No. of Printed Pages : 5

BAR-024

BACHELOR OF ARCHITECTURE (B.Arch.)

Term-End Examination

00252

December, 2017

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) The degree of static indeterminacy of a propped cantilever beam is

(i) 1

(ii) 2

(iii) 3

(iv) 4

(b) In pin-jointed trusses, members are subjected to

(i) axial forces

(ii) shear forces

(iii) moments

(iv) axial and shear forces

(c) Out of the following, the most ductile material is

(i) Brick

(ii) Stone

(iii) Concrete

(iv) Steel

(d) The shape of bending moment diagram for a simply supported beam which is subjected to a point load at its centre is

(i) rectangular

(ii) triangular

(iii) circular

(iv) parabolic

(e) Buckling may be expected in

(i) short columns

(ii) long columns

(iii) both the above depending on material of the column

(iv) circular columns

(f) Which is ***not*** an assumption taken in the theory of pure bending ?

(i) Material is homogeneous

(ii) Material is isotropic

(iii) Plane sections remain plane

(iv) Plane sections are subjected to warping

(g) An internal hinge in a beam may transfer

(i) shear force

(ii) bending moment

(iii) shear force and axial force

(iv) shear force and bending moment

2. (a) Briefly discuss how load carrying capacity of a column may be enhanced. *7*

(b) What is a Funicular Polygon ? Explain briefly. *7*

3. Draw the SFD and BMD for the beam shown in Figure 1. It is a cantilever subjected to a downward load P at the free end B and an upward force P at point C. *14*

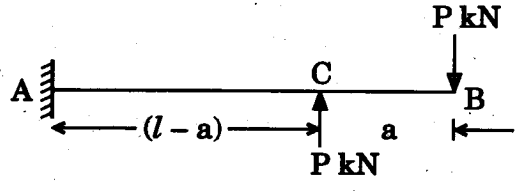

Figure 1

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

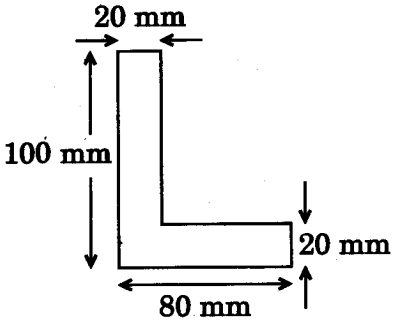

Figure 2

(b) Explain a method of analysis of a simple pin-jointed plane truss. 7

5. (a) Write the parallel axis theorem for moment of inertia. 7

(b) Determine moment of inertia of a rectangular lamina shown in Figure 3, about an axis x-x which passes through its CG. 7

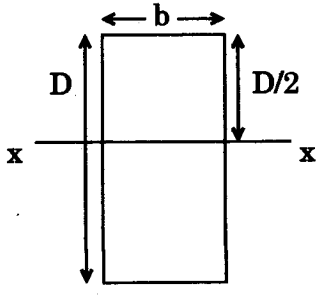

Figure 3

6. (a) What do you understand by equations of static equilibrium ? Explain briefly. 7

(b) Draw the deflected shape of the beam shown in Figure 4. 7

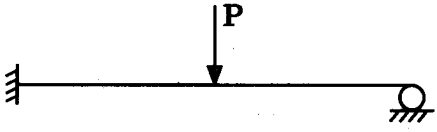

Figure 4

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

(a) Composite Sections

(b) Graphical Method of Analysis of a Truss

(c) Resultant of Coplanar Forces

(d) Effect of Flexural Stiffness of a Beam on its Deflection