CE8402 STRENGTH OF MATERIALS-II

Important 13 Mark Questions

Part-A

1. A fixed beam AB of length 6m carries point load of 160 kN and 120 kN at a distance of 2m and 4m from the left end A. Find the fixed end moments and the reactions at the supports. Draw B.M and S.F diagrams.
2. A fixed beam AB of length 6m carries two-point loads of 30 kN each at a distance of 2m from the both ends. Determine the fixed end moments.
3. Find the fixing moments and support reactions of a fixed beam AB of length 6m, carrying a uniformly distributed load of 4kN/m over the left half of the span.
4. A cantilever AB of span 6m is fixed at the end and proposal at the end B. it carries a point load of 50KnN at mid span. level of the prop is the same as that of the fixed end.
   (i) Determine the Reaction at the Prop.
   (ii) Draw SFD AND BMD.
5. Maximum torque of 45 KN-m and a maximum bending moment of 28 KN-m at perpendicular section. if the allowable equivalent stress in simple is 240MN/m2, find the diameter of the shaft according to the maximum shear stress theory.
6. State the Theories of failure.
7. The rectangular stress components of a point in three-dimensional stress system are defined as a σx=20Mpa, σy=- 40Mpa, σz = 80Mpa, xy =40Mpa, yz= -60Mpa, xz=20Mpa. Determine the principal stresses and principal planes.
8. A shaft is subjected to a maximum torque of 10KN-m and a maximum bending moment of 8KN-m at perpendicular section. if the allowable equivalent stress in simple is 160MN/m2, find the diameter of the shaft according to the maximum shear stress theory
9. An 80 x 80 x 10 mm angle is used as a simply supported beam over a span of 2.4 m. BT-5 It carries a load of 400 kN along the vertical axis passing through the centroid of the section. Find the resulting bending stress on the outer corners of the section along the middle section of the beam.
10. A beam of rectangular cross section is subjected to pure bending with a moment of 20kN.m. The trace of the plane of loading is inclined at 450 to the YY axis of the

section. Identify the N.A of the section and calculate the bending stress induced at each corner of the beam section.

11. Estimate principal moment of inertia of angle section 100 mm x 40 mm x 60 mm.
12. Predict the shear flow variation and sketch the same for a channel section of 100mm X 200mm X 5mm carrying a sheer force of 2500N.
13. A beam of rectangular section 20 mm X 40 mm has its Centre line curved to a radius of 50mm. the beam is subjected to a bending moment of 45x105 N.mm. Solve the intensity of maximum stresses in the beam. Also plot the bending stress across the section.
14. A curved bar is formed of a tube 120mm outside diameter and 7.5mm thickness. The center line of this beam is a circular arc of radius 225mm. A bending moment of 3kN.m tending to increase curvature of the bar is applied. Calculate the maximum tensile and compressive stresses set up in the bar.
15. A curved bar of rectangular section, initially unstressed is subjected to bending moment of 2000 N.m tends to straighten the bar. The section is 5 cm wide and 6 cm deep in the plane of bending and the mean radius of curvature is 10 cm. Judge the position of N.A and the stress at the inner and outer face.
16. Analyze the shear center of a channel section of 400 mm X 200 mm outside and 5 mm thick.