No. of Printed Pages : **3**

BAR-004

BACHELOR OF ARCHITECTURE (B.ARCH)

Term-End Examination

December, 2013

BAR-004 : THEORY OF STRUCTURES - 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 given in questions (a) to (g) below. **2x7=14**

(a) A moment is to be considered in the case of a
- (i) pinned support
- (ii) hinged support
- (iii) fixed support
- (iv) roller support

(b) A single span beam whose both ends are provided with roller supports
- (i) is stable for all loads.
- (ii) is unstable for vertical loads
- (iii) is unstable for both vertical and horizontal loads.
- (iv) is unstable for horizontal loads only.

(c) Area of a pin jointed truss is divided in the form of :
- (i) circles (ii) rectangles
- (iii) squares (iv) triangles

(d) Which of the following has a free end ?

(i) a fixed beam

(ii) a simply supported beam

(iii) a cantilever

(iv) a ground storey column in a building

(e) In the stress - strain diagram of mild steel, the yield point

(i) is located at start of curve

(ii) is located at the end of curve

(iii) is absent as mild steel is brittle

(iv) is located after the elastic zone

(f) The SI unit of Young's modulus of elasticity is :

(i) N/mm (ii) Nmm

(iii) N/mm^2 (iv) N/mm^3

(g) For the same externally applied load deflection in a beam would be:

(i) more if the stiffness of beam is increased.

(ii) less if the stiffness of beam is decreased.

(iii) less if the stiffness of beam is increased.

(iv) independent of the stiffness of beam.

2. (a) What do you understand by a ductile material ? Give one example. 7

(b) Discuss any one characteristic feature of a basic structural system, in brief. 7

3. (a) Discuss how an arch sustains gravity forces over it. 7

(b) What do you understand by an elastic material? Does mild steel act as such a material ? 7

4 (a) Differentiate between primary and secondary forces acting on structures. 7

(b) Describe how a pinned support is different from a roller support. Support your answer with neat sketches. 7

5. (a) What are primary elements of structures ? Discuss briefly . 7

(b) What is the utility of having factor of safety in design of structures? Discuss briefly with an example. 7

6. (a) Discuss how strength of a material may affect the design of a structure, constructed of that material. 7

(b) Discuss why consideration of wind force is important for high rise structures. 7

7. Write short notes on **any two** of the following topics : 7x2=14

(a) various types of materials

(b) Gravitational forces in structures

(c) Use of models for testing of structures