

BACHELOR OF ARCHITECTURE (B.Arch.)

Term-End Examination

December, 2014

00305

BAR-014 : THEORY OF STRUCTURES – II

Time : 3 hours

Maximum Marks : 70

Note : Question no. 1 is compulsory. Answer any four questions from the remaining questions. Use of scientific calculator is permitted.

1. Choose the most appropriate answer from the options given in questions (a) to (g). $7 \times 2 = 14$
- (a) If the depth of a beam is doubled then the flexural rigidity increases
- (i) two times
 - (ii) four times
 - (iii) six times
 - (iv) eight times
- (b) In which of the following supports, are the minimum number of reactions present ?
- (i) Fixed
 - (ii) Hinged
 - (iii) Roller
 - (iv) Hinged and Roller

- (c) A beam subjected to an eccentric transverse loading experiences
- (i) Shear force
 - (ii) Bending moment
 - (iii) Torsion
 - (iv) All of the above
- (d) Bending moment at the free end of a cantilever, of span 'L', with a point load (W) applied at the centre of the span is
- (i) zero
 - (ii) $\frac{WL}{2}$
 - (iii) WL
 - (iv) $\frac{WL}{4}$
- (e) What is the bending moment value at the support in question (d) above ?
- (i) Zero
 - (ii) $\frac{WL}{2}$
 - (iii) $\frac{WL^2}{8}$
 - (iv) $\frac{WL}{4}$

- (f) Buckling is a phenomenon experienced by a column because of
- (i) Axial compression loading
 - (ii) Axial tensile loading
 - (iii) Transverse bending
 - (iv) Transverse twisting
- (g) At point of maximum bending moment, the value of shear force is
- (i) zero
 - (ii) maximum
 - (iii) infinite
 - (iv) minimum

2. (a) What do you understand by a rigid frame ? How is it different from a pin jointed truss ? Explain with neat sketches. 7
- (b) Discuss how arches transfer external loads, applied on them, towards their supports. What types of internal forces are induced in them ? 7
3. (a) What are the different elements of an arch ? Describe briefly with a suitable sketch. 7
- (b) Discuss how properties of construction materials may affect the performance and behaviour of structures. 7

4. (a) Pin jointed trusses are made of triangular portions. Justify with reason. 7
- (b) Describe the method of joints used for analysing a pin jointed truss. 7
5. (a) Explain the structural behaviour of cuboidal and prismatic forms with symmetric and asymmetric layouts. 7
- (b) What do you understand by a simple geometric form ? Explain with an example. 7
6. (a) Explain the importance of the structural integrity in a building system. 7
- (b) Explain differences between a fixed support and a hinged support. Draw neat sketches to elaborate your answer. 7
7. Write short notes on any *two* of the following topics : $2 \times 7 = 14$
- (a) Lintels
- (b) Need of structural analysis for structural design
- (c) Basic structural systems in a building
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