BACHELOR OF ARCHITECTURE (B.Arch.)
Term-End Examination
June, 2015

00187

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 calculator, IS 800 code and steel table is permitted.*

1. Choose the most appropriate answer from the options given in questions (a) to (g) :   *7×2=14*

   (a) In a plane structure, a hinged support has a number of reactions equal to

      (i) 3

      (ii) 1

      (iii) 2

      (iv) 4

   (b) Maximum Bending Moment in a simply supported beam occurs when

      (i) Shear force is minimum

      (ii) Deflection is zero

      (iii) Shear force is zero

      (iv) Shear force is maximum

(c) In a three-hinged arch having the third hinge at crown, the BM at crown shall be

(i) Maximum sagging

(ii) Maximum hogging

(iii) Zero

(iv) None of the above

(d) Which of the following supports would absorb any action coming towards it ?

(i) Roller

(ii) Hinged

(iii) Pinned

(iv) Fixed

(e) In a steel beam, the calculation of tensile stresses in bending is based on

(i) Gross Area

(ii) Net Area

(iii) $1 \cdot 1 \times$ Net Area

(iv) None of the above

(f) The size of the butt weld is denoted by its effective throat thickness but in case of incomplete penetration the effective throat thickness is taken as

(i) Five-eighth (5/8) thickness of the thinner part.

(ii) Half the thickness of the thicker part connected.

(iii) Half the thickness of the thinner part connected.

(iv) None of the above
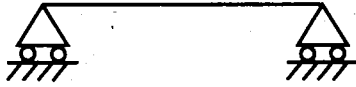
(g) Structure shown in Figure 1, is

Figure 1

(i) Indeterminate

(ii) Determinate

(iii) Stable

(iv) Unstable

2. (a) Define indeterminate structures. Discuss the advantages of these structures. 7

   (b) Discuss the various steps of the procedure for analysing a continuous beam by moment distribution method. 7

3. (a) Draw the stress-strain curve of mild steel. Explain the various stages that occur during a tensile test. 7

   (b) Define three-hinged arch. Discuss its application in a structure. 7

4. (a) Define Butt Joint. Describe the arrangement with the help of a figure. 7

   (b) Discuss the various steps to design a steel beam of given bending moment and shear force. 7

5. (a) Define effective length of a column. Discuss the various factors affecting the strength of a column. 7

(b) Define a portal frame. Explain the importance of portal frame to resist horizontal forces. 7

6. (a) Explain post and lintel system. Compare the behaviour of post and lintel system and portal frame. 7

(b) Discuss the advantages of bolted connections as compared to welded connections. 7

7. Write short notes on any *two* of the following : *2×7=14*

(a) Failure of Bolted Joints

(b) Types of Weld

(c) Application of Gusset Plates in Steel Construction