Second Semester B.Arch. Degree Examination, Jan./Feb.2021
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 parallel axis theorem and calculate M.I. about the base for a rectangular section $b \times d$. **(05 Marks)**
    b.   What are the types of beam? Draw neat sketches. **(05 Marks)**
    c.   Locate centroid for the shown Fig. Q1 (c). **(10 Marks)**
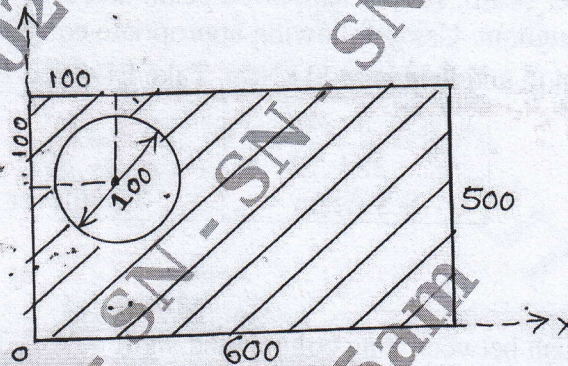

Fig. Q1 (c)

OR

2   a.   Define centroid and centre of gravity. Show the location of CG for right angle triangle. **(06 Marks)**
    b.   What are the types of supports and indicate reactions for each beam? **(04 Marks)**
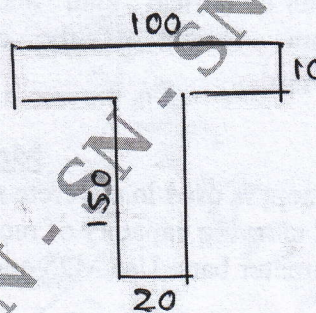   c.   Determine M.I. about base for the Fig. Q2 (c). **(10 Marks)**

Fig. Q2 (c)

Module-2

3   a.   Define BM, SF and point of contraflexure. **(06 Marks)**
    b.   Draw BMD and SFD for the Cantilever beam of span 4 m and subjected to a point load 20 kN at free end. **(04 Marks)**
    c.   Simply supported beam of span 6 m and subjected to point loads 20 kN and 40 kN at a distance 2 m and 4 m from left. Draw SFD and BMD. **(10 Marks)**

OR

4 a. What are the assumptions in simple bending theory? **(04 Marks)**

b. Give the expressions for bending stress and shear stress and explain each terms. **(06 Marks)**

c. Draw typical bending stress distribution and shear stress distribution for "T" and "I" sections. **(10 Marks)**

Module-3

5 a. Define section modulus and calculate section modulus for rectangular and circular sections with usual notations. **(06 Marks)**

b. Simply supported rectangular beam $200mm \times 450mm$, span 6 m subjected to an UDL of 10 kN/m. Calculate maximum bending stress and draw the diagram. **(14 Marks)**

OR

6 a. What is the importance of deflection calculation in the structures? **(04 Marks)**

b. Cantilever beam, simply supported beam and fixed beam of span 'ℓ' and subjected to UDL 'ω' throughout. Using following appropriate equation for each beam calculate the deflection if 'ℓ' = 4 m and load ω = 20 kN/m. Take EI = 6×10^{12} N-mm^2

$\delta = \dfrac{S}{384} \dfrac{\omega \ell^4}{EI}$	$\delta = \dfrac{\omega \ell^4}{8EI}$	$\delta = \dfrac{\omega \ell^4}{384EI}$
S.S.Beam	Cantilever	Fixed

(16 Marks)

Module-4

7 a. Distinguish between long column and short column. **(04 Marks)**

b. Define effective length of column and give the expression for different end conditions. **(06 Marks)**

c. Determine Euler's critical load for a circular column of diameter 200 mm and height 4 m. Column both ends are fixed. Take $E = 35 \times 10^3$ N/mm^2. **(10 Marks)**

OR

8 a. Define slenderness ratio and critical load. **(04 Marks)**

b. Determine Euler's critical load and safe load for a rectangular column of size $250mm \times 500mm$. Height of the column is 6 m and both ends hinged. Take $E = 36 \times 10^3$ N/mm^2. **(16 Marks)**

Module-5

9 a. Why reinforcement is used in concrete structures? **(04 Marks)**

b. Determine load carrying capacity of rectangular column of size $250mm \times 500mm$ consists of 8-18 mm diameter bars. Use M25 and Fe415. **(16 Marks)**

OR

10 a. Explain the meaning of M20 and Fe415. **(04 Marks)**

b. Determine the load carrying capacity of circular column of diameter 500 mm consists of 8-20mmϕ bars. Use M20 and Fe500. **(16 Marks)**

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