TED (15/19) - 4014
(REVISION-2015/19)

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Reg.No……
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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER - 2023

THEORY OF STRUCTURES II

(Maximum Marks:100) (Time: 3 Hours)

PART - A
(Maximum Mark : 10)

Marks

I. Answer all the questions in one or two sentences. Each question carries 2 marks.

1. Define slenderness ratio.
2. Define strut.
3. Define fixed beam.
4. Define slope of a beam.
5. Define carry over factor.

(5 x 2 = 10)

PART - B
(Maximum Mark: 30)

II Answer ***any five*** questions from the following. Each question carries 6 marks.

1. Describe the equivalent length for different end conditions of a column.
2. A rectangular column 20cm wide and 15cm deep is carrying a vertical load of 1000kN and eccentricity of 5cm in plane bisecting the depth. Determine the maximum and minimum intensities of stress in the section.
3. Define **(a)** core of a section **(b)** eccentricity.
4. Describe about strength and stiffness of a beam.
5. Determine the slope of a cantilever of length 1 with point load W at the free end using Moment Area method.
6. A fixed beam AB 4m long is carrying a central point load of 30kN. Determine the fixing moments, deflection under the load and draw BM diagram.
7. Define **(a)** Distribution factor **(b)** Fixed End Moments.

(5 x 6 = 30)

P.T.O

PART – C

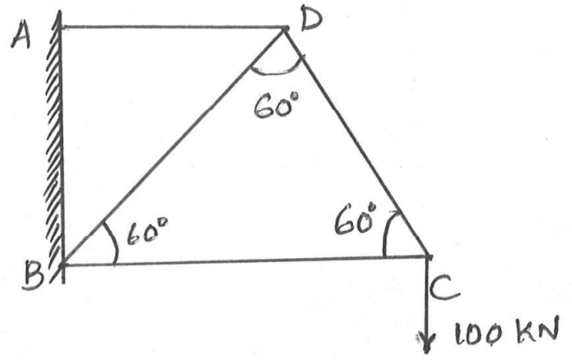
(Maximum Mark: 60)

(Answer ***one full*** question from each unit. Each full question carries 15 marks.)

UNIT - I

III (a) A column 12m long has a section 1m square. The column is made of a metal having Modulus of elasticity as 2×10^4 kN/cm^2 . Use Eulers formula to determine the buckling load if **(a)** both ends of column are pinned **(b)** one end is fixed and other end of column is free. (8)

(b) Determine analytically the magnitude and nature of forces in the members of the truss as shown in figure. . (7)



OR

IV (a) Explain the assumptions and method of finding the forces in the members of a perfect frame using the method of joints. (6)

(b) A hollow steel tube 20cm external diameter and 1 cm thick is 4m long. It is used as a sanction. If E for the tube material may be 2×10^4 kN/cm^2. Determine the buckling load on the sanction if both ends fixed and one end is fixed and other end is hinged. (9)

UNIT –II

V (a) Explain briefly the conditions for stability of dam. (7)

(b) Compute the Shear Force and Bending Moments for fixed beam subjected to concentrated load W at the centre. (8)

OR

VI (a) A concrete dam of trapezoidal section having vertical water face is 25m high. The width of the dam is 12m at the base and 5m at the top. Determine the

(i) the resultant pressure on the base per metre length of the dam.

(ii) The point where the resultant pressure cuts the base. The height of the free surface of water above the base is 20m and specific weight of water as $10kN/m^3$. (8)

(b) Describe with neat sketch mark the core area for solid rectangular and circular sections. (7)

UNIT – III

VII (a) Find the deflection at the centre of a simply supported beam carrying a point load W at centre. (9)

(b) A cantilever 5m long carries a point load of 50kN at free end, $I = 15000cm^4$. $E = 2 \times 10^4 kN/cm^4$. Determine the deflection at the load at the point. (6)

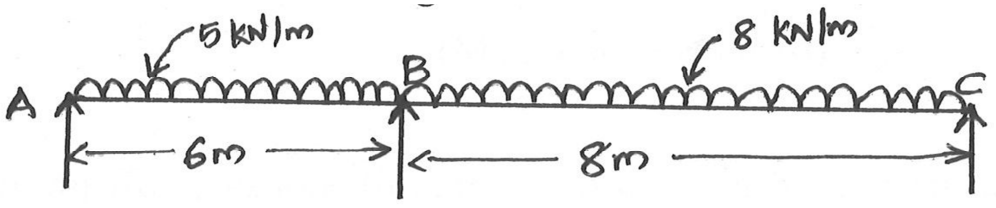
OR

VIII (a) Find the deflection at the free end for a cantilever carrying uniformly distributed load. (8)

(b) A simply supported beam of span 6m is subjected to a uniformly distributed load over the entire span. If the deflection at the centre of the beam is not to exceed 4mm. Find the value of the load. Take $E = 2 \times 10^5 N/mm^2$ and $I = 300 \times 10^4 mm^4$. (7)

UNIT – IV

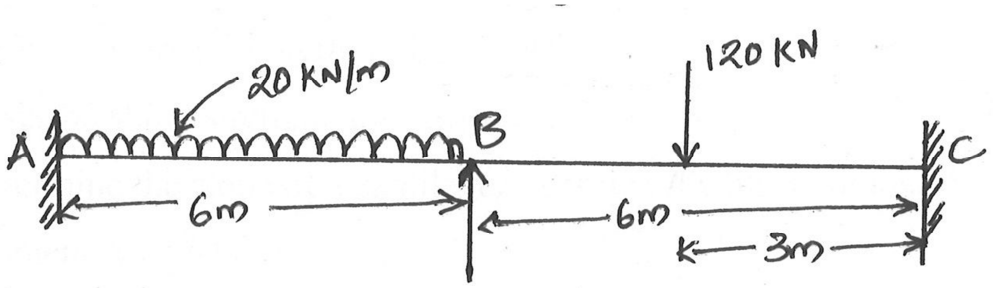
IX A continuous beam ABC is loaded as shown in figure. Find the support moments and draw BM and SF diagrams.



(15)

OR

X. Determine the end moments using moment distribution method and draw SF and BM diagrams for the beam as shown in figure.



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