

INDIAN MARITIME UNIVERSITY
(A CENTRAL UNIVERSITY, GOVT. OF INDIA)

SEMESTER- II, B.TECH. (MARINE ENGINEERING) – JUNE 2014 EXAMS

STRENGTH OF MATERIALS- I (T 2204)

(AY 2013-14 batch onwards)

Time:- 3 Hrs
Date: 25.06.2014

Max Marks : 100
Pass Marks : 50

PART - A

(3 X10 = 30 Marks)

Compulsory Questions

1. a) State Hooke's Law.
- b) Explain stress and strain.
- c) What is neutral axis and why there is no resultant on the section?
- d) What is point of contraflexure?
- e) Explain Poisson's Ratio.
- f) What do you mean by volumetric strain?
- g) What is proof resilience?
- h) Derive an expression for modulus of resilience.
- i) Show a typical stress-strain diagram of mild steel.
- j) What is strain energy?

PART - B

(5 X14 = 70 Marks)

Answer Any Five of the following

2. Develop the expressions for Hoop Stress and Longitudinal stress of thin cylinder under internal pressure. Also find out the volumetric strain on capacity. (8+6 = 14)

3. A boiler drum consists of a cylinder portion 2 m long, 1 m diameter, and 25 mm thick, closed by hemispherical ends. In a hydraulic test to 10 N/mm^2 how much additional water will be pumped in. after initial filling at atmospheric pressure? Assume the circumferential strain at the junction of cylinder and and hemisphere is the same for both. For the drum material, $E = 207,000 \text{ N/mm}^2$, ν (Poisson's ratio) = 0.3, for water $K = 2100 \text{ N/mm}^2$. (14)

