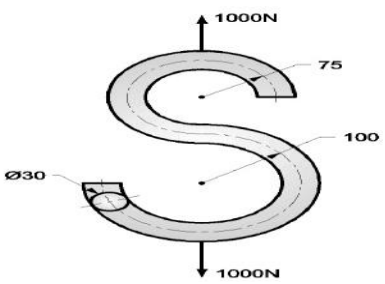
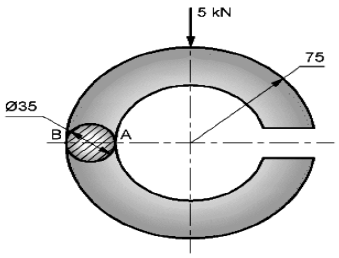
14 MARKS –DME

A link of S Shape made of diameter 30mm bar shown in figure determine the maximum tensile stress in the link



All Dimension are in mm

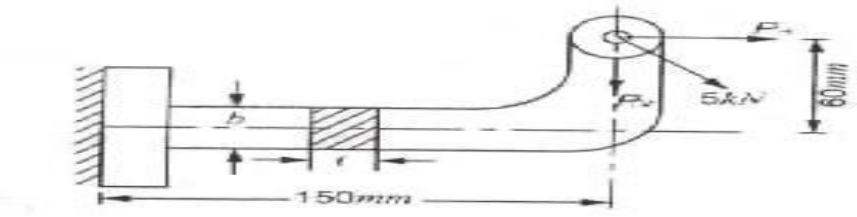
Calculate the stress at a point of A and B of Circular bar are shown in fig.The circular beam is subjected to a Compressive load of 5 KN.



Dimension are in mm

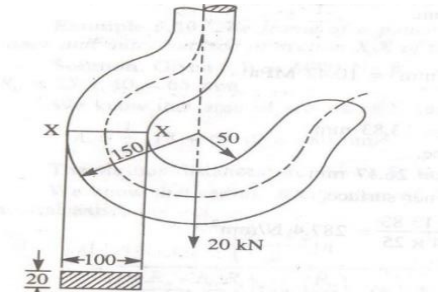
A bolt is subjected to an axial pull of 10KN and transverse shear of 5KN.The yield strength of bolt material is 300Mpa considering F.O.S of 2.5.Determine the diameter of bolt using (i) Maximum normal stress theory(ii) Maximum shear stress theory and (iii) Maximum strain theory(iv)octahedran theory Take poison ratio as 0.25

A mild steel bracket shown in fig. It is subjected to a pull of 5000N acting at 45° to the horizontal axis.The bracket has a rectangular section whose depth is twice the thickness.Find the cross sectional dimension of bracket if the permissible stress in the material is 50N/mm².

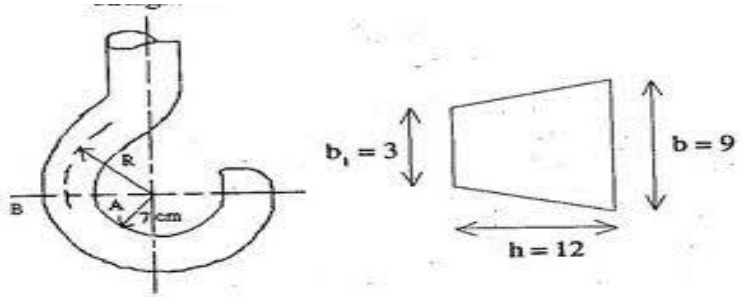


The crane hook carries a load of 20KN,as shown in fig,The section is rectangular whose horizontal side is 100mm.find the stress in the inner and outer fiber at a givens Section

All Dimension are in mm

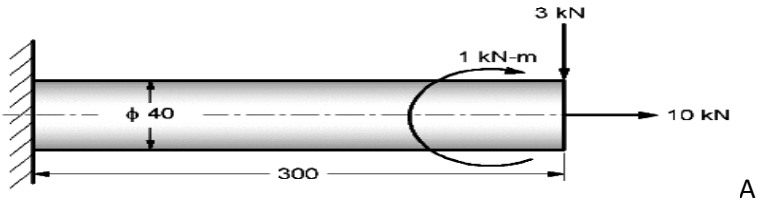


Crane hook has a section, which for the purpose of analysis is consideredtrapezoidal as shown in fig.it is made of plain carbon steel with an yield strength of 380Mpa in the tension.Determine the load capacity of hook for a factor of safety 3.



All Dimension are in cm

A steel bar of 40mm dia and 300mm length is subjected to a torque of 1KN-m and two other load is shown in fig. The yield Strength of the material is 250Mpa,determine the factor of safety using(i) Maximum normal stress theory(ii) Maximum shear stress theory and (iii)Maximum strain energy



A

All Dimension are in mm

Design a knuckle joint to transmit 150 KN. The design stresses may be taken as 75 MPa in tension, 150 MPa in compression and 60 MPa in shear.

Its required to design a bushed pin flange coupling to connect two shafts And transmit 37.5kW Power at 180 r.p.m. The maximum torque is 30 percent more than mean torque. Use the following data (i) Allowable shear stress for shaft and key =104.6N/mm^2 (ii) Allowable shear stress for bolt =90N/mm^2(iii) Allowable shear stress for CI Flange=75N/mm^2(iv)Allowable crushing stress for shaft=133.33N/mm^2

Design a clamp coupling to transmit 30 kW at 100 r.p.m. The allowable shear stress for the shaft and key is 40 MPa and the number of bolts connecting the two halves are six. The permissible tensile stress for the bolts is 70 MPa. The coefficient of friction between the muff and the shaft surface may be taken as 0.3.

Design a knuckle joint to connect two rods under the action of tensile load of 55 KN. The design stresses may be taken as 60 MPa in tension, 30 MPa in shear and 70 MPa in compression.

Design a bushed-pin type of flexible coupling to connect a pump shaft to a motor shaft transmitting 32kw at 960rpm. The maximum torque is 20 percent more than mean torque. The material properties are as follow:

a. The allowable shear and crushing stress for shaft and key material is 40Mpa and 80Mpa respectively.
b. The allowable shear stress for C.I is 15Mpa.
c. The allowable bearing pressure for rubber bush is $0.8N/mm^2$.

The material of the pin is same as that of shaft and key.

Design a muff coupling to connect two mild steel shaft and transmit 35 kW at 1440 r.p.m. The maximum torque transmitted is 25% greater than mean torque. The allowable shear stress for the shaft is 15 MPa. The allowable shear stress for the key is 65 MPa. The permissible crushing stress is 160 MPa.