USN | | | | | | | | | | | **18ENG25**

Second Semester B.Arch. Degree Examination, June/July 2025
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   Define stress. Explain the different types of stress with neat sketches.   **(20 Marks)**

OR

2 a. A rod 150 cm long and 2 cm diameter is subjected to an axial pull of 20 kN. If $E = 2 \times 10^5 N/mm^2$. Determine stress, strain and elongation of the rod.   **(10 Marks)**

  b. A rod which tapers uniformly from 40 cm diameter to 20 cm diameter in a length of 400 mm is subjected to axial load of 5000 N. If $E = 2.1 \times 10^5$ MPa. Find the extension of the rod.
  (10 Marks)

Module-2

3 a. Define the following :
   i)   Modulus of rigidity
   ii) Bulk modulus
   iii) Poisson's ratio
   iv) Volumetric strain.   **(10 Marks)**

  b. A bar of 30 mm dia subjected to a pull of 60 kN. The measured extension on gauge length of 200 mm is 0.1 mm and change in dia is 0.004 mm. Calculate young's modulus, Poisson ratio and bulk modulus.   **(10 Marks)**

OR

4 a. Explain relation between E and K and E and G with equations.   **(10 Marks)**

  b. A bar of 20 mm dia is subjected to pull of 50 kN. The measured extension on gauge length of 250 mm is 0.12 mm and change in dia is 0.00375 mm. Calculate young's modulus, Poisson's ratio and bulk modulus.   **(10 Marks)**

Module-3

5 a. Draw SFD and BMD for a cantilever beam of length 'L' arrying point load "W".   **(10 Marks)**

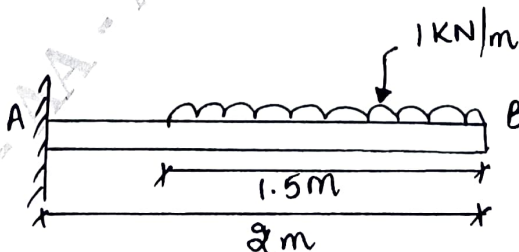 b. Draw SFD and BMD for the Fig.Q5(b) shown below :

Fig.Q5(b)   **(10 Marks)**

OR

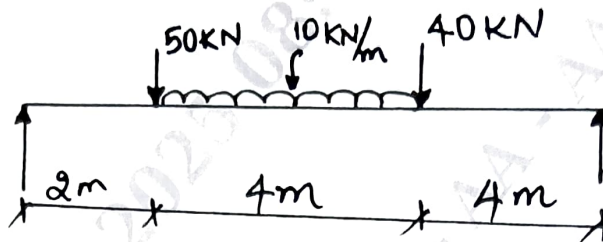6 a. Draw SFD and BMD for the beam shown in the Fig.Q6(a).

Fig.Q6(a) (10 Marks)

b. Draw SFD and BMD for a simply supported beam of length "L_m" carrying UDL 'W' KN/m throughout. (10 Marks)

Module-4

7 a. Define a column. Explain long and short column. (10 Marks)

b. A circular column 4 m long 60 mm dia is used as a strut. Determine the crippling load. Take $E = 2 \times 10^5$ MPa for :
  i) One end fixed other end free
  ii) Both ends fixed. (10 Marks)

OR

8 a. Give the expressions for effective length of column for various end conditions with neat sketches. (10 Marks)

b. A column of timber section 15 cm × 20 cm is 6 m long with both ends fixed. If the young's modulus is 17.5 KN/m².
  Determine :
  i) Crippling load
  ii) Safe load
  iii) Take FOS = 3. (10 Marks)

Module-5

9 Write moment curvature equation. Explain the terms in the equation along with assumptions made in deflection theory. (20 Marks)

OR

10 Determine maximum slope and deflection in cantilever beam of length 'L' m subjected to point load 'W' kN at the free end using Macaulay's method. (20 Marks)

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