**BBDNITM**

**MECHANICAL ENGG. DEPARTMENT**

**SESSION (2018-19)**

**Subject- Mechanics of Solids [RME303]**

**Assignment – 2**

1. What do you mean by the point of contraflexure?
2. State the condition for the use of Macaulay’s method.
3. Write the assumption in the theory of simple bending.
4. Define torsional rigidity of the solid circular shaft.
5. What is the maximum deflection in a simply supported beam subjected to uniformly

distributed load over the entire span?

1. Sketch (a) the bending stress distribution (b) shear stress distribution for a beam of rectangular cross section.
2. Calculate the maximum deflection of a simply supported beam carrying a point load of 100nKN at mid span. Span = 6 m, E= 20000 kN/m2.
3. A cantilever beam 3 m long carries a load of 20 KN at its free end. Calculate the shear force and bending moment at a section 2 m from the free end.
4. A beam of size 150 mm wide, 250 mm deep carries a uniformly distributed load of w kN/m over entire span of 4 m. A concentrated load 1 kN is acting at a distance of 1.2 m from the left support. If the bending stress at a section 1.8 m from the left support is not to exceed 3.25 N/mm2 find the load w.
5. A Simply supported beam of length 6 metres carries a udl of 20KN/m throughout its length and a point of 30 KN at 2 metres from the right support. Draw the shear force and bending moment diagram. Also find the position and magnitude of maximum Bending moment.
6. Find the minimum diameter of shaft required to transmit a torque of 29820 Nm if the maximum shear stress is not to exceed 45 N/mm2.
7. Find the torque which a shaft of 50 mm diameter can transmit safely, if the allowable shear stress is 75 N/mm2.
8. Determine the diameter of a solid shaft which will transmit 300 KN at 250 rpm. The maximum shear stress should not exceed 30 N/mm2 and twist should not be more than 10 in a shaft length 2m. Take modulus of rigidity = 105 N/mm2.
9. A steel shaft ABCD having a total length of 2400 mm is contributed by three different sections as follows. The portion AB is hollow having outside and inside diameters 80 mm and 50 mm respectively, BC is solid and 80 mm diameter. CD is also solid and 70 mm diameter. If the angle of twist is same for each section, determine the length of each portion and the total angle of twist. Maximum permissible shear stress is 50 Mpa and shear modulus 0.82 x105 MPa.
10. A beam AB of length 8 m is simply supported at its ends and carries two point loads of 50 kN and 40 kN at a distance of 2 m and 5 m respectively from left support A. Determine, deflection under each load, maximum deflection and the position at which maximum deflection occurs.Take E = 2 x 105 N/mm2 and I = 8.5 X106 mm4
11. Beam is simply supported at its ends over a span of 10 m and carries two concentrated loads of 100 kN and 60 kN at a distance of 2 m and 5 m respectively from the left support. Calculate
12. Slope at the left support
13. Slope and deflection under the 100 kN load. Assume EI = 36 x 104 kN-m2