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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)

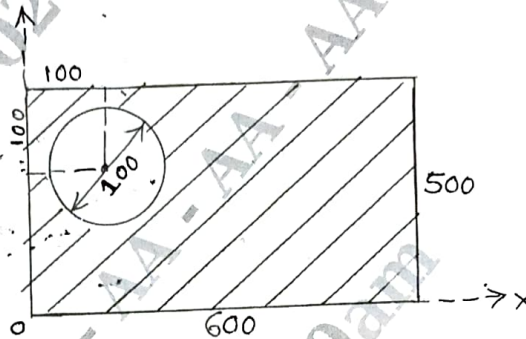


Fig. Q1 (c)

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)

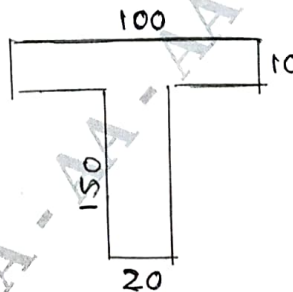


Fig. Q2 (c)

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)

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.

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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 × 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 × 10¹² N-mm²

$\delta = \frac{S}{384 EI} \omega \ell^4$ S.S.Beam	$\delta = \frac{\omega \ell^4}{8EI}$ Cantilever	$\delta = \frac{\omega \ell^4}{384EI}$ Fixed
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(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 × 10³ N/mm². (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 × 500mm. Height of the column is 6 m and both ends hinged. Take E = 36 × 10³ N/mm². (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 × 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)
