

USN

--	--	--	--	--	--	--	--	--	--

14ENG2.5

Second Semester B.Arch. Degree Examination, Dec.2017/Jan.2018
Building Structures – II

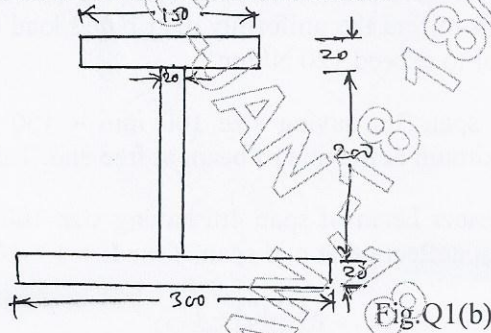
Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each module.

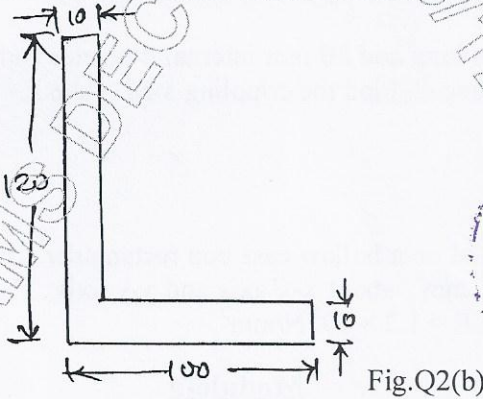
Module-1

- 1 a. Define the following:
 i) Centre of gravity
 ii) Centroid
 iii) Moment of inertia (06 Marks)
- b. Locate the centroid of the section shown below:



(14 Marks)

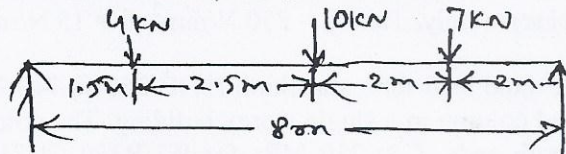
- 2 a. Explain the theorem of parallel axis. (06 Marks)
 b. Find the moment of inertia about centroidal axis of the section shown in Fig.Q2(b).



(14 Marks)

Module-2

- 3 a. Define shear force and bending moment. (04 Marks)
 b. Calculate and draw the SF and BM diagrams for the beam shown in Fig.3(b).



(16 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.

- 4 a. What are the types of beams? (05 Marks)
 b. Calculate the SF and BM for the cantilever beam shown in Fig.Q4(b) and draw shear force and bending moment diagram. (15 Marks)

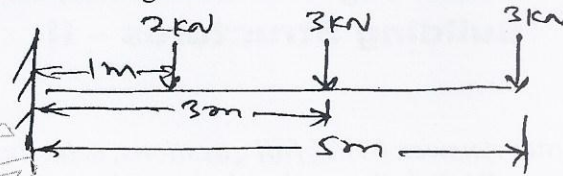


Fig.Q4(b)

Module-3

- 5 a. Define the following: (06 Marks)
 i) Bending stress
 ii) Neutral axis
 iii) Section modulus
 b. A steel beam of hollow square section of outer side 100 mm and inner side 80 mm is used on beam for a span of 4 m find the uniformly distributed load on the beam that can carry if the bending stress is not to exceed 120 N/mm^2 . (14 Marks)
- 6 a. A cantilever beam of span 3m having size 100 mm \times 150 mm deep carrying a udl of 10 kN/m. Find the maximum deflection of beam at free end. Take $E = 2 \times 10^5 \text{ N/mm}^2$. (10 Marks)
 b. A simply supported timber beam of span 4m having size 100 \times 200 deep carries a udl of 5 kN/m. Find maximum deflection at mid span. Take $E = 1 \times 10^4 \text{ N/mm}^2$. (10 Marks)

Module-4

- 7 a. Define the following: (06 Marks)
 i) Crushing load
 ii) Buckling load
 iii) Safe load
 b. A mild steel tube 4 m long and 30 mm internal diameter and 38 mm external dia is used as strut with both ends hinged. Find the crippling load. Take $E = 2.1 \times 10^5 \text{ N/mm}^2$. (14 Marks)
- 8 a. Define: (04 Marks)
 i) Short column
 ii) Long column
 b. Determine the safe load on a hollow cast iron rectangular column having M.I of $7188 \times 10^4 \text{ mm}^4$ and $4375 \times 10^4 \text{ mm}^4$, about x-x axis and y-y axis. The height of column is 7m with both ends fixed. Take $E = 1.2 \times 10^5 \text{ N/mm}^2$. (16 Marks)

Module-5

- 9 a. A column of size 300 mm \times 300 mm in section is provided with 8 bars of 20 mm ϕ . Find the load taken by concrete and load taken by steel. Take $f_s = 415 \text{ N/mm}^2$ $f_c = 20 \text{ N/mm}^2$. (10 Marks)
 b. A RCC column 300 mm dia is reinforced with 6 bars of 20 mm dia. Find the load taken by concrete and steel separately. Take $f_s = 250 \text{ N/mm}^2$, $f_c = 15 \text{ N/mm}^2$. (10 Marks)
- 10 Calculate the safe axial load for a stanchion ISHB 350 @ 710.2 N/m, 3.5 m high. It is to be used as an uncased column in a single storey building. The column is restrained in direction and position at both ends. $f_y = 250 \text{ MPa}$ for ISHB350 @ 710.2 N/mm $r_{xx} = 146.5 \text{ mm}$, $r_{yy} = 52.2 \text{ mm}$. (20 Marks)