Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Marine Engg.) (2013 Onwards) (Sem.–4)

STRENGTH OF MATERIALS-II

Subject Code : BTME-401

M.Code : 72434

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Answer briefly :

a) What is energy of distortion?

b) State Castigiliano's theorem.

c) What is a theory of failure?

d) What is a hoop stress?

e) State assumptions made in Lame's theory.

f) What is a helical spring?

g) Define proof resilience.

h) Give any two examples of rotating thin ring.

i) Where does the maximum vertical shear stress occur in I-section?

j) What is a shear centre?

SECTION-B

2. A mild steel shaft is subjected to a torque of 3 kNm and a bending moment of 2 kNm. Calculate the diameter of the shaft required if the yield stress of the material is 200 MPa and factor of safety is 2. Use principal stress theory.

3. A thick cylinder of 150 mm internal diameter is subjected to an internal pressure of 6 MPa. Determine the thickness of the cylinder if the material is not to be stressed beyond 12 MPa.

4. Derive an expression for the hoop and longitudinal stresses in a thin cylinder subjected to internal pressure. State the assumptions made.

5. What is the type of variation of bending stress across the section of a curved bar with large initial curvature? Discuss.

6. Write short notes on stresses in rotating disc.

SECTION-C

7. Determine the mean coil radius, wire diameter and number of turns of a close coiled spring of 1 kN/m stiffness and solid length 45 mm. The shear stress in the spring under an axial load of 75 N should not exceed 180 MPa. Modulus of rigidity for the spring material = 82 GPa.

8. A beam of T-section with flange 300 mm × 30 mm and web 260 mm × 30 mm is subjected to a shear force of 100 kN. Determine the percentage of shear force carried by the web.

9. Write a note on shear strain energy theory.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student