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BAR-034

BACHELOR OF ARCHITECTURE (B.Arch.)

00250

Term-End Examination

June, 2016

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 IS 800 and steel tables is permitted. Assume any missing data suitably.*

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

(a) An internal hinge in a beam may transfer

(i) Shear force

(ii) Bending moment

(iii) Axial force

(iv) Shear and axial forces

(b) Indeterminacy of a fixed beam of a single span is

(i) 2

(ii) 3

(iii) 4

(iv) 6

(c) Force required for a unit deformation is called

(i) Hardness

(ii) Toughness

(iii) Stiffness

(iv) Stress

(d) A three-hinged arch is

(i) statically determinate

(ii) statically indeterminate

(iii) unstable

(iv) stable and indeterminate

(e) Total number of reactions at a fixed support in a space structure is

(i) 3

(ii) 4

(iii) 5

(iv) 6

(f) A structure should be

(i) safe

(ii) economical

(iii) durable

(iv) All the above

(g) Choose the most ductile material.

(i) Mild steel

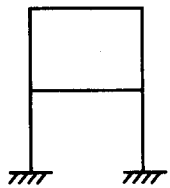
(ii) Stone

(iii) Medium tensile steel

(iv) Brick

2. (a) Find indeterminacy of the structures shown in Figure 1. *7*

(i) Propped cantilever



(ii) Rigid frame

Figure 1

(b) Write the advantages of indeterminate structures briefly. *7*

3. (a) Write a short note on the importance of portal frames in resisting horizontal forces. 7

(b) Draw a neat sketch of the stress – strain curve of mild steel and show the important stages and characteristic points in it. 7

4. Analyse the structure shown in Figure 2 by Moment Distribution Method and draw the BMD. 14

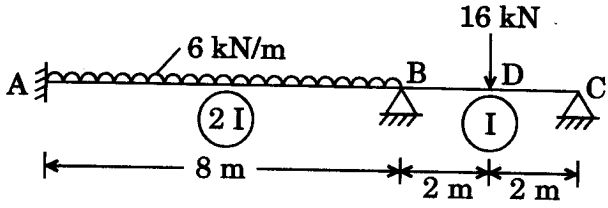


Figure 2

5. (a) Compare an arch to a beam in all respects briefly. 7

(b) Write some advantages of welded connections. 7

6. (a) Write the assumptions in the theory of riveted joints. 7

(b) Determine the strength of a single riveted joint of 6 mm thick plates having 20 mm nominal diameter rivets at a pitch of 6 cm. Maximum permissible stresses in hand-driven shop rivets used in shear and bearing on rivet are 80 MPa and 250 MPa respectively. Bearing stress on connecting part (f_y) may be taken as 150 MPa. 7

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

(a) Bolted connections

(b) Design of steel girders

(c) Efficiency of a riveted joint

(d) Different types of steel sections