CBCS Scheme

USN ☐☐☐☐☐☐☐☐☐☐   **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 Ist principles locate the centriod of right angled triangle.   **(10 Marks)**
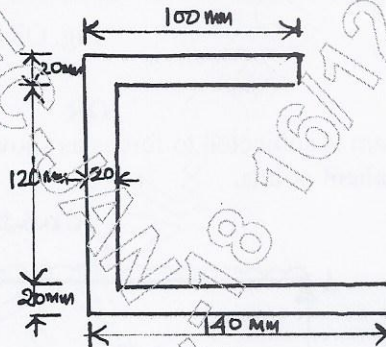   b. For the composite section shown in Fig. 1(b) locate the centroid.   **(10 Marks)**

Fig. Q1(b)

OR

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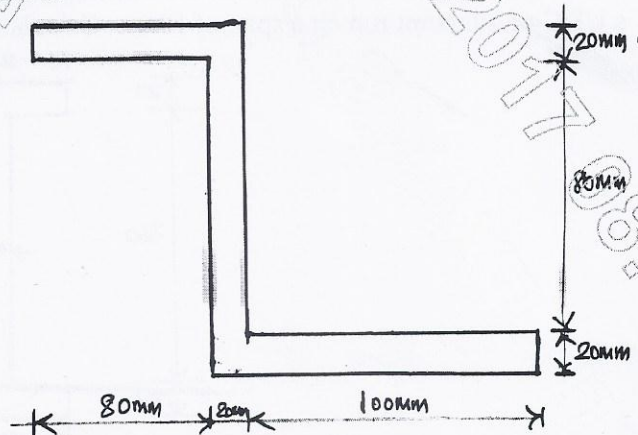
(only horizontal) Centriodal Axis

Fig Q2(b)

Module-2

3 a. For a cantilever beam of span L mts subjected to a print 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)**
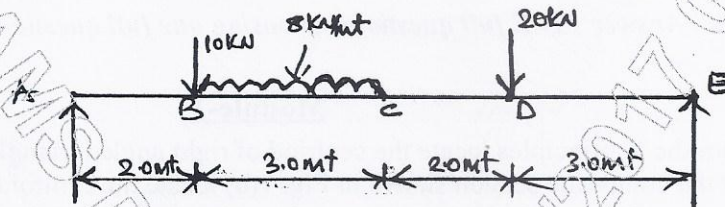

Fig. Q3 (b)

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)**
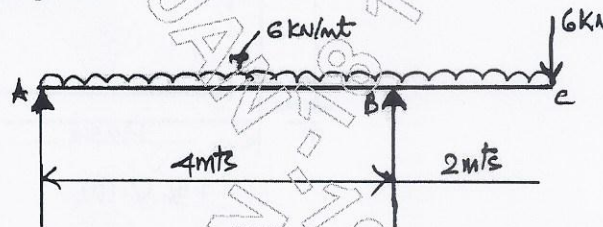

Fig. Q4

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 rotted steel Joist of I section has the dimensions as shown in Fig. Q5(c). The beam carries a UDC of 40kN/mt run on a span of 10mts. Calculate maximum bending stress. **(09 Marks)**
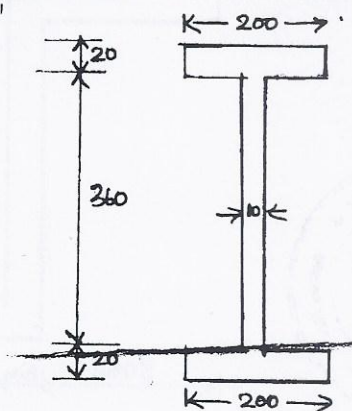

Fig. Q5(c)

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 scope and maximum deflection. Given $E = 2 \times 10^5$ N/mm^2 $I = 2\times10^8$ 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. $E = 0.95 \times 10^5$ 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 $E = 2.0 \times 10^5$ 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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