

BACHELOR OF ARCHITECTURE (B.Arch.)

Term-End Examination

00489

June, 2017

BAR-034 : THEORY OF STRUCTURES – IV

Time : 3 hours

Maximum Marks : 70

Note : *Question no. 1 is compulsory. Attempt any four questions from the remaining. Use of scientific calculators, IS 800 code and steel tables is permitted.*

1. Choose the most appropriate answer from the options in questions (a) to (g) as given below : $7 \times 2 = 14$
- (a) Hooke's law gives the relationship between
- (i) stress and strain
 - (ii) force and displacement
 - (iii) moment and rotation
- (b) In a determinate structure
- (i) forces in members can be found only by equilibrium equations
 - (ii) forces in members cannot be found only by equilibrium equations
 - (iii) equilibrium equations are not adequate

- (c) The unit of Stress is
- (i) N/m^3
 - (ii) kN/mm
 - (iii) N/mm^2
- (d) A four-hinged arch is a/an
- (i) unstable structure
 - (ii) indeterminate structure
 - (iii) determinate structure
- (e) Steel structures, as compared to R.C. structures, are
- (i) unstable
 - (ii) expensive
 - (iii) inexpensive
- (f) For a simple truss, welded connections compared to bolted connections
- (i) are stronger
 - (ii) are preferred and simple to construct
 - (iii) fail in shear
- (g) A space frame structure is
- (i) linear
 - (ii) three-dimensional
 - (iii) a plane frame

2. (a) What are determinate structures ? Explain with sketches. 7
- (b) Explain with a sketch, what is a three-hinged arch. 7
3. (a) Discuss the merits and demerits of steel structures. 7
- (b) Write the steps involved in the design of welded joints in steel construction. 7
4. A beam AB of length 4 m (Ref. Figure 1 below) has its end A fixed and end B simply supported. It carries a UDL of 10 kN/metre run. Using the moment distribution method, find the support moments and draw the bending moment diagram. 14

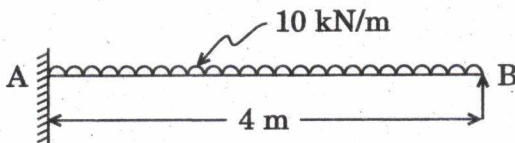


Figure 1

5. (a) Discuss the merits and demerits of welded joints in steel structures. 7
- (b) Write the various steps in the design of a steel column. 7

6. (a) Discuss the merits of an arch over a straight beam for the design of a bridge. 7
- (b) Discuss what are statically indeterminate structures. 7
7. For a bridge spanning 60 m, what would be the preferred system in R.C. or steel? 14
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