

Indian Maritime University

(A Central University, Govt of India)

May-June 2018 End Semester Examinations

B. Tech (Marine Engineering)

Semester-III

Strength of Materials- II (UG11T2304/T1304)

Date: 09.07.2018

Time: 3 Hrs

Max Marks:100 Marks

Pass Marks: 50 Marks

PART-A

Marks:10X3 =30

(All questions are Compulsory)

1.

- (a) Name the types of Principal theories of failures.
- (b) What is the use of Mohr's circle?
- (c) What are the methods of determining slope and deflection at a section in a loaded beam?
- (d) Define Over hanging beam.
- (e) Define compound cylinder.
- (f) Define built-in and continuous beam
- (g) What is Claperyon's Three moment theorem
- (h) State Castigliano's Theorem
- (i) What are the assumptions in Euler's theory for long column.
- (j) Write the equation of Rankine -Gordon formula and name the terms used in it?

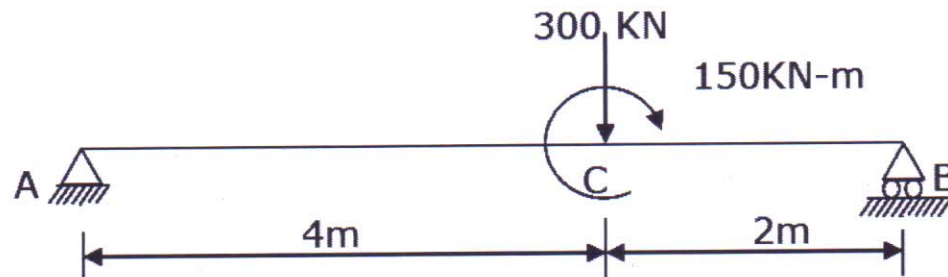
PART B

Answer any Five of the Following

2. The stresses at a point in a bar are 200 N/mm^2 (tensile) and 100 N/mm^2 (compressive). Determine the resultant stress in magnitude and direction on a plane inclined at 60° to the axis of the major stress. Also determine the maximum intensity of shear stress in the material at the point. (14 Marks)

3. A cantilever 2.5 m long is carrying a load of 25 kN at free end and 35 kN at a distance of 1.3 m from the end. Find the slope and deflection at the free end. Take $E = 2.0 \times 10^8 \text{ KN/m}^2$, $I = 1.5 \times 10^{-4} \text{ m}^4$
(14 Marks)

4. A beam of 6 metres long is loaded as shown in figure. If the flexural rigidity (EI) of the beam is $8 \times 10^4 \text{ KNm}^2$, find the deflection at point 'C'



(14 Marks)

5. Using moment area method, find maximum deflection of a simply supported beam of length 'L' subjected with a concentrated load 'W' acting at the centre.
(14 Marks)

6. A continuous beam ABC covers two consecutive span AB and BC of lengths 4 m and 6 m, carrying uniformly distributed loads of 6 kN/m and 10 kN/m respectively. If the ends A and C are simply supported, find the support moments at A, B and C. Draw also bending moment.
(14 Marks)

7. Derive Lamé's equations involved for the stresses in thick cylindrical shell. Also sketch the radial pressure distribution & circumferential stress distribution across the section.
(14 Marks)

8. a) Derive the relation of Euler's buckling load for column whose both ends are pinned.
(7 Marks)

- b) Calculate the safe compressive load on a hollow cast iron column with one end rigidly fixed and the other hinged, of 150 mm external diameter, 100 mm internal diameter and 10 m length. Use Euler's formula with factor of safety of 5, and $E = 95 \text{ GN/m}^2$

(7 Marks)

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