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14ENG2.5

Second Semester B.Arch. Degree Examination, June/July 2019
Building Structures - II

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least ONE questions from each module.***

Module – 1

1 a. From the 1st principles, locate centriod of Quadrant of a circle. **(10 Marks)**

b. Locate the centriod of composite section shown in Fig Q1(b) about '0'.

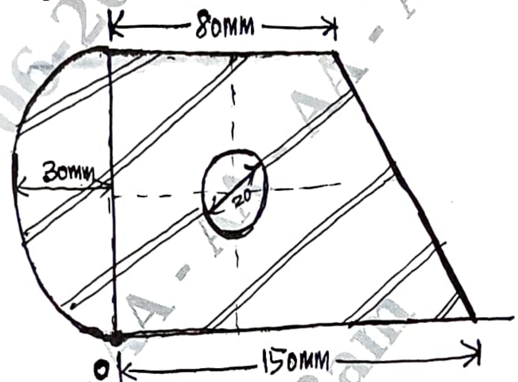

Fig Q1(b) **(10 Marks)**

OR

2 a. Determine the moment of inertia of right angled triangle about its base and about its centriodal axis. **(10 Marks)**

b. Determine the moment of invertia of composite section shown in Fig Q2(b) about its horizontal centriodal axis. **(10 Marks)**

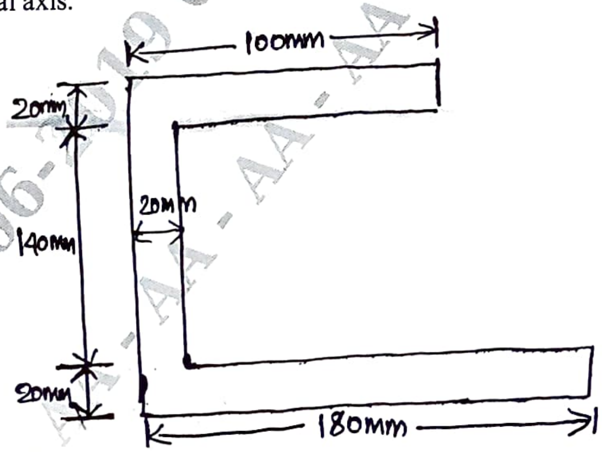

Fig Q2(b)

Module – 2

3 a. Draw the BMD and SFD for beam shown in Fig Q3(a).

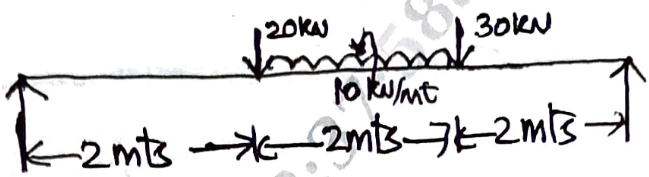

Fig Q3(a) **(12 Marks)**

b. Draw the BMD and SFD to a cantilever show in Q3(b).

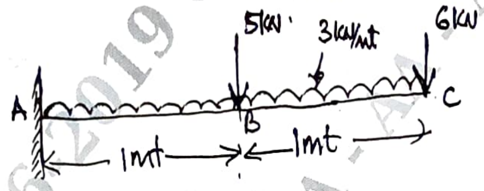

Fig Q3(b) **(08 Marks)**

OR

4 a. Draw BMD and SFD for beam shown in Fig Q4(a)

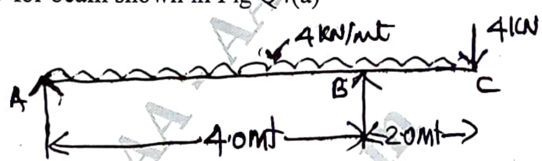

Fig Q4 (a) **(10 Marks)**

b. Draw the BMD and SFD for beam shown in Fig Q4(b).

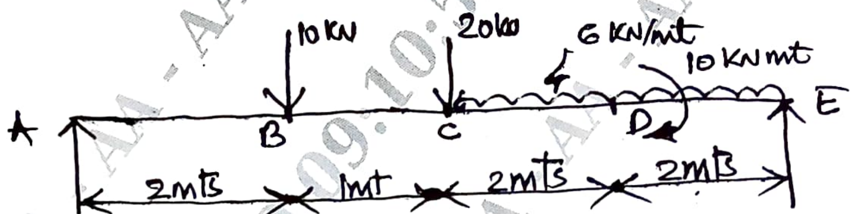

Fig Q4(b) **(10 Marks)**

Module – 3

5 a. What is section modulus?
Obtain expression to section modulus for following cross sections.
i) Rectangular section ii) Hollow rectangular section
iii) Triangular section iv) Hollow circular section. **(10 Marks)**

b. A circular Rope of external diameter 70mm and thickness 8mm is used, as simply supported beam over an effective span 2.5mts. Find the maximum concentrated load, that can be applied at the centre of the span. If the permissible stress in the tube is 150N/mm^2. **(10 Marks)**

OR

6 a. Prove form 1st principle, for a Rectangular cross section maximum shear stresses is 1.5 Average shear stress. **(10 Marks)**

b. A simply supported beam of span 6mts is subjected to 10kN/mt UDL over the retire span. Determine the slope at the supports and maximum deflection if EI = 14.0×10^{12}Nmm^2 **(10 Marks)**

Module – 4

7 a. Explain briefly the following :
i) Buckling load ii) Slenderness ratio iii) Effective length column. (06 Marks)
b. What are the assumptions made in Euler's theory? (04 Marks)
c. Derive an expression for Buckling load of long columns when two ends are hinged. (10 Marks)

OR

8 a. Explain the limitations of Euler's theory. (08 Marks)
b. A Hallow cast iron column, whose outside diameter is 200mm and has a thickness of 20mm, is 4.50 mts long, and is fixed at both ends. Calculate the safe load by Rankines formula use factor of safety = 2.5. Find the ratio of Euler's to Rankines load.
Take the value of $E = 1 \times 10^5$ N/mm^2, Rankine's constant = $a = \frac{1}{1600}$ and $f_c = 550$N/mm^2. (12 Marks)

Module – 5

9 a. Define the difference between short and long column as per IS 456 2000. (04 Marks)
b. A square column carries a working load of 100kN. Design the column if the properties of material are M20 grade concrete and Fe415 grade steel respectively. (16 Marks)

OR

10 a. A column has C/S of 230mm × 450mm and is reinforced with 6 bars of 20mm. Determine the load carrying capacity of column the properties of materials are M20 and Fe415. (08 Marks)
b. Determine the steel required to carry a load of 1000kN on rectangular column of size 300mm × 450mm. if properties to material
i) M20 grade concret and Fe415 steel
ii) M15 grade concrete and Fe415 steel (12 Marks)

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