| **BAR-034**

BACHELOR OF ARCHITECTURE (BARCH)

Term-End Examination

December, 2013

BAR-034 : THEORY OF STRUCTURES-IV

Time : 3 hours *Maximum Marks : 70*

Note : *Question no. 1 is compulsory. Answer any four questions from the remaining questions. Use of IS : 800-2007 and steel tables are permitted. Assume any missing data suitably.*

1. Choose the most appropriate answer from the options given in questions (a) to (g). **7x2=14**

    (a) Equations of static equilibrium are more than the total number of unknown reactions in the case of

        (i) Unstable and determinate structures

        (ii) Stable and determinate structures

        (iii) Unstable structures

        (iv) Stable and indeterminate structures

    (b) A simply supported beam provided with an internal hinge is

        (i) Unstable structure

        (ii) A determinate structure

   (iii) An indeterminate structure

        (iv) None of the above

(c) A portal frame is subjected to an earthquake. Its columns will be subjected to

   (i) Alternate tension and compression along with shear force and bending moment

   (ii) Alternate tension and compression only

   (iii) Shear force and bending moment

   (iv) Compression only

(d) A beam resting on load bearing walls in a single storey house can be idealised as

   (i) Simply supported beam

   (ii) A cantilever

   (iii) Propped cantilever beam

   (iv) Compound beam

(e) Absolute stiffness of a beam member with farther end continuous is :

   (i) $\dfrac{3EF}{l}$

   (ii) $\dfrac{6EF}{l}$

   (iii) $\dfrac{4EF}{l}$

   (iv) $\dfrac{2EF}{l}$

(f) Which of the following connections may provide greater speed of construction ?

   (i) Riveted connections

   (ii) Welded connections

   (iii) Bolted connections

   (iv) Both Riveted and bolted connections

(g) In design of compression members, main criteria of design is :

(i) Slenderness ratio

(ii) Cross sectional shape

(iii) Weight of column

(iv) Net area.

2. Analyse the frame shown in figure.   **14**
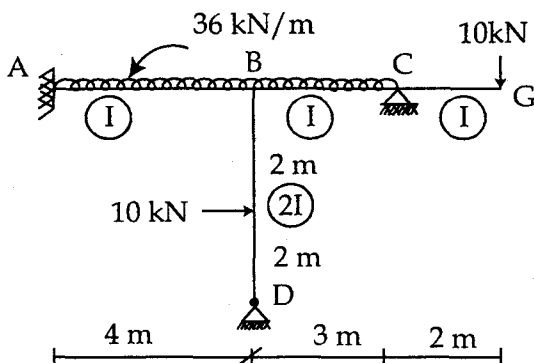
3. (a) Differentiate between a two hinged arch and a three hinged arch.   **7**

(b) A three hinged arch has a span of 30m and a rise of 10m. The arch carries a udl of 80 kN/m on the left half of the span. It carries two concentrated loads of 160 kN and 140 kN at 5 m and 10m from the right end. Determine the reactions and horizontal thrust at both the supports.   **7**

4. Design a suitable steel section for a column to carry an axial load of 400 kN. The column is 4m long and is fixed in position as well as direction at one end and fixed in position only at the other end. **14**

5. (a) Write advantages of steel structures over masonry and R.C.C. Structures. **7**

    (b) What do you understand by degree of static indeterminary for a riged frame ? **7**

6. Explain briefly with an example.

    (a) Compare characteristics of welded and riveted connections. **7**

    (b) 16 mm thick plates are joined together by a single riveted lap joint with 22 mm rivets. Calculate the efficiency of the joint . Assume permissible stresses suitably. **7**

7. Write short notes on **any two** of the following topics. **2x7=14**

    (a) Distribution factor

    (b) Shear force and bending moment diagrams.

    (c) Symmetrical and unsymmetrical portal frame.

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