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BACHELOR OF ARCHITECTURE**Term-End Examination****December, 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 given in questions (a) to (g). **2x7=14**

(a) In a pin jointed plane truss, members are subjected to :

- (i) axial force
- (ii) shear force
- (iii) bending moment
- (iv) shear force and bending moment

(b) Young's modulus (E) in terms of stress (σ) and strain (ϵ) is given as :

- (i) $E = \sigma, \epsilon$
- (ii) $E = \sigma/\epsilon$
- (iii) $E = \epsilon/\sigma$
- (iv) $E = \frac{(\sigma + \epsilon)}{\epsilon}$

- (c) A structure should be :
- (i) safe
 - (ii) stable
 - (iii) economical
 - (iv) all the above
- (d) Total number of external reactions in a simply supported beam are :
- (i) 2
 - (ii) 3
 - (iii) 4
 - (iv) 5
- (e) A dome is a 3D representation of :
- (i) a line
 - (ii) an arch
 - (iii) a triangle
 - (iv) a rectangle
- (f) Initially the graph between stress and strain for mild steel is :
- (i) convex upwards
 - (ii) concave upwards
 - (iii) straight
 - (iv) curved
- (g) Out of safety and economy for structures :
- (i) safety comes first
 - (ii) economy is more important
 - (iii) both are equally important
 - (iv) none is important

2. (a) Draw a neat sketch showing stress strain behaviour of mild steel. Mark various stages of the curve. 7
- (b) Explain how an arch takes and bears the loads imposed on it. What types of reactions are produced at both the ends if fixed support at one end and hinged support at the other end are provided ? 7
3. (a) Discuss how wind may endanger the safety of a structure. 7
- (b) Differentiate between a hinged support and a roller support. 7
4. (a) What may be the effect of temperature increase on stresses in members of a steel tower ? Explain briefly. 7
- (b) A simply supported beam has been provided with a hinged support at one end and a roller support at the other one. If the hinged support is replaced by another roller support, explain how the stability of beam shall be affected ? 7
5. (a) Discuss why analysis is necessary before taking up design of a structural member. 7
- (b) What do you understand by 'Factor of safety' ? What are various factors affecting it ? 7

6. (a) What do you understand by strength of a material ? Is it connected with stiffness ? Discuss briefly. 7
- (b) Discuss how shear forces act in a beam. 7
Provide a neat sketch to show them in a beam at a section.
7. Write short notes on *any two* of the following : $7 \times 2 = 14$
- (a) Various types of structures
- (b) Dead Load
- (c) Poisson's ratio
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