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Total No. of Pages : 02

Total No. of Questions : 09

B. Architecture (2012 & Onwards) (Sem.–2)

THEORY OF STRUCTURES - I

Subject Code : BACH-207

M.Code : 45095

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **Attempt total FIVE questions. Question no.1 is compulsory.**
2. **Missing data, if any may be assumed suitably.**
3. **Draw neat sketches wherever necessary.**

1. a) Define the term 'Centre of Gravity'. (2)

   b) Explain the term Moment of Resistance. (2)

   c) Differentiate between Perfect and Redundant frame. (2)

   d) Define the term 'Second Moment of Area' (2)

   e) Name various loads (as per IS 875) acting on the structures. (2)

   f) What are Concurrent forces? (2)

2. Write short notes on : (12)

   a) Gravity loads

   b) Earthquake loads

   c) Resultant of concurrent force system.

3. a) State and prove the theorem of Perpendicular axis. (4)

   b) Calculate centre of gravity and moment of inertia about X-X axis and Y-Y axis of the inverted T-section 200×200×20mm (Flange 200×20mm and web 20×180mm). (8)

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4. a) Derive an expression for M.O.I of a rectangular lamina by method of integration. (6)

   b) Calculate moment of inertia about X-X axis and Y-Y axis of the given I-section with size of bottom and top flange as 200×20mm and web as 20×260mm. (6)

5. Derive an expression for 'Basic Bending Equation' using usual notation. What are the assumptions made for the derivation? (12)

6. A simply supported rectangular beam 100×200 mm of 5 m span placed with longer leg vertical, carries a u.d.l. of 5kN/m over the whole span.

   Calculate the bending stress developed in the section at:

   a) Supports

   b) 1.5 m from the supports

   c) At the point of maximum bending moment. (12)

7. Find magnitude and nature of forces in all members of frame given in figure using method of joints. (12)

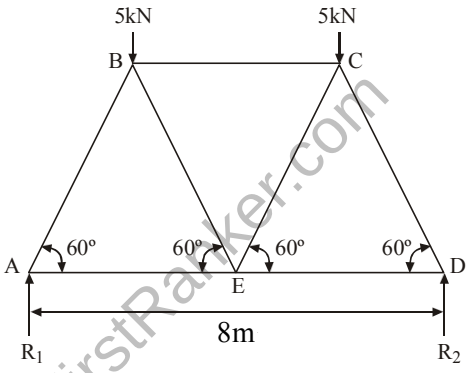

Fig.1

8. A simply supported beam of span 5.0 m carries a u.d.l. of 6 kN/m over the whole span in addition to a point load of 5 kN at mid-point. Draw shear force and bending moment diagram of the beam. (12)

9. Write short notes on :

   a) Link Polygon and method of construction (6)

   b) Coplanar force system (6)

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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