

BACHELOR OF ARCHITECTURE (B.Arch.)

Term-End Examination

00096

June, 2015

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.*

1. Choose the most appropriate answer from the options in questions (a) to (g) given below : $7 \times 2 = 14$
- (a) The bending moment value is not zero for which support condition ?
- (i) Fixed
- (ii) Hinged
- (iii) Roller
- (iv) Pinned

- (b) In a cantilever, the slope of the deflected shape is zero at
- (i) Fixed end
 - (ii) Free end
 - (iii) Mid point
 - (iv) None of the above mentioned points
- (c) A truss member is subjected to
- (i) Only bending
 - (ii) Only axial tension
 - (iii) Only axial compression
 - (iv) Axial tension or compression
- (d) A single span beam with roller support at both the ends is
- (i) Stable
 - (ii) Unstable
 - (iii) Stable only for vertical forces
 - (iv) Stable only for horizontal forces
- (e) Which of the following beams is an indeterminate structure ?
- (i) Simply supported beam
 - (ii) Cantilever beam
 - (iii) Fixed beam
 - (iv) Simply supported beam with an overhang

(f) If the depth of a rectangular beam increases keeping the same width, then which of the following increases ?

- (i) Bending stiffness
- (ii) Axial stiffness
- (iii) Both bending and axial stiffness
- (iv) None of the above

(g) How many reactions are there in a roller support ?

- (i) Zero
- (ii) One
- (iii) Two
- (iv) Three

2. (a) Explain any one type of foundation adopted for a building, with a neat sketch. 7

(b) Draw the stress-strain diagram for mild steel. Label the salient points on it. 7

3. (a) What do you understand by the process of design for a structure ? Explain briefly. 7

(b) What are the primary and secondary forces acting on a structure ? 7

4. (a) Draw different types of supports and briefly explain the characteristics of any one. 7
- (b) What is meant by structural analysis ? Enlist the names of various types of loads considered for buildings. 7
5. (a) Explain the concept of factor of safety for a material in designing a structure. 7
- (b) Explain why stability is important for a structure. Show how a building can become unstable, by taking an example. 7
6. (a) How can the behaviour of an actual structure, while subjected to loads, be studied ? Explain with a suitable example. 7
- (b) What are the different primary elements of a structure ? Explain with an example. 7
7. Write short notes on any *two* of the following topics : $2 \times 7 = 14$
- (a) External forces acting on buildings
- (b) Ductility requirements for materials
- (c) Indeterminate structures
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