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C14-C-**402**

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BOARD DIPLOMA EXAMINATION, (C-14)
OCTOBER/NOVEMBER-2018
DCE – FOURTH SEMESTER EXAMINATION

THEORY OF STRUCTURES

Time : 3 Hours] [Total Marks: 80

PART-A

3X10=30

Instructions :
1. Answer **All** questions.
2. Each question carries **three** marks.
3. Answer should be brief and straight to the point and shall not exceed five simple sentences.

1. State any 3 assumptions of Euler's theory for columns.
2. Show different forces acting over a masonry dam with a neat sketch
3. A concrete dam trapezoidal in shape has top width 2m and bottom width 6m. Its water face is vertical. Calculate the distance of centroid from heel of the dam.
4. Define (a) Angle of repose (b) Surcharge.
5. Find the necessary depth for the foundation of a square column supporting an axial load of 4000 KN. Safe bearing capacity of soil is 200 KN/m^2. Angle of repose of soil is 30^o and weight of the soil is 20 KN/m^3. Use Rankine's formula.
6. Define degree of static indeterminacy.
7. Write 3 advantages of continuous beams over simply supported beams.
8. Determine the distribution factors for a continuous beam ABC fixed at both ends A and B and simply supported at center C. Span AC=CB=L
9. Define
   a) Determine frame
   b) Indeterminate frame
   c) Redundant frame
10. State the different methods to analyse a determinate frame

PART-B

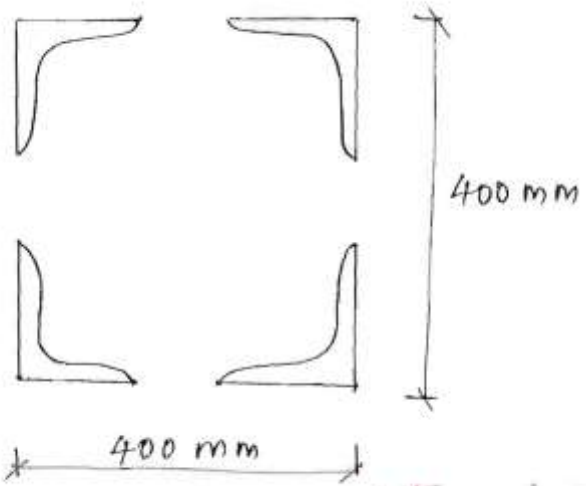
10X5=50

Instructions :

1. Answer any **Five** questions.
2. Each question carries **ten** marks.
3. Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

11. A symmetrical I-section of overall length 6m is used as a column with both ends hinged. Depth of I section = 320mm, width of flanges = 150mm, thickness of flange = 10mm, thickness of web = 8mm. Calculate Euler's crippling load, E= 2 x 105 mm2

12. A built up column is made up of 4 equal angles ISA 60 x 60 x 6mm forming a square of side 400mm. If the length of column is 10m, calculate safe axial load using Rankine's formula. Assume both ends of the column to be fixed. Take factor of safety as 4. For each angle A=929 mm2, Ixx = Iyy = 56 x 10^4 mm4, Cxx = Cyy = 21.6mm. Rankine's constant, Fc=0.33 kN/mm^2, a = 1/1600



13. A concrete dam 3m wide at top and 8m at bottom is 12m high. The face of dam exposed to water is vertical and contains water upto the top level. Check the stability of the dam, if co-efficient of friction between dam and soil is 0.6. The specific weight of concrete is 24 KN/m^3 and specific weight of water is 10KN/m^3. Show the stress distribution at the base.

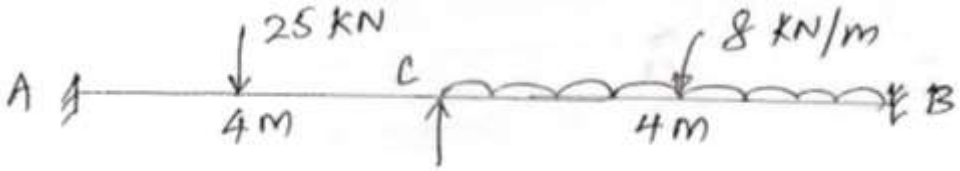
14. A masonry wall 12m high has a vertical back and retains earth, level with the top of the wall. The top width of wall is 3.5m. Determine the minimum base width required for the wall so that the stresses at the base are wholly compressive. Specific weight of masonry is 22 KN/m^2 and that of earth is 18 KN/m^2. Angles of repose of soil is 30^o

15. An I-section of span 5m is used as a beam. It is fixed at both ends and carries a point load of 15 KN at mid span. Calculate
    a) Fixed moments at ends
    b) Reactions at supports
    c) Position and magnitude of maximum deflection

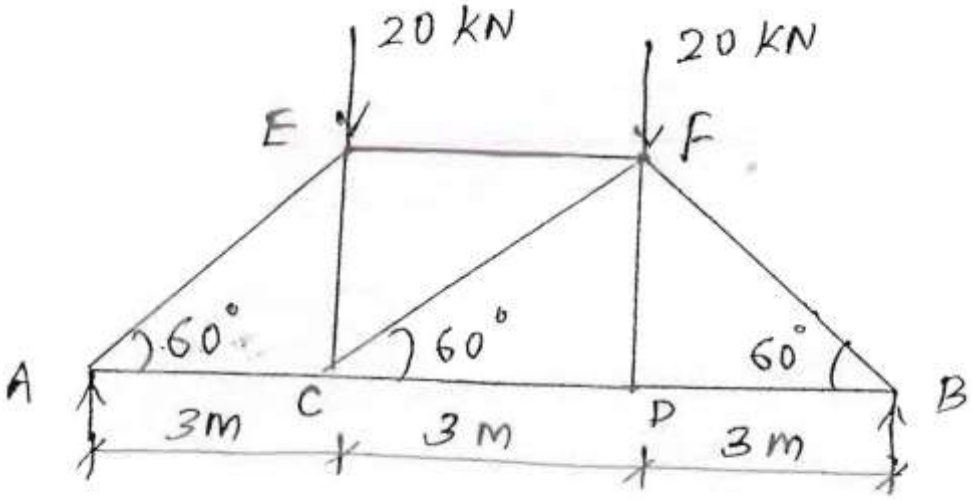
    Take E = 2.0 x 10^5 N/mm^2, I = 200 x 10^6 mm^4

16. A continuous beam ABC has 2 spans AB = 4m and BC = 6m. A udl of 10 kN/m acts over the full span AB and a point load 40 kN acts at a distance of 3m from RHS in span BC. Determine the moments over the beam and draw SFD and BMD. Use theorem of three moments.

17. Analyse the continuous beam as shown in the figure by moment distribution method.



18. Find the magnitude and nature of forces in all the members of truss shown in the figure. Use method of joints.



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