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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE, APRIL-2020

THEORY OF STRUCTURE-II

[Maximum marks: 75] (Time: 2.15 Hours)

PART – A

(Answer any ***three*** questions in one or two sentences. Each question carries 2 marks)

I. (1). When a column is said to be long column.

(2). State the relation between slenderness ratio and least radius of gyration.

(3). Specify the dimensions of the core of circular base of diameter 'd'.

(4). Define stiffness of a structural beam.

(5). Specify the condition and effect of carry over moment. (3 x 2 = 6)

PART – B

(Answer any ***four*** of the following questions. Each question carries 6 marks)

II. (1). State the different end conditions and corresponding Eulers Crippling load for a long column.

(2). For a rectangular column of width b and depth d, prove the conditions of middle third rule of the base with respect to both axes.

(3). Write the causes by which a dam is liable to fail and the minimum requirement to resist them.

(4). A cantilever of length 2m carries a uniformly distributed load of 2500N/meter length, throughout of the span. If the section is rectangular 120mm wide and 200mm deep find the deflection at free end, $E=10000N/mm^2$

(5). Write three advantages and disadvantages for a fixed beam.

(6). State the clapeyrons Theorem and specify how it is used for a continuous beam with fixed end supports.

(7). State the following:

(i). Carry over factor. (2). Stiffness factor. (3). Distribution factor. (4 x 6= 24)

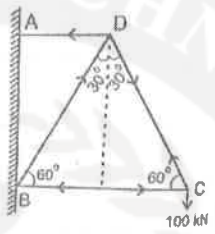
PART – C

(Answer ***any of the three units*** from the following. Each question carries 15 marks)

UNIT –I

III. (a). A solid round bar 3m long and 50mm in dia is used as a strut. Determine crippling load for all the different end conditions taking E = 2.0 x 10^5 N/mm^2 (7)

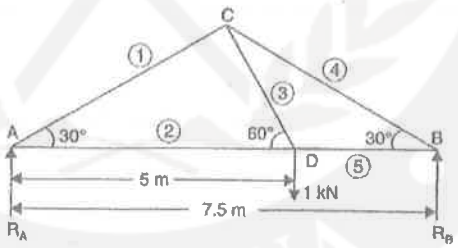
(b). Determine analytically the magnitude and nature of force in the members of truss in the figure.



(8)

OR

IV. A truss of span 7.5 m carries a point load of 1 KN at joint D as shown in fig. find the reaction and forces in the members of the truss.



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UNIT-II

V. (a). A solid circular rod carries a load of 8kN acting at 15mm away from the center of gravity. Determine the diameter of rod if the max. stress developed is not to be exceed 40N/mm^2 (7)

(b). A dam section is 8m height, the maximum depth of water impounded being 7.5m, the top width of section is 1m, the weight of masonry is 22000N/m^3. While the weight of water is 9810 N/cum. Find the minimum base width required. Coefficient of friction between soil and masonry is 0.6, the water face of the dam is vertical. (8)

OR

VI. (a). In a tension specimen 2.6 cm in diameter, the line of pull is parallel to the axis of the specimen but is displaced from it. Determine the distance of the line of pull from the axis when the maximum stress is 20% greater than the means stress on a section normal to the axis. (7)

(b). A masonry trapezoidal dam 4 m high, 1 m wide at its top and 3m width at its bottom retains water on its vertical face. Determine the maximum and minimum stresses at the base (i) when the reservoir is full. Take the weight density of masonry as 19.62kN/m^3 (8)

UNIT-III

VII. (a). A cantilever 2m long is loaded with a concentrated load of 1.0kN at the free end and uniformly distributed load of 2kN/m over a length of 1.2m from the fixed end. If E=11kN/mm^2 and I = 66 x 10^6 mm^4, calculate the deflection at the free end. (8)

(b). A beam 8 meters long fixed at both ends carries a uniformly distributed load over the whole span. Find the load intensity on the beam,

(i). If the maximum bending moment shall not exceed 40kNm

(ii) if the maximum deflection shall not exceed 1/400 of the span.

Take E1 = 9.5 x 10^9 $kNmm^2$ (7)

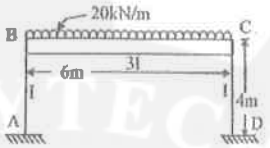
OR

VIII.(a). A simply supported beam of span 6m is carrying two point load. Each of 20kN at 2m and 4m from the left end. Determine the slope at the end and deflection at mid span of the beam. E1 of the beam is 20000kNm^2. Use moment area method. (8)

(b). A fixed beam AB, 4 meters long, is carrying a central point load of 30kN. Determine the fixing moments, deflection under the load and draw the BM diagram. Flexural rigidity of the beam as 5 x 10^4 kN-m^2 (7)

UNIT-IV

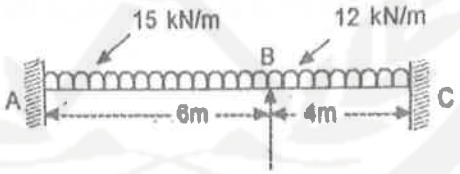
IX. A portal frame ABCD shown in fig, is loaded with a uniformly distributed load of 20kN/m on the horizontal member. $I_{AB} = I_{CD}$ and $I_{BC} = 3I_{AB}$. Determine the end moments and draw the BM diagram.



(15)

OR

X. Find the support moments by the method of moment distribution for the beam shown in Fig. and sketch the B.M diagram. E1 is constant for the beam.



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