Question Bank of SOM (22306)

Unit Test-II (Shift:-I)

Program: - Mechanical Engg. Course Code:- 22306

Semester: - III Course: - SOM

Question for 2 Marks

Chapter 04 (CO4)

1) State any two assumptions made in the theory of pure bending.
2) Define moment of resistance and neutral axis.
3) State the shear stress equation and write the meaning of symbols used.
4) Draw the shear and bending stress distribution diagram for solid rectangular section.

Chapter 05 (CO5)

1) Define torque and state it's S.I. unit.
2) Define Polar Modulus and state it's expression.
3) Calculate the polar modulus of circular shaft of 100 mm diameter.

Chapter 06 (CO6)

1) Define the term direct stress with formula.
2) Define the term limit of eccentricity with it's S.I. unit.
3) State the condition of no tension at the base of a column.
4) Draw the resultant stress distribution diagram for following condition:
   i) Direct stress > Bending stress ii) Direct stress = Bending stress

Question for 4 Marks

Chapter 04 (CO4)

1) A rectangular beam of 400 mm * 200 mm size is of wood material. If the permissible bending stress in wood is 2 MPa, calculate the moment of resistance of beam.
2) Find the bending stress at 25 mm below the top edge of rectangular section 80 mm wide and 200 mm deep, if maximum bending moment is 4 KN-m.
3) A cantilever rectangular M.S. section is 4 m in length. It carries load due to its self weight of 5 KN/m and the permissible bending stress in the M.S. is 5 MPa. Find the size of the section, if depth to width ratio is 2.

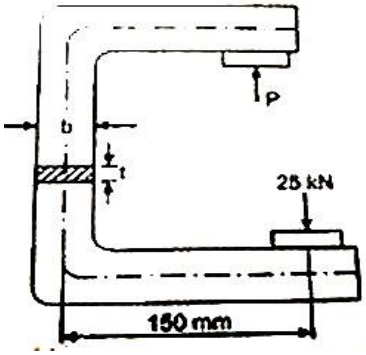
4) A solid circular compression member 60 mm in diameter is to be replaced by a hollow circular section of the same material. Find the size of the section if the internal diameter is 0.6 times the external diameter.
5) Determine the concentrated load , when placed at the free end of a cantilever beam of length 1 m will produce a shear stress 1.5 MPa. The cross-section is circular of diameter 100 mm.

Chapter 05 (CO5)

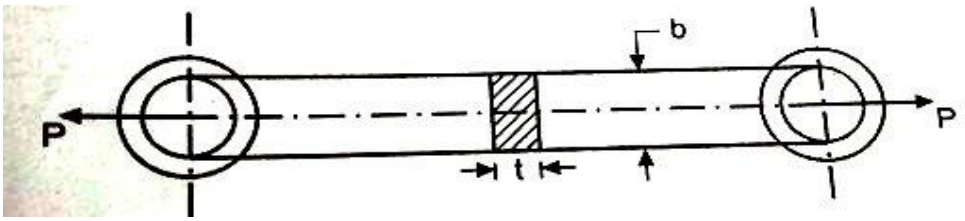
1) Compare solid shaft and hollow shaft.
2) The shaft has to transmit 105 KW at 160 rpm. If the shear stress is not to exceed 65 N/mm^2 and twist in the length of 3.5 m must not exceed 1^0, find the diameter of the shaft. Take G = 800 GPa.
3) A solid circular shaft of 100 mm diameter is transmitting power 100 KW at 150 rpm. Find the intensity of the induced shear stress in the shaft.
4) A steel shaft 10 mm diameter rotates at the speed of 9900 rpm. Calculate the maximum power in H.P. that the shaft can transmit without exceeding the shear stress of 40 MPa.
5) A shaft is required to transmit 25 KW power at 180 rpm. The maximum torque may exceed the mean torque by 30%. If the shear stress not to exceed 60 MPa, determine the minimum diameter of the shaft.

Chapter 06 (CO6)

1) A rectangular strut is 120 mm * 80 mm thick. It carries a load of 100 KN at an eccentricity of 10 mm in a plane bisecting the thickness. Find the maximum and minimum intensities of stress in the strut section.
2) A hollow circular column having external and internal diameters of 40 cm and 30 cm respectively, carries a vertical load of 150 KN at the outer edge of the column. Calculate the maximum and minimum intensities of stress in the section.
3) A C- clamp as shown in fig carries a load P = 25 KN. The cross-section of the clamp at X-X is rectangular, having width equal to twice the thickness. Assuming that the C – clamp is made of steel casting with an allowable stress of 100 MPa, find its dimensions.



4) A M.S. link as shown in fig. by full lines, transmits a pull of 80 KN. Find the dimensions b and t if b = 3t. Assume the permissible tensile stress as 70 MPa.



5) A hollow C.I. column of external diameter 250 mm and internal diameter 200 mm carries an axial load ‘W’ KN and a load of 100 KN at an eccentricity of 175 mm. Calculate the minimum value of W so as to avoid the tensile stresses.