SURYA POLYTECHNIC COLLEGE, VIKIRAVANDI-605 602.

DEPARTMENT OF CIVIL ENGINEERING

MECHANICS OF SOLIDS -4010310

PART-A **10 x3 =30**

1. What are the types of forces acting or structural member?
2.What is mean by tension or tensile force?
3.What is mean point load?
4.What is mean by tensile (or) longitudinal (or) linear strain?
5.Define bending moment?.
6.Write the expression for centroid in triangle and semi circle?
7. What is bending stress?
8.What is mean twisting moment?
9. What is a vector diagram?.
10.Define Deficient frame?.

PART-B **5 x14 =70**

11a).A steel bar 300mm long of section 50mm x 12 mm is subjected to an axial compression of 84KN.calculate the volumetric strain and change in volume of the bar E=2 x10^5 N/mm^2,1/m=0.3.

(OR)

b). A cylindrical bar of 150mm diameter and 300mm long is increased by 0.12mm in diameter and is decreased by 0.30mm in length under an axial compression of 250KN. Compute the values of young's modulus, Poisson's ratio, volumetric strain and change in volume.

12 a). .A simply supported beam of span 8m carries a UDL of 12 KN/m over the left half of the span and a point load of 25KN at 2m from the right support support. Draw SF and BM diagrams .Also find the position and magnitude of max bending moment.

(OR)

b). 3.A simply supported beam of 12m span carries two point loads of 25KN and 40KN at 5m and 8m respectively from the left support in addition to its self weight of 2KN/m over the entire span . Draw the SF and BM diagrams for the beam.

13 a).Determine the I_{xx} and I_{YY} for the I-section given below.

Top flange-100mm x20mm
Bottom flange-200mm x20mm
Web portion-150mm x20mm

(OR)

b).Determine the I_{xx} and I_{YY} for the L-section 75mm X 75mm x10mm overall.

14 a).A hollow Shaft of internal diameter 400mm and external diameter 460mm is required to transmit power at 180rpm. Determine the power it can transmit if the shear stress is not to exceed 60N/mm^2 and max torque exceeds the mean by 30%

(OR)

b).The internal and external diameters of a hollow shaft are 200mm and 250mm respectively. It is transmitting power at 120rpm. The maximum torque is 20% more than the mean torque. Find the power transmitted by the shaft if the shear stress is not to exceed 70N/mm^2

15 a).Determine the magnitude and nature of forces in the members of the given truss by method of joint.

(OR)

b).Determine the magnitude and nature of forces in the members of the given truss by method of joint.

SUB:ENGINEERING MECHANICS

1.A steel bar 300mm long of section 50mm x 12 mm is subjected to an axial compression of 84KN.calculate the volumetric strain and change in volume of the bar E=2 x10^5 N/mm^2,1/m=0.3.

2.Calculate the change in diameter of a short mild steel column when it carries a compressive load of 800KN.The original diameter is 80mm. E=2 x10^5 N/mm^2,1/m=0.3.

3.A simply supported beam of span 8m carries a UDL of 12 KN/m over the left half of the span and a point load of 25KN at 2m from the right support support. Draw SF and BM diagrams .Also find the position and magnitude of max bending moment.

4.A simply supported beam of 6m carries three point loads 25KN,35KN,and 40KN at 1.5m, 2.5m and 4m from the left support. Draw SF and BM diagrams and locate the max values.

5.Determine the I_{xx} and I_{YY} for the I-section given below.

Top flange-100mm x20mm
Bottom flange-200mm x20mm
Web portion-150mm x20mm

6.Determine the I_{xx} and I_{YY} for the L-section 75mm X 75mm overall.

7.Find the values of I_{XX} ,I_{YY} for the channel section.300mm x 100mm (300mm web and 100mm flange)over all. The thickness of flange and web is 10mm.

8.A hollow Shaft of internal diameter 400mm and external diameter 460mm is required to transmit power at 180rpm. Determine the power it can transmit if the shear stress is not to exceed 60N/mm^2 and max torque exceeds the mean by 30%

9.Determine the magnitude and nature of forces in the members of the given truss by method of joint.

FIGURE -1

10. Determine the magnitude and nature of forces in the members of the given truss by method of joint.

FIGURE -2