

BACHELOR OF ARCHITECTURE

00801

Term-End Examination

June, 2010

BAR-014 : THEORY OF STRUCTURES - II

*Time : 3 hours*

*Maximum Marks : 70*

**Note :** (i) *Question No.1 is compulsory.*

(ii) *Answer any four questions from the remaining questions.*

(iii) *Use of calculator is permitted.*

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

(a) Structural systems should have :

- (i) only roller supports
- (ii) maximum brittleness
- (iii) strength
- (iv) none of the above

(b) A standing tree is considered as :

- (i) Cantilever beam
- (ii) simply supported beam
- (iii) fixed beam
- (iv) propped cantilever beam

- (c) A dome is a three dimensional representation of :
- (i) a beam
  - (ii) a column
  - (iii) an arch
  - (iv) a cantilever
- (d) In members of a pin jointed truss :
- (i) no tension is present
  - (ii) no compression is present
  - (iii) no tension, compression or shear force is present
  - (iv) no bending moment is present
- (e) The point where the mass of an object is located is called as :
- (i) axis
  - (ii) point of mass
  - (iii) centre of gravity
  - (iv) mass point
- (f) Concurrent forces :
- (i) are in the same plane necessarily
  - (ii) are forces passing through a point
  - (iii) may or may not be in the same plane but they do not pass through a point
  - (iv) are not forces but moments

(g) Centre of gravity of right circular solid cone lies on the vertical axis at a distance of :

(i)  $\frac{h}{4}$

(ii)  $\frac{h}{3}$

(iii)  $\frac{h}{2}$

(iv)  $\frac{2h}{3}$

from the base of the cone where  $h$  is the height of the cone.

2. Determine the position of the centroid of an unsymmetrical Z-section shown in Figure - 1. 14

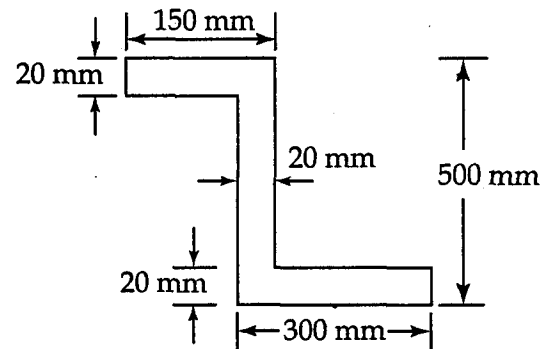


Figure - 1

3. Find the moment of inertia about  $x-x$  and  $y-y$  centroidal axes for an unequal angle section shown in Figure 2. 14

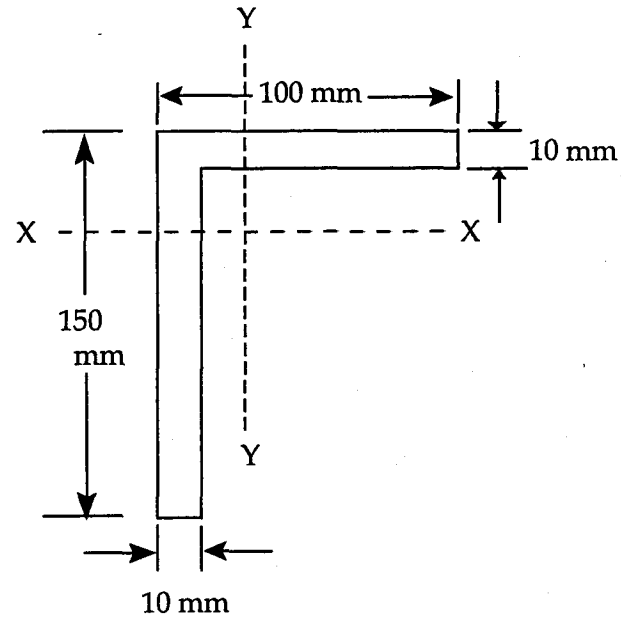


Figure - 2

4. Describe the following structural systems in brief :  $4 \times 3\frac{1}{2} = 14$
- (a) Arches
  - (b) Post-and lintel
  - (c) Bearing wall
  - (d) Rigid frames
5. (a) Draw stress-strain curve for mild steel. 7  
Discuss the salient features of this curve.

(b) Differentiate between the following two material properties with suitable examples : 7

- (i) Ductility
- (ii) Brittleness

6. (a) A circular rod of 12 mm diameter was tested for tension. The total elongation on a 300 mm length was 0.22 mm under a tensile load of 17 kN. Find the value of Young's modulus of elasticity of the material. 7

(b) Find the resultant for the concurrent coplanar force system shown in Figure 3. 7

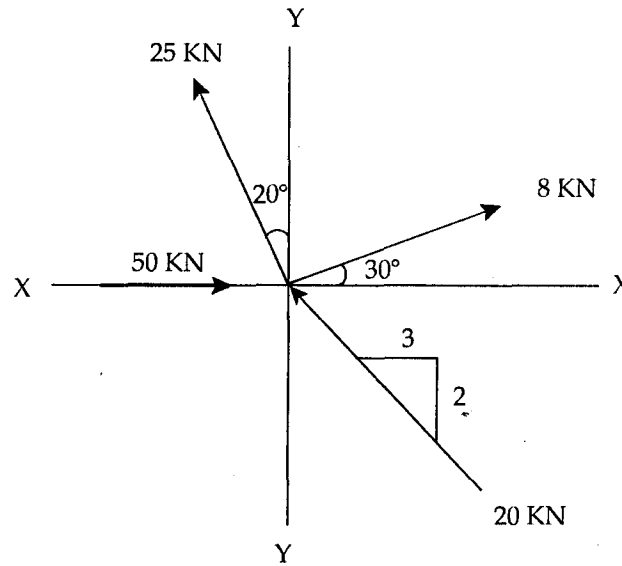


Figure - 3

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

- (a) Funicular polygon graphical method for finding resultant of a force system.
- (b) Assumptions in strength of materials.
- (c) Use of centre of gravity and moment of inertia of a body in structural systems.

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