



# St. Michael Polytechnic College



St. Santhiyagappar Nagar  
Kalayarkoil-630 551.

DEPT: CIVIL ENGG

YEAR/SEMESTER: II / III

SUB.NAME: ENGINEERING MECHANICS

*Each question carries 1(one) mark in PART-A and 12(twelve) marks in PART-B*

## UNIT-1

### PART – A

- 1 .DEFINE FORCE
2. DEFINE STATIC
3. WHAT IS ENGINEERING MECHANICS
4. WHAT IS THE EXAMPLE FOR ELASTICITY
5. NAME THE MATERIAL POSSESSING PLASTICITY
6. WHAT IS THE MATERIAL HAVING HARDNESS
7. NAME THE MATERIAL POSSESSING BRITTLENESS
8. NAME THE MATERIAL HAVING CREEP
9. DEFINE ELASTICITY
10. DEFINE HARDNESS
11. NAME THE VARIOUS TYPES OF STRESS
12. WHAT IS MEANT BY POISSON'S RATIO

### PART B

1. A bar of steel is 500mm long. Two ends are 32mm and 28mm in diameter and each is 125mm long the middle portion being 25mm diameter for the remaining portion. Find the total elongation of the bar if  $E=2 \times 10^5 \text{ N/MM}^2$
2. A bar steel 4m long is subjected to pull of 180KN. It is 30mm dia for 1m length 25mm dia for 2m of its length and 20mm dia for remaining length. Find the total elongation of the bar.  $E=0.2 \times 10^6 \text{ N/MM}^2$  and  $\delta l=1.794\text{mm}$ .
3. A reinforced concrete circular section of  $50000\text{mm}^2$  cross sectional area carries 6 reinforcing bars whose total area is  $500\text{mm}^2$ . Find the safe load, the column can carry, if the concrete is not to be stressed more than 3.5MPa. Take modular ratio for steel and concrete as 18.

4. A bar of length 10mm and square in section of side 50mm is subjected to an axial pull of 150KN. The extension in length was 0.05mm and the decrease in side was 0.00625mm. Find the elastic constants and poisson's ratio.
5. Young's modulus for a material is  $2 \times 10^5 \text{ N/MM}^2$  and its modulus of rigidity is  $0.8 \times 10^5 \text{ N/MM}^2$ . Find the values of poisson's ratio and bulk modulus.
6. A hollow cylinder 2m long has an outside diameter of 50mm and inside diameter of 30mm. If the cylinder is carrying a load of 25KN, Find the stress in the cylinder. Also find the deformation of the cylinder, if the value of modulus of elasticity for the cylinder material is 100GPa.
7. An aluminium bar of 1.8m long has a 25mm sided square section over 0.6m of its length and a circular section of 25mm dia over the remaining length. Calculate the elongation under a pull of 20KN.  $E = 0.7 \times 10^5 \text{ N/MM}^2$