00582

BACHELOR OF ARCHITECTURE

Term-End Examination

June, 2011

BAR-004 : THEORY OF STRUCTURE - I

Time : 3 hours *Maximum Marks : 70*

Note : *Question No. 1 is* ***compulsory****. Answer* ***any four*** *questions from the remaining questions.*

1. Choose the most appropriate answer from the options in questions (a) to (g). **7x2=14**

   (a) On a simply supported beam, a concentrated load is applied at the centre. The shape of BMD shall be

   (i) a rectangle

   (ii) a parabola

   (iii) a triangle

   (iv) an arc of a circle

   (b) In a plane structure, the total number of reactions in a cantilever are

   (i) 2 (ii) 3 (iii) 4 (iv) 5

(c) Out of the following, which may be considered as a natural force ?

(i) Dead load of a table on a slab

(ii) Live load of a train on a bridge

(iii) Wind force

(iv) All the above

(d) Stiffness is defined as

(i) Unit action required for creating some displacement

(ii) Action required for unit deformation

(iii) Force required for producing unit moment

(iv) Moment required for producing failure of a beam

(e) An internal pin in a continuous beam can transfer

(i) Bending moment

(ii) Shear force

(iii) axial force

(iv) both shear force and axial force

(f) Which of the following supports has only one reaction component ?

(i) a fixed support

(ii) a hinged support

(iii) a roller support

(iv) both hinged and roller supports

(g) A tree subjected to wind forces may be considered similar to

(i) a simply supported beam

(ii) a cantilever

(iii) a continuous beam

(iv) none of the above

2. (a) Describe how Young's modulus of elasticity is calculated from stress- strain curve of mild steel. 7

(b) What are 'Live loads' ? Discuss with examples. 7

3. (a) Discuss why stiffness is required in building components such as beams and columns. 7

(b) Enlist any two important properties of construction materials. Explain the need of any one, out of these. 7

4. (a) What do you understand by a 'Link' which is provided in a structure ? Explain with a neat sketch. 7

(b) Write condition equations for equilibrium of a plane rigid body, such as a simply supported beam, in two dimensions and explain them. 7

5. (a) What do you understand by a 'Free body diagram' ? Explain with an example. 7

(b) What do you understand by 'stability' ? How shall you check stability of a simply supported beam loaded with a concentrated point load at centre of its span ? 7

6. (a) What may be the effects on steel structures due to temperature variations ? Explain briefly. 7

(b) Explain the need of analysis of a structural component before it is designed. 7

7. Write short notes on *any two* of the following : **2x7=14**

(a) Requirement of economy for a structure

(b) Criteria for design

(c) Moment of Inertia