

GUJARAT TECHNOLOGICAL UNIVERSITY
ME Semester –I Examination Feb. - 2012

Subject code: 712005N

Date: 15/02/2012

Subject Name: Basic Concepts of Structural Behaviour

Time: 10.30 am – 01.00 pm

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain various Primary Structural units and their aggregation with neat sketches. **07**
- (b) Determine the unknown reaction forces R_A & R_B in the structure shown in fig.1 **07**

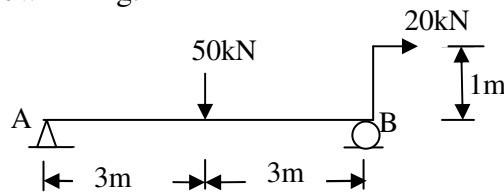


Fig.1

- Q.2** (a) Draw and explain typical Stress-strain diagram for structural steel tested in tension showing all important points and limits on it. **07**
- (b) Explain following material properties & its importance in structural behaviour: **07**
- Ductility
 - Brittleness
 - Fatigue strength

OR

- (b) Explain effect of end conditions in design of columns. **07**
- Q.3** (a) Explain various types of loads on a structure and mention related codes of practice. **07**
- (b) What is shear center? Explain its importance. **07**

OR

- Q.3** (a) Draw and explain deflected shapes of various types of beams. **07**
- (b) Draw shear stress distribution in beam of cross-section: rectangular, T-shape and I-shape. **07**

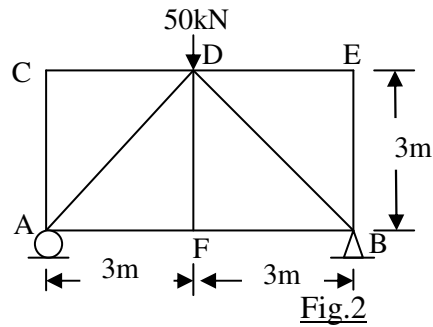
- Q.4** (a) Explain various components of cable suspended structure and cable stayed structure giving neat sketch of each. **07**
- (b) Draw shear force and Bending moment diagrams for a cantilever beam of length 3m carrying uniformly distributed load of 10kN/m over the entire length and a point load of 25kN at 1.5m from the fixed end. **07**

OR

- Q.4** (a) Explain the difference between cables and Arches. **07**
- (b) Write short note on one way and two way plate structures. **07**

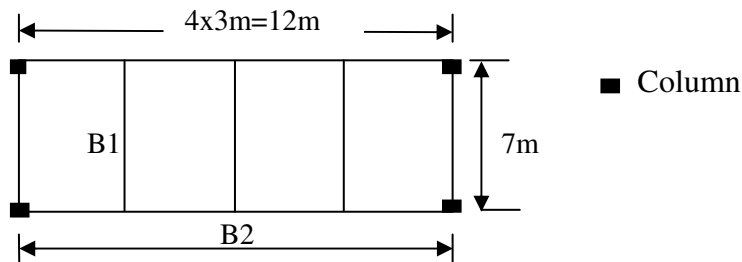
Q.5 (a) Determine internal forces in all members of a truss shown in fig.2

07



(b) Find the support reactions of beams B1(secondary beam) & B2 (primary beam) for the given plan (Fig.3) of a floor. Assume live load= 3kN/m^2 & Floor finish= 1kN/m^2 . Assume slab thickness= 125mm and density of RCC slab as 25kN/m^3 .

07



OR

Q.5 (a) Write short note on cylindrical shell structures.

07

(b) Determine maximum bending stresses in a simply supported beam of span 6m and rectangular cross-section 300mm wide x 450mm deep, carrying uniformly distributed load of 20kN/m over the entire length.

07
