

CBCS Scheme

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15ENG2.5

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

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. From the 1st principles locate the centroid of right angled triangle. (10 Marks)
- b. For the composite section shown in Fig. 1(b) locate the centroid. (10 Marks)

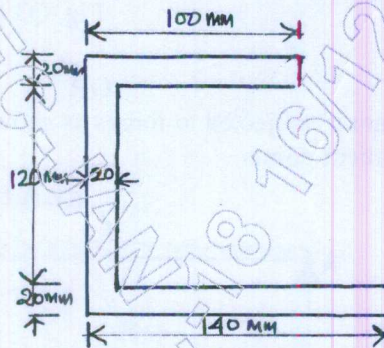


Fig. Q1(b)

OR

- 2 a. From the 1st principle determine the moment of inertia of a Rectangle about its base and about its centroidal Axis. (10 Marks)
- b. For the Z section shown in Fig. 2(b). Determine the moment of inertia about its centroidal axis. (10 Marks)

(only horizontal)
Centroidal Axis

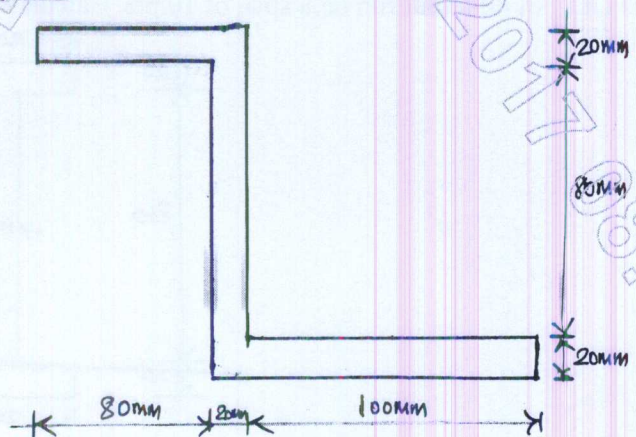


Fig Q2(b)

Module-2

- 3 a. For a cantilever beam of span L mts subjected to a point load W KN at free end draw bending moment diagram and shear force diagram. (08 Marks)
- b. A simply supported beam is subjected to forces as shown in Fig. Q3 (b). Draw BMD and SFD for the same (12 Marks)

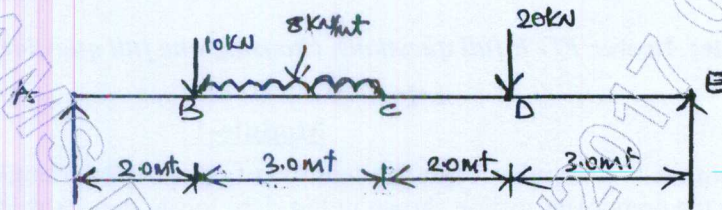


Fig. Q3 (b)

OR

- 4 An overhang beam is subjected to forces as shown in the Fig. Q4. Draw the BMD and SFD and indicate all salient points. (20 Marks)

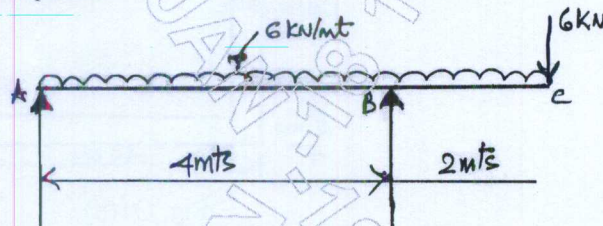


Fig. Q4

Module-3

- 5 a. What are the Assumptions made in Bending theory? (05 Marks)
- b. What is section modulus? Calculate the section modulus for Rectangular section, circular section. (06 Marks)
- c. A rolled steel Joist of I section has the dimensions as shown in Fig. Q5(c). The beam carries a UDC of 40kN/m run on a span of 10m . Calculate maximum bending stress. (09 Marks)

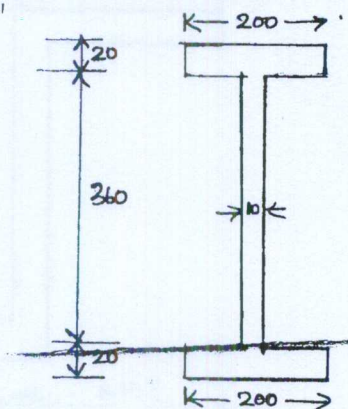


Fig. Q5(c)

OR

- 6 a. Prove that Max shear stress in a Rectangular section is 1.5 Average shear stress. (10 Marks)
 b. A cantilever beam of span 5mts carries a UDL of 6 kN/mt over the entire span. Calculate maximum slope and maximum deflection. Given $E = 2 \times 10^5 \text{ N/mm}^2$ $I = 2 \times 10^8 \text{ mm}^4$. (10 Marks)

Module-4

- 7 a. For different end conditions obtain Euler's expression for Bucking load of columns. (08 Marks)
 b. Calculate the safe compressive load on a Hollow cast iron column (one end fixed and other hinged) of 15cms external diameter and 10cms internal dia and 10mts in length use Euler's formula with factor of safety = 5. $E = 0.95 \times 10^5 \text{ N/mm}^2$. (12 Marks)

OR

- 8 a. Define :
 i) Effective length of column
 ii) Crippling load
 iii) Slenderness ration (06 Marks)
 b. Determine the crippling load for a T section of dimensions 10cm \times 10cm \times 2cm and length 5mts. when it is used as strut with both of its ends hinged. Take $E = 2.0 \times 10^5 \text{ N/mm}^2$. (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 980kN. The grade of concrete and steel are M_{20} and Fe 415 respectively. (16 Marks)

OR

- 10 a. Determine the load carrying capacity of a column of size 300mm \times 400mm reinforced with 6 rods of 20mm. the grade of concrete and steel are M_{20} and Fe415 respectively. (08 Marks)
 b. Determine the steel required to carry a load and 980kN on rectangular columns of size 300mm \times 400mm. the grade of steel and concrete are Fe 415 and M_{20} respectively and Fe 415 and M15 respectively. (12 Marks)

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