CBCS SCHEME

USN

15ENG2.5

Second Semester B.Arch. Degree Examination, June/July 2019
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. Find center of gravity of plane figure by method of moments. **(08 Marks)**

b. Locate the centroid for the composite section shown in Fig.Q1(b) about the given axis a – a and b – b. **(12 Marks)**

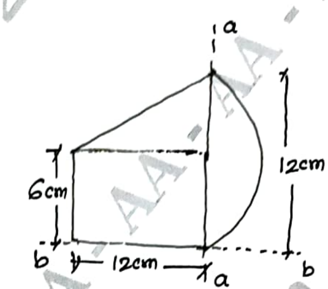

Fig.Q1(b)

OR

2 a. State and prove parallel axis theorem. **(08 Marks)**

b. Determine moment of inertia of the section about the horizontal and vertical axis passing through the centre of gravity of the section shown Fig.Q2(b). **(12 Marks)**

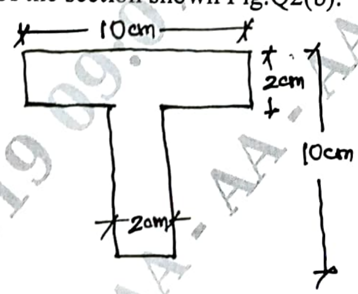

Fig.Q2(b)

Module-2

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

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

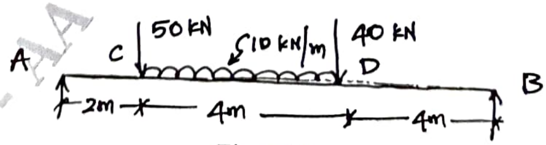

Fig.Q3(b)

OR

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

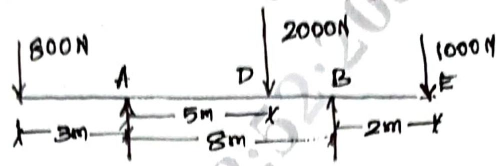

Fig.Q4

Module-3

5 a. Define (i) Section modulus (ii) Moment of Inertia (iii) radius of Gyration. **(06 Marks)**

b. A cantilever is 3m long with 150 × 230mm rectangular cross section carries a concentrated load of 40 kN.

(i) What maximum bending stress developed at the base of the cantilever? **(07 Marks)**

(ii) For the same span and loading condition what stress would develop in a beam with a circular cross section having a diameter 400 mm. **(07 Marks)**

OR

6 a. A timber beam spans 4 m carries a udl load of 4 kN/m run. 100 × 200mm timber section is used if the modulus of elasticity in the timber is $E = 0.125 \times 10^5$ N/mm^2. Find the maximum deflection in the timber beam. **(10 Marks)**

b. Determine the deflection for a cantilever beam at free end with concentrated load W at free end W = 30 kN, L = 3m, $E = 2\times10^5$ N/mm^2, $I = 2\times10^8$ mm^2. **(10 Marks)**

Module-4

7 a. For different end conditions obtain Euler's expression for buckling load of columns. **(08 Marks)**

b. Determine the section of a cast iron hollow cylindrical column 3m long with both ends firmly built in. It carries an axial load of 800 kN. The ratio of internal to external diameter is 5/8, use factor of safety as 4. **(12 Marks)**

OR

8 a. Define (i) Effective length of column (ii) Crippling load (iii) Slenderness ratio. **(06 Marks)**

b. Calculate the critical load of a strut which is made of a bar circular in section and 5 m long which is pin-jointed at both ends. The same bar when used a simply supported beam gives a mid span deflection of 10 mm with a load of 10 N at the centre. **(14 Marks)**

Module-5

9 a. Define short column and long column as per IS456-2000. **(04 Marks)**

b. Design a square column to carry a working load of 980 kN. The grade of concrete and steel are M_{20} and Fe415 respectively. **(16 Marks)**

OR

10 a. Determine the load carrying capacity of a column 400×400 mm reinforced with 6 rods of 20 mmϕ. The grade of concrete and steel are M_{20} are Fe415 respectively. **(10 Marks)**

b. Determine the steel required to carry a load of 1200 kN on Rectangular column 400×400. The grade of concrete and steel are M_{20} are Fe415 respectively. **(10 Marks)**

* * * * *