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Total No. of Pages : 02

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**B.Arch. (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) What do you understand by Young's Modulus of Elasticity? 2
  - b) What is a Perfect Frame? 2
  - c) Define the term 'Section Modulus'. 2
  - d) State Triangle law of forces. 2
  - e) Name various Gravitational loads? 2
  - f) Differentiate between a Cantilever and Simply Supported beam. 2
2. Explain various loads (as per IS 875) acting on the structures. 12
3. Explain various Force systems acting on a body in brief with the help of sketches. 12
4.
  - a) State and prove 'Theorem of Parallel Axis'. 4
  - b) Find Moment of Inertia ( $I_{xx}$  and  $I_{yy}$ ) of an unequal angle section  $150\text{mm} \times 100\text{mm} \times 10\text{mm}$  with longer leg vertical. 8
5.
  - a) Define centroid and centre of gravity. 4
  - b) Find Moment of Inertia ( $I_{xx}$  and  $I_{yy}$ ) of an inverted T-section  $150\text{mm} \times 150\text{mm} \times 10\text{mm}$ . 8



6. a) Derive the 'Basic Equation of Bending'. 6
- b) A simply supported rectangular beam  $75 \times 100\text{mm}$  of 5m span placed with longer leg vertical, carries a u.d.l. of  $5\text{kN/m}$  over the whole span. Calculate the maximum bending stress developed in the section. 6
7. A simply supported beam of span of 12m span carries a concentrated load of 4 kN, 5 kN and 3 kN at distance of 3m, 6m and 9m respectively from left hand support. Calculate maximum shear force and bending moment. Also draw SFD and BMD. 12
8. Write short notes on :
- a) Neural Axis 3
- b) Moment of Resistance 3
- c) Young's Modulus of Elasticity 3
- d) Shear Modulus 3
9. Explain classification of frames in brief. What are the assumptions made for the analysis of frames? 12

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