BAR-034

BACHELOR OF ARCHITECTURE (B.Arch.)

Term-End Examination

December, 2015

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 :   *7×2=14*

   (a) Which of the following supports is provided to take care of the effects due to temperature variation ?

   (i) Fixed Support

   (ii) Hinged Support

   (iii) Roller Support

   (iv) Pinned Support

(b) Simple supported beam of length '*l*' is subjected to a UDL intensity 'w' per unit length over its whole length. Bending moment at mid-span is

(i) $\dfrac{wl^2}{2}$

(ii) $\dfrac{wl^2}{8}$

(iii) $\dfrac{wl^2}{4}$

(iv) wl

(c) A beam in a building requires _____ reinforcement as compared to an arch for the same span and loading.

(i) less

(ii) more

(iii) equal

(iv) None of the above

(d) Structure shown in Figure 1 is

Figure 1

(i) Determinate

(ii) Unstable

(iii) Indeterminate

(iv) None of the above

(e) The effective length of a column that has unsupported length 'L' and one end fixed and the other end hinged is given by

(i)   0·50 L

(ii) 1·2 L

(iii) 0·65 L

(iv) 1·5 L

(f) The maximum pitch of bolts for parts in compression is

(i)   Lesser of 250 mm or 16 t

(ii) Lesser of 200 mm or 12 t

(iii) Lesser of 200 mm or 16 t

(iv) Lesser of 300 mm or 12 t

(g) Member of a rigid frame may be subjected to

(i)   Shear force

(ii) Axial force

(iii) Bending moment

(iv) All of the above

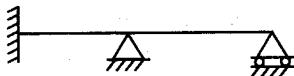**2.** (a) Calculate the indeterminacy of the beam as shown in Figure 2.

Figure 2

Also discuss the disadvantages of indeterminate structures.   7

(b) Define distribution factor calculated in moment distribution method. Discuss the factors affecting it.   7

3. (a) Discuss the properties of mild steel. Explain why it is used in structures.   7

(b) Define Lap Joint. Show the arrangement of a typical lap joint.   7

4. (a) Discuss various support conditions of a column. Explain the types of failure of columns.   7

(b) Discuss various steps to design a built-up column as per IS 800.   7

5. (a) Discuss the behaviour of three-pinned arch. Explain its advantages.   7

(b) Define Portal Frame. Discuss the step-by-step procedure to analyse a portal frame using the moment distribution method.   7

6. (a) Discuss various considerations important for the design of a steel beam. 7

(b) Explain 'Post and lintel' system. Discuss its applications. 7

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

(a) Design of typical bolted connection

(b) Failure of welding joints

(c) Importance of the shape of an arch for a given loading and end conditions

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