STRENGTH OF MATERIALS
4th Exam/Mech./Auto/2093/Jan'2022
(For Batch 2018 onwards)

Duration: 1.15Hrs.   **M.Marks:25**

SECTION-A

Q1. Attempt any three questions.   **3x5=15**

  i.   Define Young's modulus of elasticity, Modulus of rigidity, Bulk modulus of elasticity, Poisson's ratio and Hooke's Law.
  ii. Define Resilience, Proof resilience and Modulus of resilience.
  iii. State the theorem of Perpendicular and Parallel axis.
  iv. Draw S.F. and B.M. diagrams for a cantilever carrying U.D.L on its span.
  v.   What is beam and explain different types of beams.
  vi. Write torsion equation and name each term.
  vii. Define: i) Slenderness ratio,   ii) Bulking factor   iii) Bulking load.

SECTION-B

Q2. Attempt any one question.   **1x10=10**

  a. A tensile test was conducted on a mild steel specimen having diameter 30mm and gauge length of 240mm. The load at elastic limit is 65KN and corresponding elongation is 0.14mm. Poisson's ratio of the material of specimen is 0.3. Calculate i) Stress produced in the specimen ii) Longitudinal strain   iii) Young's Modulus of elasticity iv) Bulk Modulus of elasticity   v) Modulus of Rigidity.
  b. Determine the moment of inertia of a T-section of dimensions 150X150X50 mm about the base of the T-section.
  c. A simply supported beam of span 10m carries a uniformly distributed load of 25 KN/m over the whole span. Calculate the maximum Bending moment and Shear force acting on the beam and also draw the shear force and bending moment diagrams.
  d. A solid steel shaft at 300 r.p.m. has to transmit 50 KW power. The material of the shaft can bear maximum stress of 100 MN/m^2. The maximum torque transmitted on each revolution exceeds the average torque by 30%. What should be the diameter of the shaft in order to prevent its failure?