

# STRENGTH OF MATERIALS

## ASSIGNMENT-1

1. Write notes on following

- a) Stress and strain      c) Creep
- b) Stress relaxation      d) Stress-strain diagram

2. For biaxial and shear stress condition derive relation for

- a) Principal plane
- b) Principal stress
- c) Maximum shear plane
- d) Maximum shear stress

3. Derive the following relation

- a)  $E = 2G(1 + \nu)$
- b)  $E = 9KG / (3K + G)$

4. Draw Mohr's Circle for the following cases

- a)  $\sigma_x = 100 \text{ MPa}$
- b)  $\sigma_x = -100 \text{ MPa}$
- c)  $\sigma_x = 100 \text{ MPa}$        $\sigma_y = 50 \text{ MPa}$
- d)  $\sigma_x = 100 \text{ MPa}$        $\sigma_y = -50 \text{ MPa}$
- e)  $\sigma_x = -100 \text{ MPa}$        $\sigma_y = 50 \text{ MPa}$
- f)  $\sigma_x = -100 \text{ MPa}$        $\sigma_y = -50 \text{ MPa}$
- g)  $\tau_{xy} = 100 \text{ MPa}$
- h)  $\tau_{xy} = -100 \text{ MPa}$
- i)  $\sigma_x = 100 \text{ MPa}$        $\sigma_y = -50 \text{ MPa}$        $\tau_{xy} = 40 \text{ MPa}$
- j)  $\sigma_x = 100 \text{ MPa}$        $\sigma_y = -50 \text{ MPa}$        $\tau_{xy} = -40 \text{ MPa}$

5. For all cases of Q.4 find the following from circle

- a) Principal stresses
- b) Principal plane
- c) Max. shear plane
- d) Max. shear stress

6. Derive the relation

$$\tau/R = T/J = G\theta/L$$