BAR-024

BACHELOR OF ARCHITECTURE (B.Arch.)

Term-End Examination

June, 2018

00263

BAR-024 : THEORY OF STRUCTURES – III

Time : 3 hours *Maximum Marks : 70*

Note : *Question no. 1 is **compulsory**. Attempt any **four** questions from the remaining ones. Use of scientific calculator is permitted. All questions carry equal marks.*

1. Choose the most appropriate option in questions (a) to (g) given below : 7×2=14

    (a) Summation of all transverse forces, either from left or right, up to a section under consideration in a beam is termed as

    (i) Axial force

    (ii) Shear force

    (iii) Bending moment

    (iv) Torque

    (b) A cantilever is

    (i) determinate

    (ii) unstable

    (iii) indeterminate

    (iv) None of the above

(c) Young's modulus of elasticity has a unit

    (i) N/mm

    (ii) `N/mm^2

    (iii) N/mm^4

    (iv) N . mm

(d) Deflection of free end point of a cantilever, subjected to a UDL of intensity 'w' is

    (i) $wL^3/8EI$

    (ii) $wL^4/6EI$

    (iii) $wL^4/8EI$

    (iv) $wL^3/6EI$

where L, E and I have their usual meanings.

(e) Buckling may take place in

    (i) a short column

    (ii) a long column

    (iii) a tension member

    (iv) All the above

(f) Flexural rigidity of a beam is

    (i) E

    (ii) EI

    (iii) E / I

    (iv) EI^2

(g) Members of a plane pin-jointed truss are subjected to

    (i) axial force

    (ii) shear forces

    (iii) bending moments

    (iv) All the above

2. (a) What do you understand by stability of a structure. How do you check it ? Explain briefly. 7

(b) Explain the terms 'free body diagram' and 'equations of static equilibrium' ? 7

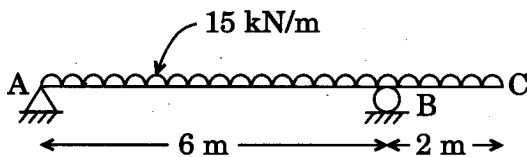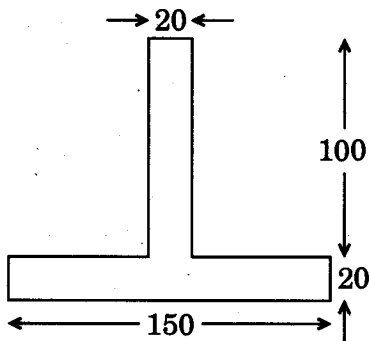**3.** Draw SFD and BMD for the beam shown in Figure 1. 14

Figure 1

**4.** (a) Find the centroid of the lamina shown in Figure 2. 7

(All dimensions are in mm)

Figure 2

(b) Explain the effect of end conditions on load carrying capacity of a long column. 7

5. (a) Explain the parallel axis theorem. 7

   (b) Explain a method of determining resultant of concurrent coplanar force system. 7

6. Determine moment of inertia of the section shown in Figure 3 about centroidal axis XX. *14*
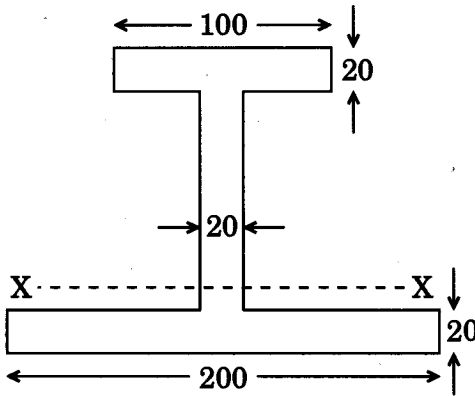
(All dimensions are in mm)

Figure 3

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

   (a) Effective Length of a Long Column

   (b) Average and Maximum Shear Stress on a Beam Section

   (c) Composite Sections