St. Michael Polytechnic College

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DEPT: MECHANICAL **YEAR/SEMESTER**: II / III
SUB.NAME: STRENGTH OF MATERIALS

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

UNIT-1 DEFORMATION OF METALS

PART-A

1. Define elasticity.
2. Define fatigue.
3. Define volumetric strain.
4. What is meant by FOS?
5. Define machinability.
6. Define temperature stress.
7. Write down the formula for modulus of resilience.
8. Define ductility.
9. State the purpose of alloy.
10. Define Hooke's law.
11. Define poisson's ratio.
12. Define temperature strain.
13. Define plasticity.
14. Define brittleness.

PART-B

1. Following data's refers to a mild steel specimen tested in a laboratory.
2. Diameter if Specimen (D) =25mm.
3. Length of Specimen (l) =300mm.
4. Extension under a load of 15KN=0.045mm.
5. Load at end point =127.65KN.
6. Maximum load=208.60KN.
7. Length of specimen after failure=375mm.
8. Neck diameter=17.75mm.

To Determine:-

9. Young's modulus II) Yield point III) ultimate stress IV) % of elongation V) % of reduction in area VI) safe stress adopting a factor of safety is 2. [P.no-1.31]
10. A steel rod 4m long and 20 mm diameter is subjected to an axial tensile load of 45KN.find the change in length, diameter and the volume of the rod. Take for steel $E=2X10^5$ N/mm^2 and poisson's ratio =1/4 [P.no-1.34]
11. A steel bar of 500mm length , 60mm width and 20 mm thickness is subjected to and axial compression of 168 KN. Calculate the final diamensions and change in volume of flat. The modulus of elasticity of steel is 2.1 X 10^5 N/mm^2 and poisson's ratio of steel is 0.3. [P.no-1.35]
12. The modulus of rigidity of metal is $0.4X10^5 N/mm^2$. A 10mm diameter metal is subjected to an axial load of4.9KN. The change in diameter is found to be $1.9X10^{-3}$mm.Calculate the poisson's ratio , Young's modulus and Bulk's modulus . [P.no-1.35]
13. A bar of 30mmX30mmX250mm long is subjected to a pull of 90KN in the direction of its length. The extension of bar was found to be 0.125mm,While the decrease in each lateral dimensions is found to be 0.00375mm. Find the young's modulus ,Poisson's ratio, modulus of rigidity & bulk's modulus for the material of the bar. [P.no-1.43]
14. A copper rod 40mm in diameter is rigidly attached at both ends to the inside of a steel tube 50mm in external diameter and 5mm thick. The composite section is than subjected to an axial pull of 100KN. Find the structure induced in each metal and extension on a length of 1.2m. Es= $2X10^5$ N/mm^2 and Ec = 0.5X105 N/mm^2. [P.no-1.46]