Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B. Architecture (Sem.–1)

THEORY OF STRUCTURE-I

Subject Code : AR-135

M.Code : 45009

Time : 3 Hrs. **Max. Marks : 50**

INSTRUCTION TO CANDIDATES :

1. **Attempt total FIVE questions.**
2. **All questions carry equal marks**
3. **Question No. 1 is compulsory**
4. **Missing data, if any may be assumed suitably.**
5. **Draw neat sketches wherever necessary.**

1. a) Define the term 'Polar Moment of Inertia'. (2)

   b) Define the term 'Bending Moment and Shear Force'. (2)

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

   d) Define the term 'Moment of Resistance'. (2)

   e) What are concurrent forces? (2)

2. a) State and prove the theorem of Parallel 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. Also calculate the section modulus. (6)

3. a) Derive an expression for 'M.O.I, of a rectangular lamina by method of integration. (5)

   b) Calculate moment of inertia about X-X axis and Y-Y axis of the given I-section (Size of bottom and top flange 150x20mm, size of web 20x300mm). (5)

4. A simply supported beam of span 5.0 m carries a u.d.l. of 5 kN/m over the whole span in addition to a point load of 10 kN at 2m from left support. Draw shear force and bending moment diagram of the beam. (10)

5. Derive an expression for 'Basic Bending Equation' using usual notation. What are the assumptions made for the derivation? (10)

6. A simply supported rectangular beam 80×100 mm of 5m 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 : (10)

   a) Supports

   b) 1 m from the supports and

   c) At midpoint

7. Find magnitude and nature of forces in all members of frame given in figure using method of joints. (10)

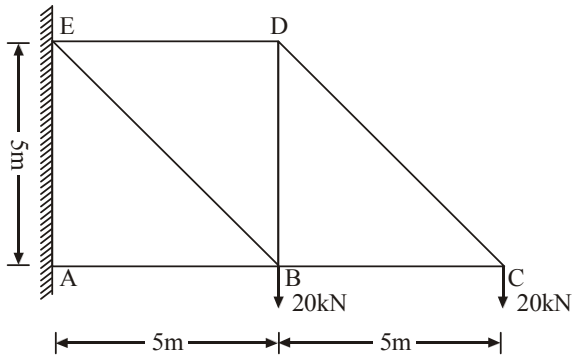

FIG.1

8. Write short notes on : (10)

   a) Neural Axis

   b) Moment of Resistance

   c) Define and derive the law of 'Parallelogram law of forces'.

9. Write short notes on :

   a) Link Polygon and method of construction (5)

   b) Coplanar force system (5)

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.