No. of Printed Pages : **4**

BAR-024

00740

BACHELOR OF ARCHITECTURE (BARCH)

Term-End Examination

June, 2013

BAR-024 : THEORY OF STRUCTURES - III

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any five** questions including question No. 1 which is **compulsory**. Use of scientific calculator is **permitted**.*

1. Choose the most appropriate answer from options given in questions (a) to (g) below : **2x7=14**

(a) Two forces going through the same point and being in the same plane are called :

(i) Concurrent

(ii) Coplanar

(iii) both (i) and (ii) above

(iv) None of the above

(b) Which one of the following is correct ?

(i) $I_z = I_x - I_y$ (ii) $I_z = I_x + I_y$

(iii) $I_z = I_x \cdot I_y$ (iv) $I_z = I_x / I_y$

(c) Method of joints may be used to analyse :

(i) pin jointed trusses

(ii) rigid jointed trusses

(iii) both the above

(iv) none of the above

(d) In the graph showing stress - strain curve for mild steel, on the x - axis.

(i) strain values are shown

(ii) stress values are shown

(iii) either stress or strain values may be shown

(iv) stress values are shown but strain values would be shown for any other material.

(e) Shear force at the fixed support in Fig. 1 shall be :

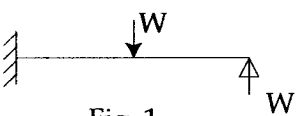

Fig. 1

(i) 2 W (ii) zero

(iii) W/2 (iv) W^2

(f) Choose the correct statement :

(i) Euler's critical load of a column does not depend on end conditions.

(ii) Only short columns are prone to buckling.

(iii) The standard case for Euler's critical load has fixed end conditions for a column.

(iv) A decrease in length would lead to an increase in load bearing capacity of a column.

(g) Choose the correct one :

(i) $\sigma = \frac{MI}{y}$ (ii) $M = \frac{\sigma y}{I}$

(iii) $M = \frac{Iy}{\sigma}$ (iv) $\sigma = \frac{My}{I}$

2. (a) Explain the parallel axis theorem for determining moment of inertia for an area. 7

(b) Describe the concept of a 'Funicular polygon' briefly. 7

3. (a) Determine support reactions for the pin jointed truss shown in fig 2. 7

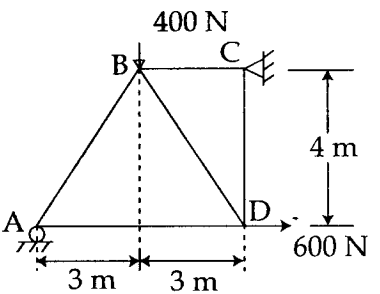

Fig. 2

(b) What do you understand by 'Young's modulus of elasticity' ? 7

4. (a) Draw SFD and BMD for the beam shown in fig. 3. 7

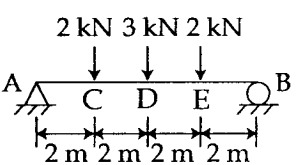

Fig. 3

(b) Why deflections are computed for loaded structures ? Explain briefly. 7

5. (a) What do you understand by a composite material ? 7

(b) Draw the possible deflected shape of the structure, shown in fig. 4, without making any calculations, 7

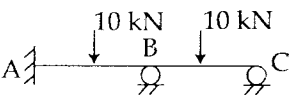

Fig. 4

6. (a) A rectangular beam of width 100 mm and depth 200 mm in cross section is simply supported over a span of 4 m. The beam is loaded with a UDL of 5 kN/m over the entire span. Find the maximum bending stress in the beam in N/mm^2. 7

(b) Show shear stress distribution in a beam of rectangular cross - section with the help of a neat sketch. What is the relation between maximum and average values of shear stress in such a section ? 7

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

(a) Poisson's ratio

(b) Thermal stresses

(c) Modular ratio