

# CBCS SCHEME

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21ENG36/21ARC36

Third Semester B.Arch. Degree Examination, Dec.2023/Jan.2024

## Building Structures – II

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Define stress and explain different types of stress. (10 Marks)  
b. An axial pull of 40000 N is acting on a bar consisting of 3-sections of length 30cm, 25cm and 20cm and of diameter 2cm, 4cm and 5cm respectively. If the Young's modulus is  $2 \times 10^5 \text{ N/mm}^2$ , determine  
i) Stress in each section ii) Total Extension of the bar (10 Marks)

OR

- 2 a. Define strain and explain different types of strain. (10 Marks)  
b. A rod of 200cm long and of diameter 3cm is subjected to an axial pull of 30 kN. If the Young's modulus is  $2 \times 10^5 \text{ N/mm}^2$ , determine i) Stress ii) Strain iii) Elongation. (10 Marks)

### Module-2

- 3 a. Define : i) Modulus of Rigidity ii) Bulk Modulus iii) Poisson's ratio. (06 Marks)  
b. Explain briefly temperature effects on structure. (04 Marks)  
c. A bar of 20mm diameter subjected to a pull of 50 kN. The measured extension on gauge length of 250mm is 0.12mm and change in diameter is 0.00375mm calculate  
i) Young's modulus ii) Poisson's ratio iii) Bulk modulus. (10 Marks)

OR

- 4 A bar of 30mm in diameter was subjected to tensile load of 54 kN and the measured extension on 300mm gauge length was 0.112 and change in diameter is 0.00366mm. Calculate Poisson's ratio and values of three moduli. (20 Marks)

### Module-3

- 5 a. Summarize the assumptions made by Euler on Long Column. (05 Marks)  
b. A solid circular bar of 5m long and 4cm in diameter was found to extend 4.5mm under a tensile load of 48 kN. The bar is used as a strut with both end hinged. Determine buckling load and safe load take factor of safety = 4. (15 Marks)

OR

- 6 a. Write Euler's Buckling load formula for different end conditions. (10 Marks)  
b. Calculate the safe compressive load on a hollow cast iron column with one end fixed and other end hinged of 10cm external diameter and 7cm internal diameter and 8 cm in length. Take FOS = 4 and  $E = 95 \text{ kN/mm}^2$ . (10 Marks)

### Module-4

- 7 a. Draw SFD and BMD for a simply supported beam carrying UDL throughout the length of the beam. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

b. Draw SFD and BMD for the Fig.Q7(b) given below.

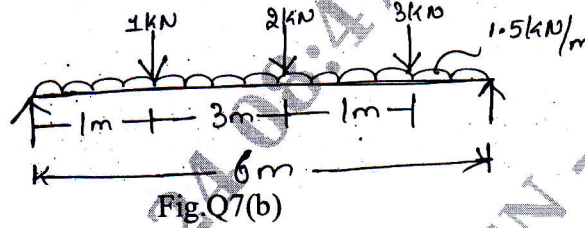


Fig.Q7(b)

(10 Marks)

OR

- 8 a. Draw SFD and BMD for a cantilever beam carrying point load at the free end.  
 b. Draw SFD and BMD for the Fig.Q8(b) given below.

(10 Marks)

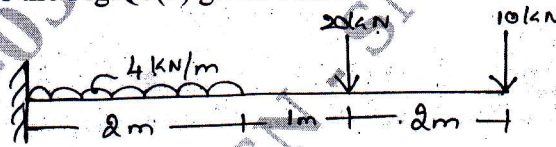


Fig.Q8(b)

(10 Marks)

**Module-5**

- 9 a. Write the Bending Equation and assumption made.  
 b. The unsymmetric I-section is shown in Fig.Q9(b) is subjected to shear force of 40 kN. Draw shear stress variation across the depth.

(10 Marks)

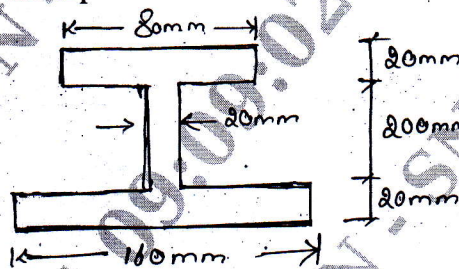


Fig.Q9(b)

(10 Marks)

OR

- 10 I-section given in the Fig.Q10 is simply supported over a span of 4m to carry a UDL of 80 kN/m over its entire span. Draw bending and shear stress across a section.

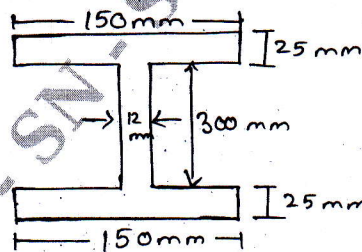


Fig.Q10

(20 Marks)

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