

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

Examination, May - 2017

APPLIED MECHANICS

Sub. Code : 59185

Day and Date : Saturday, 13-05-2017

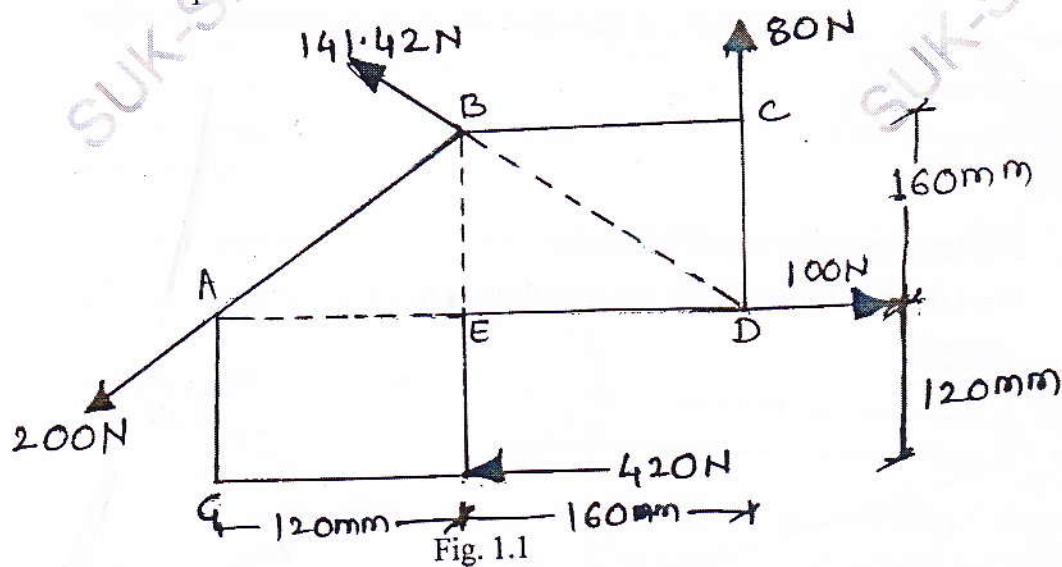
Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

- Instructions :**
- 1) All the questions are compulsory.
 - 2) Figures to the right indicate maximum marks for the question.
 - 3) Neat sketches should be drawn whenever necessary.
 - 4) Use of non-programmable calculator is allowed.
 - 5) Any missing data may be assumed suitably and clearly highlighted in the answer sheet.

SECTION-I

- Q1) a) Define force and explain characteristics of force. [4]**
b) Determine the resultant for the force system shown in fig 1.1 and locate it about point 'A'. [12]



- Q2) a) Describe the types of loading on the beam. [6]**
b) Two spheres A and B of radius 90mm and 30mm rest on 3 planes as shown in fig.2.1 the weight of sphere A is 60N and sphere B is 30N. Determine the support reaction at point of contact. [12]

P.T.O.

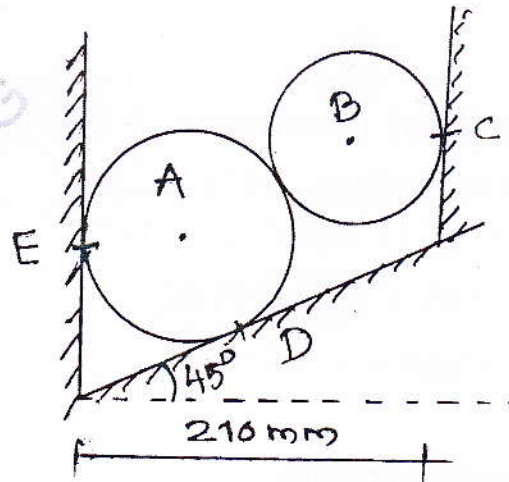


Fig. 2.1

OR

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

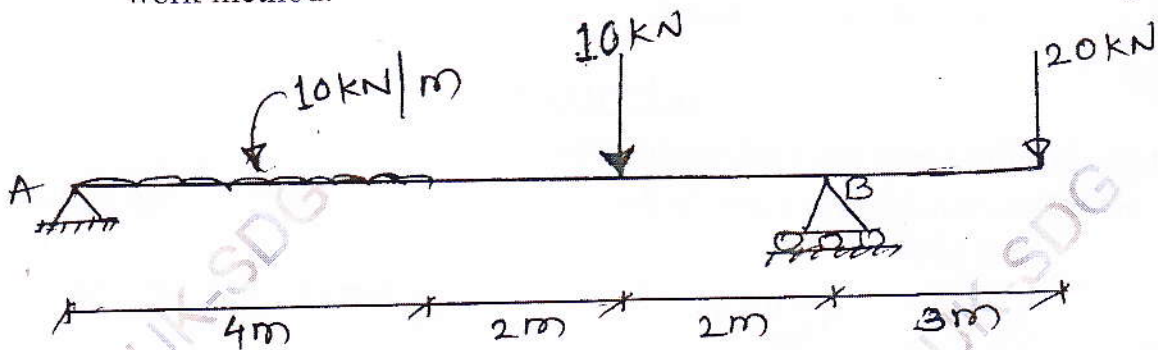


Fig. 2.2

- Q3) a) Explain imperfect truss in detail. [4]
 b) Find out the forces in all the member of the truss as shown in figure.3.1. [12]

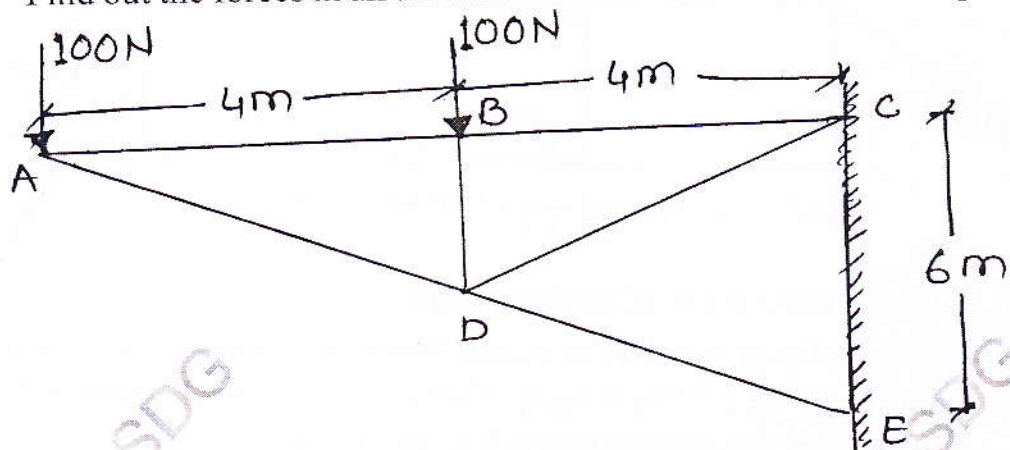


Fig. 3.1

SECTION-II

- Q4) a) State and prove perpendicular axis theorem. [4]
- b) Find the moment of inertia of a section shown in figure 4.1 about both mutually perpendicular centroidal axes. [12]

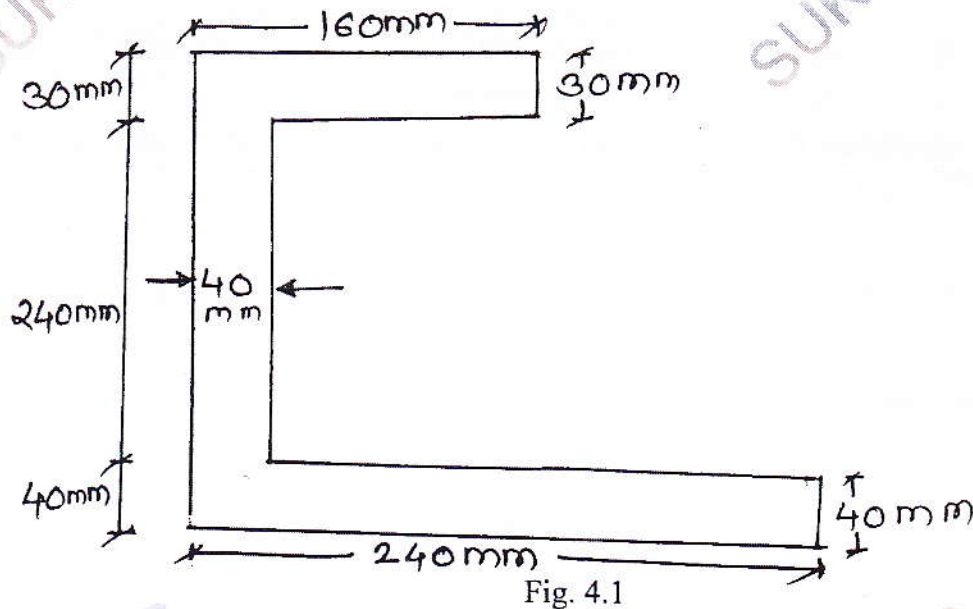


Fig. 4.1

- Q5) a) State and explain impulse momentum principle. [4]
- b) A 50 kN vehicle is moving with a speed of 80 km/hr when brakes are applied causing all four wheels to skid. Determine time required to stop the vehicle. If [14]
- on concrete road for which $\mu = 0.75$
 - on ice for which $\mu = 0.08$

Use impulse momentum principle.

OR

- b) A body of mass 30 kg is projected up an inclined plane of slope 30° with an initial velocity of 10 m/s. The friction coefficient between the contact surface is 0.2. Calculate [14]
- Distance travelled before coming to rest
 - The time required to reach at highest point
 - Time required and final velocity to return to starting point

Q6) a) Explain the following terms.

- i) Centrifugal force
- ii) Centripetal force

b) Explain perfectly elastic impact and perfectly inelastic impact. [4]

c) A body of mass 3 Kg moving with a velocity of 3m/s collides directly on another body of mass 6 Kg 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]

