3219

BOARD DIPLOMA EXAMINATION, (C-09)

JUNE - 2019

DIPLOMA IN CIVIL ENGINEERING

STRENGTH OF MATERIALS & THEORY OF STRUCTURES

THIRD SEMESTER EXAMINATION

Time: 3 Hours **Total Marks: 80**

PART - A (10 x 3 = 30 Marks)

Note 1:Answer all questions and each question carries 3 marks

2:Answers should be brief and straight to the point and shall not exceed 5 simple sentences

1. Write the formula for the maximum shear stress at Neutral axis of a circular section of diameter D and hence obtain the ratio between maximum shear stress to average shear stress.
2. A steel rod 100mm diameter is to be bent into a circular shape. Find the minimum radius of curvature to which it should be bent so that stress in steel may not exceed 120 N/mm^2 . Take E = 2 x 10^5 N/mm^2.
3. Write any three advantages of Macaulay's method of determining slope and deflection of beams
4. Distinguish between strength and stiffness of a beam.
5. State any 3 cases of beams where Mohr's theorems can be used easily
6. In the case of columns , define
   (a) Actual Length
   (b) Safe load
7. State the equation for Rankine's crippling load and explain the terms.
8. List any three failures of a retaining wall
9. Name the various methods which are employed in finding out the forces in a frame.
10. Define polar modulus of section and state its units.

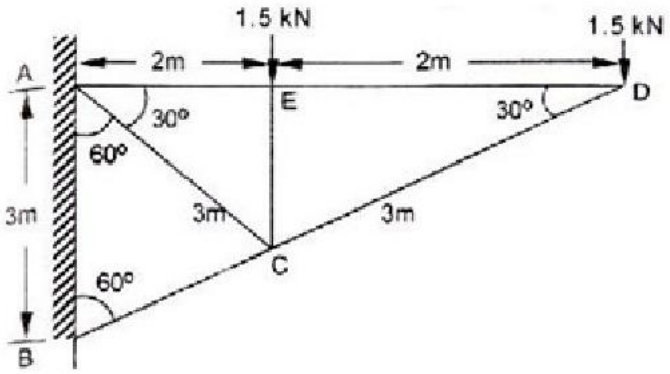
PART - B (5 x 10 = 50 Marks)

Note 1:Answer any five questions and each question carries 10 marks

2:The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer

11. Abeam of span 'L' m simply supported at ends carries a central load 'W'. The beam section has an overall depth of 290mm with horizontal flanges each 150mm x 20mm and a vertical web of height 250mm and thickness 10mm. If the maximum shear stress is to be 45 N/mm^2 and maximum bending stress is 150N/mm^2, calculate the value of the centrally applied point load 'W' and the span 'L'.
12. A Cantilever beam of symmetrical section 300mm deep and I=12 x 10^7 mm^4 carries a u.d.l of 16kN/m. Calculate the maximum span of the beam, if the maximum bending stress is not to exceed 160 N/mm^2 with this span. Calculate the maximum central point load if the bending stress is not to exceed the limit given above
13. A cantilever beam AB of span 4m which is fixed at A and propped at B. It carries a point load of 10kN at its mid span. Find the reaction of the prop and draw SFD and BMD showing the values at salient points.

14. A cantilever beam 3m long carries a u.d.l of 10kN/m run over a length of 2m from fixed end and a point load of 5kN at free end. Calculate the maximum slope and deflection. Take E = 200kN/mm^2 and moment of inertia I= 8600 x 10^{4}mm^4.
15. A hollow cast iron column of 300mm external diameter and 220mm internal diameter is used as a column 4m long with both ends hinged. Determine Rankine's critical load.Take f_c=550N/mm^2 and a=(1/1600).
16. For what length of a hollow steel bar of 40mm external diameter and 30mm internal diameter used as a strut, the Euler's theory is applicable for buckling if ultimate compressive strength is 0.33kN/mm^2,
    (a) When both the ends are fixed and
    (b) One end is fixed, other end is free.
17. A concrete dam of trapezoidal section 15m high and 3m wide at top and 7m wide at bottom. The water face is vertical and retains water up to 13m. Check the stability of the dam for overturning, sliding and no tensile stresses are developed at the base, if the co-efficient of friction of the dam material and soil is 0.6. Specific weight of concrete is 23kN/m^3 and specific weight of water is 10kN/m^3.
18. Determine the forces in all the members of the truss shown in figure by method of joints.



- xxx -