

AR-1842

Faculty of Engineering & Technology
B. Arch. Semester—II (CGS) Examination
ARCHITECTURAL OF STRUCTURE—I

(10014)

Paper—02 AR 05

Time : Three Hours]

[Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

- (1) All questions carry marks as indicated.
- (2) Answer **THREE** questions from Section A and **THREE** questions from Section B.
- (3) Due credit will be given to neatness and adequate dimensions.
- (4) Assume suitable data wherever necessary.
- (5) Illustrate your answers wherever necessary with the help of neat sketches.
- (6) Use pen of Blue/Black ink/refill only for writing the answer book.

SECTION—A

1. (a) Define force and explain with neat sketches various types of force systems. 5
- (b) Determine the moment of all the forces in the system at point P. (FIG. 1)

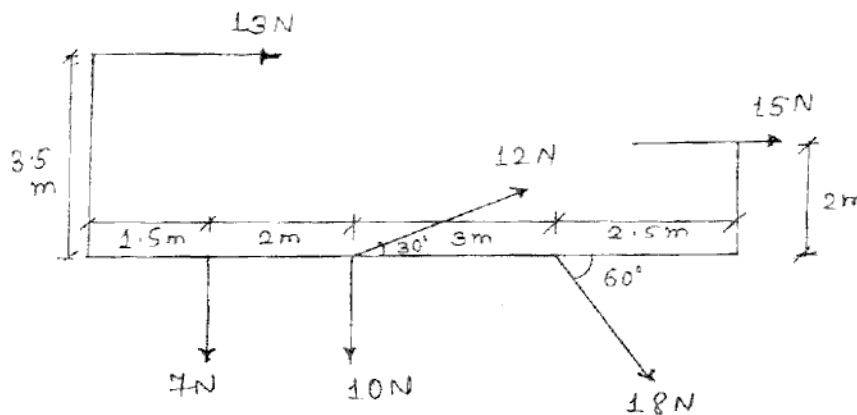


FIG. 1

OR

2. (a) Calculate the resultant force for the given system :

- (i) 15 kN force towards east
- (ii) 25 kN force towards south-east
- (iii) 45 kN force towards 25° west of north.
- (iv) 32 kN force towards 30° west of south
- (v) 20 kN force towards 20° east of north.

7

(b) Calculate support reactions at A & B. (FIG. 2)

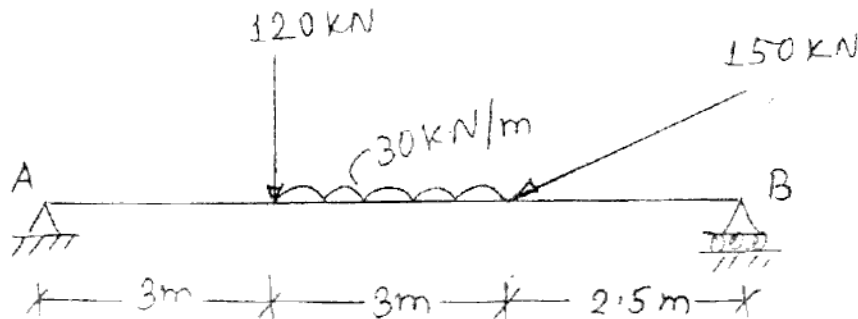


FIG. 2

7

3. Analyze the given cantilever truss of 4m span, carrying two point loads of 2 kN each as shown in the FIG. 3.

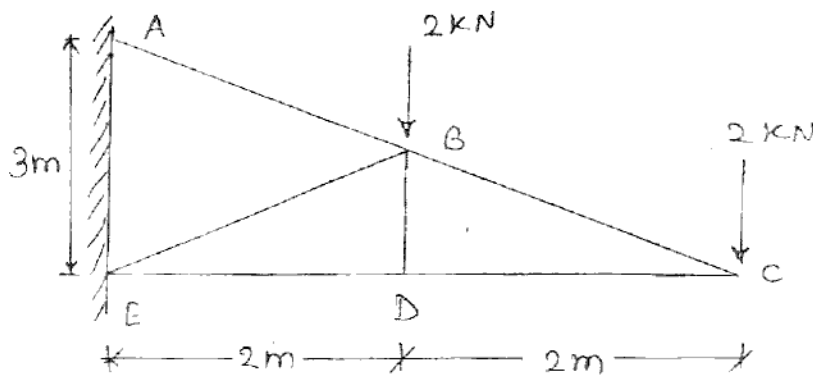


FIG. 3

13

OR

4. Determine the forces in the members of truss by graphical method (FIG.) 4.

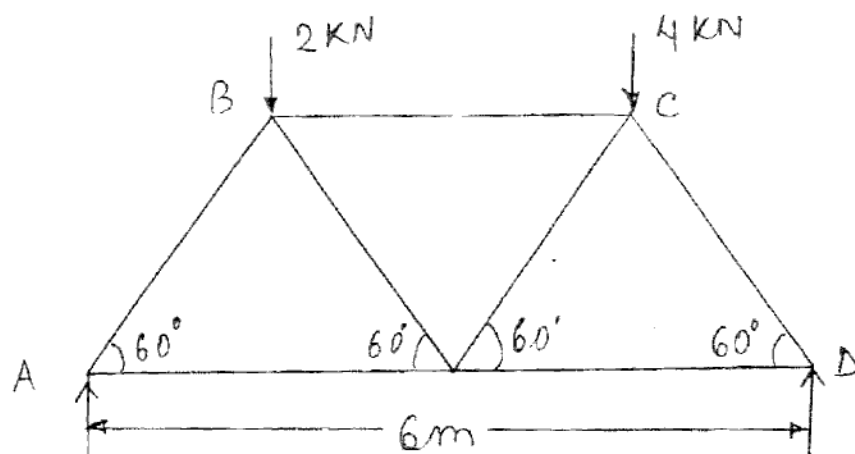


FIG. 4

5. (a) State :

- (i) Volumetric strain
- (ii) Hook's law
- (iii) Modulus of Rigidity
- (iv) Young's Modulus
- (v) Factor of safety.

5

- (b) A reinforced concrete column is 350×350mm in section. The column is provided with 8-20 mm ϕ . The column carries a load of 450 kN. Find the stresses in concrete and steel.

$$E_s = 2.1 \times 10^5 \text{ N/mm}^2$$

$$E_c = 0.14 \times 10^5 \text{ N/mm}^2$$

8

OR

6. (a) State the Hook's law and also discuss the stress strain curve relationship for mild steel. 5
- (b) A hollow cylinder 2m long has an outside diameter of 50 mm and inside diameter of 30 mm. If the cylinder is carrying a load of 25 kN, find the stress in the cylinder. Also find the deformation of the cylinder, if the value of modulus of elasticity for the cylinder, material is 100 GPa. 8

SECTION—B

7. Draw shear force diagram and bending moment diagram for the beam shown in FIG. 5.

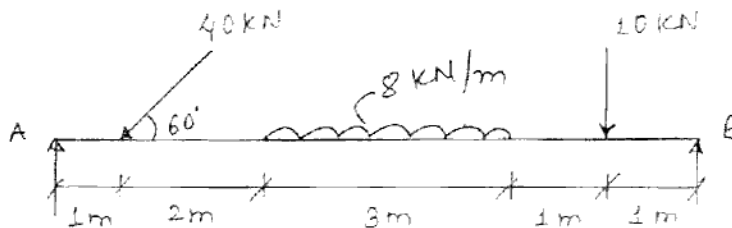


FIG. 5

13

OR

8. Draw SFD and BMD for the Beam shown in FIG. 6.

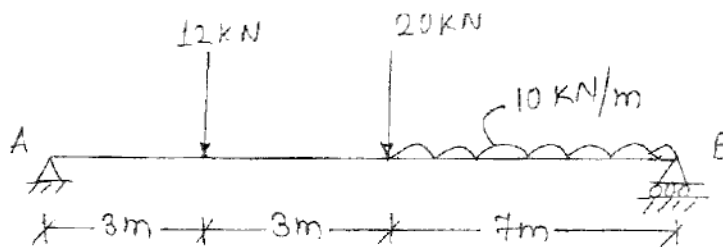


FIG. 6

13

9. Find the MI @ the centroidal XX and YY axes of the angle section shown in the FIG. 7.

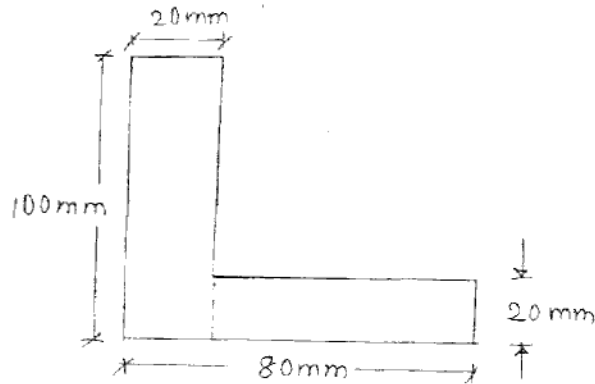


FIG. 7

14

OR

10. FIG. 8 shows the cross-section of a cast iron Beam. Determine the moment of inertia of the section @ horizontal and vertical axes passing through the centroid of the section.

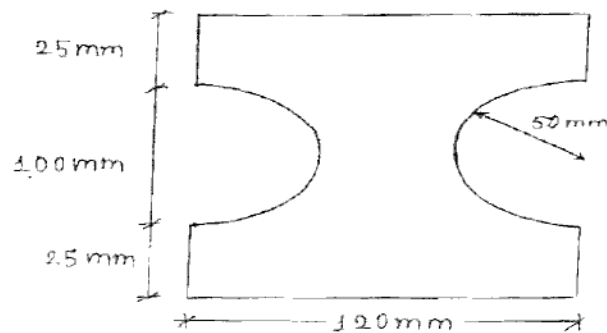


FIG. 8

14

11. (a) Write bending equation and meaning of each term.

4

- (b) Derive the equation for maximum deflection for FIG. 9 shown below.

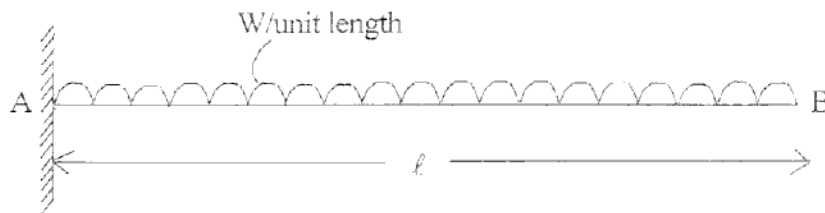


FIG. 9

9

OR

12. (a) Write assumptions made in the theory of Pure Bending. 4
- (b) Derive expression for maximum deflection for simply supported beam carrying UDL of 'W/m' on entire span of ' l 'm. 9