

BACHELOR OF ARCHITECTURE

Term-End Examination

December, 2010

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). 7x2=14
- (a) A beam which is provided with roller supports at both the ends is :
- (i) stable for all loads
 - (ii) stable only for gravity forces
 - (iii) stable only for inclined forces
 - (iv) unstable for all loads.
- (b) Type of stress generated in a fixed beam due to rise in temperature shall be :
- (i) shear
 - (ii) tensile
 - (iii) compressive
 - (iv) bending

- (c) In a plane structure, total number of reactions at a hinged support are :
- (i) one
 - (ii) two
 - (iii) three
 - (iv) five
- (d) A strut is :
- (i) a beam
 - (ii) a slab
 - (iii) an isolated footing
 - (iv) an axially loaded structural member
- (e) Horizontal force on a structure may occur due to :
- (i) earthquake
 - (ii) wind
 - (iii) earth pressure
 - (iv) all of the above
- (f) An element in bending is subjected to :
- (i) tension
 - (ii) compression
 - (iii) tension and compression both
 - (iv) none of the above

- (g) An internal hinge in a beam may transfer :
- (i) bending moments
 - (ii) bending moments and axial forces
 - (iii) bending moments and shear forces
 - (iv) axial forces and shear forces.
2. (a) Discuss how wind forces are applied on buildings ? How are they different from gravity loads? 7
- (b) Explain Hooke's law taking the example of stress- strain relation of mild steel. 7
3. (a) What do you understand by equations of equilibrium ? For what purpose can they be used ? 7
- (b) Describe different types of support and their characteristics. Explain with the help of their neat sketches. 7
4. (a) What precautions should be taken in the design of a column in a building if the load bearing capacity of soil is low? 7
- (b) Define the following terms : 7
- (i) section modulus
 - (ii) radius of gyration

5. (a) What do you understand by 'factor of safety'? Discuss its need and importance in design of structures. 7
- (b) What do you understand by analysis and design of structures? Is there any difference between the two? Explain by giving suitable examples. 7
6. (a) What are various parameters affecting the stability of a column? 7
- (b) Describe in brief the primary elements of a framed structure and their behaviour. 7
7. Write short note on *any two* of the following: **2x7=14**
- (i) Criteria for design of structures
- (ii) Functions of structures
- (iii) Types of stresses
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