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15ENG2.5

Second Semester B.Arch. Degree (CBCS) Examination, Dec.2016/Jan.2017
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 centroid and centre of gravity. **(06 Marks)**

b. Locate centroid of the following I section shown in Fig.Q1(b). **(14 Marks)**

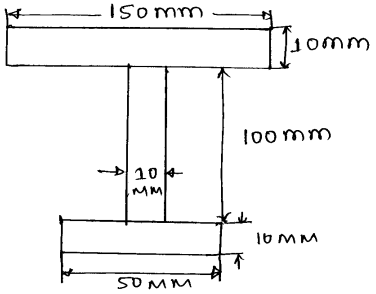

Fig.Q1(b)

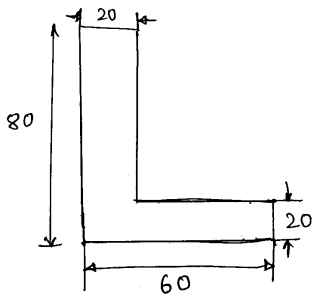

Fig.Q2(b)

2 a. State parallel axis theorem of moment of inertia. **(04 Marks)**

b. Find the moment of inertia about centroidal axis Fig.Q2(b). **(16 Marks)**

Module-2

3 a. Define i) Bending moment ii) Shear force and explain sign conventions. **(06 Marks)**

b. Draw shear force diagram (SFD) and bending moment diagram (BMD) for given beam in Fig.Q3(b). **(14 Marks)**

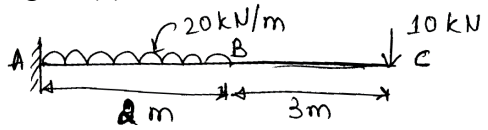

Fig.Q3(b)

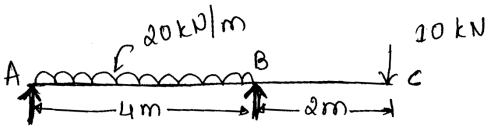

Fig.Q4

4 Draw shear force diagram and bending moment diagram for given beam Fig.Q4. **(20 Marks)**

Module-3

5 a. Define section modulus. Write expression for section modulus for (i) rectangular section (ii) circular section. **(06 Marks)**

b. Compute bending stress for a simply supported hollow pipe with outer diameter of 60 mm and inner diameter of 20 mm. The pipe carries a uniformly distributed load (UDL) of 1 kN/m on over all sum span of 4 m. **(14 Marks)**

6 a. A cantilever beam of length 5 m. carries a uniformly distributed load (UDL) of 2 kN/m on entire span. Find out deflection at free end. The cross section of beam is rectangular with size (200mm × 400mm) with $E = 1\times10^4$ N/mm^2. **(12 Marks)**

b. A fixed beam of span 4 m carries a concentrated load of 4 kN at midspan. Find maximum deflection if $E = 2\times10^5$ N/mm^2, $I = 2\times10^8$ mm^4. **(08 Marks)**

Module-4

7 a. Define : (i) Crushing load (ii) Crippling load. **(04 Marks)**

b. A solid round bar of 3 m long and 50 mm in diameter is used as strut and $E = 2\times10^5$ N/mm^2. Determine crippling load/crushing load when (i) Both the ends are hinged (ii) One end is fixed and other end is free. **(16 Marks)**

8 a. Define (i) Effective length (ii) Slenderness ratio. **(04 Marks)**

b. Determine crippling load for an I-section with 400×200×10mm size having length of 6 m used as strut with both ends fixed. $E = 2.1\times10^5$ N/mm^2 and Factor of safety (FS) = 3. **(16 Marks)**

Module-5

9 a. Define short column and long column according to IS 456:2000. **(04 Marks)**

b. Calculate ultimate load carried by a RCC column of size 500mm × 500mm and reinforced with 8 bars of 16 mm diameter. Grade of steel and concrete used are Fe415 and M20 respectively. **(16 Marks)**

10 Calculate ultimate load carried by the circular column of diameter 300 mm and reinforced with 6 bars of 16 mm diameter. Grade of concrete and steel used are

(i) M20 and Fe415

(ii) M15 and Fe500. **(20 Marks)**

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