

BACHELOR OF ARCHITECTURE (B.Arch.)

00426 **Term-End Examination**

June, 2015

BAR-024 : THEORY OF STRUCTURES – III

Time : 3 hours

Maximum Marks : 70

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

1. Choose the most appropriate options in questions (a) to (g) given below. $7 \times 2 = 14$

(a) For a plane structure, the number of equations for static equilibrium is

(i) 2

(ii) 3

(iii) 4

(iv) 6

- (b) Intensity of a UDL, covering full span of a simply supported beam of 10 m length, to produce maximum BM equal to the maximum BM produced by a 100 N, concentrated load applied at the centre of the beam, is
- (i) 2 N/m
 - (ii) 20 N/m
 - (iii) 10 N/m
 - (iv) 5 N/m
- (c) The point where the mass of an object may be taken to be concentrated is
- (i) its thickest part
 - (ii) support
 - (iii) hinge
 - (iv) centre of gravity
- (d) Which of the following may be considered as a composite material ?
- (i) Steel
 - (ii) Timber
 - (iii) Stone
 - (iv) Reinforced concrete

- (e) Euler's theory may be applied to
 - (i) Short columns
 - (ii) Pedestals
 - (iii) Long columns
 - (iv) Both long and short columns

- (f) In the case of pure bending in a beam
 - (i) Shear force is constant
 - (ii) Shear force is maximum
 - (iii) Shear force does not change its sign
 - (iv) Shear force is zero

- (g) Buckling load for a column is calculated when the column is
 - (i) in a stable condition
 - (ii) in an unstable condition
 - (iii) in a neutral condition
 - (iv) in a broken or failed condition

2. (a) Discuss briefly the advantages of using composite sections in structural members. 7
- (b) Write the basic equation of pure bending explaining various terms. 7

3. Locate the centroid of the area shown in Figure 1 below, with respect to the axes shown. 14

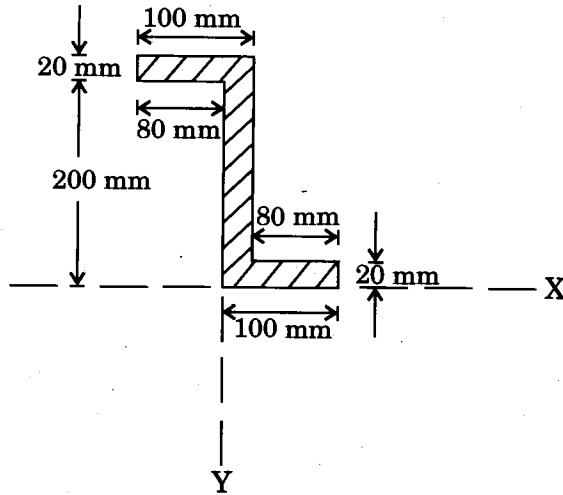


Figure 1

4. (a) Draw SFD and BMD for the beam shown in Figure 2. 7

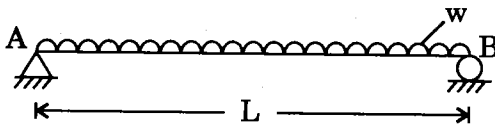


Figure 2

- (b) Discuss how end conditions affect the buckling load of a column. 7
5. (a) What do you understand by 'moment of inertia'? Discuss briefly. 7
- (b) Write the various steps of 'Method of joints', used for analysing plane trusses. 7

6. (a) What are those factors on which deflection at a point in a beam depends ? Discuss briefly. 7
- (b) Draw deflected shape for the beam shown in Figure 3 and Figure 4. 7

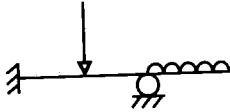


Figure 3

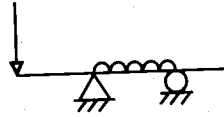


Figure 4

7. Write short notes on any *four* of the following topics : $4 \times 3 \frac{1}{2} = 14$

- (a) Space structures
 - (b) Coplanar forces
 - (c) Funicular polygon
 - (d) Ductility and its advantages
 - (e) Types of trusses
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