

Roll No

CE-110

B.E. I & II Semester

Examination, June 2017

Choice Based Credit System (CBCS)

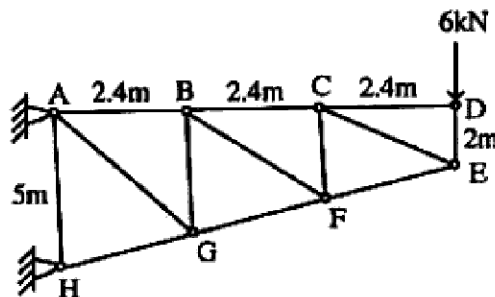
Engineering Mechanics

Time : Three Hours

Maximum Marks: 60

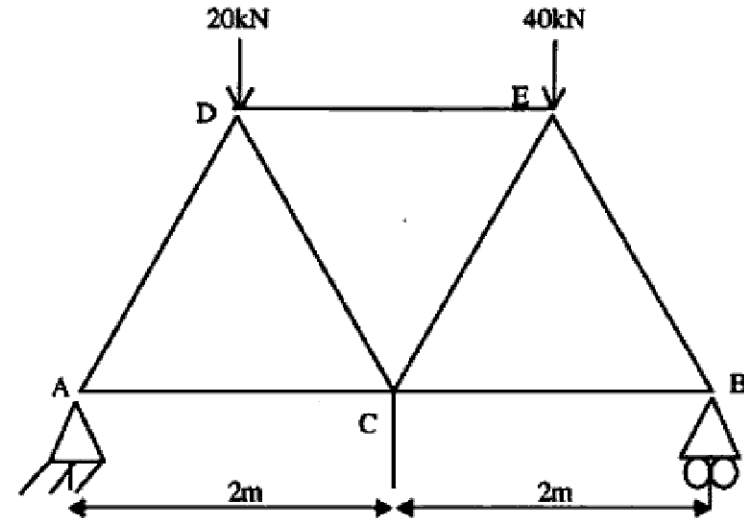
- Note:** i) Total No. of questions is eight.
ii) Attempt any five questions (including all parts).
iii) Assume missing data, if any, suitably.

1. a) State Triangle law and Polygon law of forces?
b) Find the force in members AB, BG and CF? Solve the each force from an equilibrium equation which contains that force as the only unknown.



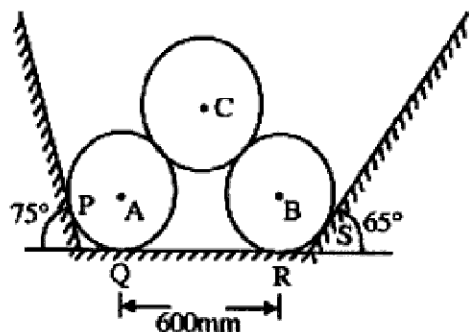
[2]

2. Analyse the truss as shown in Fig. all triangles are equilateral.



3. a) Define polar moment of inertia.
b) Given that moments of inertia of a section are $I_{xx}=I_{yy}=3 \times 10^4 \text{ mm}^4$ and $I_{xy}=1.5 \times 10^4 \text{ mm}^4$, determine moments of inertia of the section about inclined axes inclined at 30° to the X-axis in the anticlockwise direction.
4. a) What is the principal of statistics? Define various conditions of equilibrium.

- b) Three spheres A, B and C having their diameters 500mm, 500mm and 800mm, respectively are placed in a trench with smooth side walls and floor as shown in Fig. The centre-to-centre distance of spheres A and B is 600mm. The cylinders A, B and C weight 4kN, 4kN and 8kN respectively. Determine the reactions developed at contact point P, Q, R and S.



5. A ball is thrown upwards from the top of a 50m high building with an initial velocity of 20m/s. at the same instant, another ball is thrown upwards with an initial velocity of 30m/s from the ground. Determine
- When and where they will meet each other, and
 - The velocity of each ball at that instant.
6. A truck of 6 ton mass moving at 60kmph collides with a car of 2ton mass moving at 45kmph in the same direction as that of the truck. If after collision, they coalesce as one body, determine their common velocity. Determine the loss in kinetic energy, considering the two vehicles to be a single system.

- Explain types of beam and support with neat sketch.
 - Find the support reaction of a simply supported beam subjected to a uniformly varying load of 2kN/m at one end and 3kN/m at the other end.
- Define following:
 - Centre of gravity
 - Moment of inertia
 - Radius of gyration
 - D'Alemberts principal
