

BACHELOR OF ARCHITECTURE (B.Arch.)

Term-End Examination

December, 2015

00431

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 in questions (a) to (g) given below : $7 \times 2 = 14$
- (a) A simply supported beam is subjected to a uniformly distributed load on the whole of its span. The bending moment is maximum at
- (i) Support
 - (ii) Mid-span
 - (iii) Quarter span
 - (iv) Mid-span and support

- (b) A propped cantilever beam is a/an
- (i) Determinate structure
 - (ii) Stable and determinate structure
 - (iii) Stable and indeterminate structure
 - (iv) Unstable structure
- (c) The free end of a cantilever is applied with a point load. The point of maximum bending moment is at the
- (i) Free end
 - (ii) Fixed end
 - (iii) Mid-span
 - (iv) Free end and fixed end
- (d) A slender member is most critical under which type of loading ?
- (i) Compression
 - (ii) Tension
 - (iii) Flexure
 - (iv) Torsion
- (e) A structure should be in
- (i) Stable equilibrium
 - (ii) Unstable equilibrium
 - (iii) Neutral equilibrium
 - (iv) Stable and Neutral equilibrium

(f) Displacement resulting because of the application of unit force is known as

- (i) Stiffness
- (ii) Flexibility
- (iii) Stress
- (iv) Strain

(g) The stiffness method of analysis is also known as

- (i) Displacement method
- (ii) Force method
- (iii) Equilibrium method
- (iv) Displacement or Equilibrium method

2. (a) Explain under what conditions is a combined footing required for a building. 7

(b) Draw the stress-strain diagram for mild steel and describe its various portions briefly. 7

3. (a) Enlist the names of different types of loads which are considered for a building. Explain the characteristics of any one of them briefly. 7

(b) Draw the symbols of different types of supports. Explain the characteristics of a fixed support. 7

4. (a) What do you understand by the analysis of a structure ? Discuss its importance briefly. 7
- (b) What are the different steps to be followed for designing a structural element ? Explain briefly. 7
5. (a) Describe an indeterminate structure with a suitable example. 7
- (b) What do you understand by a primary element of a structure ? Explain with a neat sketch of a structure taken as an example. 7
6. (a) Explain the importance of model study for the design of various types of structures. Give a suitable example. 7
- (b) What do you understand by the term “Factor of safety” for designing a structure ? How is it determined ? 7
7. Write short notes on any *two* of the following : $2 \times 7 = 14$
- (a) Primary and secondary forces acting on a structure
- (b) Proof stress and its determination
- (c) Importance of strength of a material of construction
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