

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech., Winter 2017-18 Examination

Semester: 1
Subject Code: 03217102
Subject Name: Stress Analysis

Date: 28/12/2017
Time: 2:00PM TO 4:30PM
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

- Q.1** Explain the following terms (05)
- A) Hydrostatic stress tensor (05)
- B) Deviator stress tensor. (05)
- C) Give names for Plastic flow theories. (05)
- Q.2** Answer the following terms. (Attempt any three) (Each five mark) (15)
- A) Give Airy's stress function for plate bending
- B) Give physical formulation of deviator & spherical strain tensor.
- C) What is octahedral stress?
- D) Compatibility equation for a plate.
- Q.3** A) The stress tensor at a point is given by (07)
- $$T_{ij} = \begin{bmatrix} 50 & 50 & 150 \\ 50 & 100 & 100 \\ 150 & 100 & 150 \end{bmatrix} \text{ N/mm}^2$$
- Calculate for the plane having direction cosines
- $$a_x = \frac{1}{\sqrt{6}}, \quad a_y = \frac{1}{\sqrt{3}}, \quad a_z = \frac{1}{\sqrt{2}}$$
- a) total stress b) normal stress c) shear stress
- B) Derive equation for deflection of a cantilever loaded at the end. (08)
- OR**
- B) Two bodies of radius R1 & R2 are in contact with a load acting "p" N. Find the maximum pressure generated.
- Q.4** A) Derive relation for pressure distribution for the plate with a central hole. (07)
- OR**
- A) Derive relation for elastic strain energy of a rigid body.
- B) Write short note on theories of failure. (08)