullet and the loss in the energy of the system. [12]

**Q6) a) Explain the following terms.**

**i) Centrifugal force**

**ii) Centripetal force**

**b) Explain a-t, v-t and s-t diagrams for motion under constant acceleration. [4]**

**c) A body of mass 3 Kg moving with a velocity of 3m/s collides directly on another body of mass 6Kg moving with a velocity of 2m/s in opposite direction. If coefficient of restitution is 0.6; find the velocity of ball after impact. [8]**

