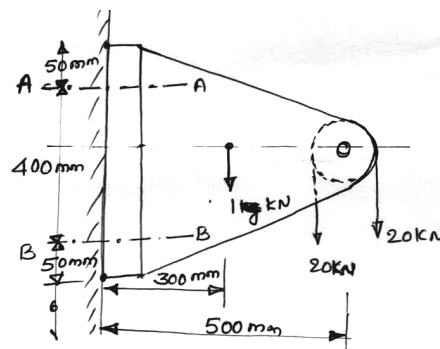


UNIT - III

- 5 a. A hollow shaft of 400 mm outside diameter and 250 mm inside diameter is supported on two bearings 3 meter apart. The shaft rotates at 180 rpm and receives a thrust load of 300 kN and transmits 120 kW. The weight of the shaft is 90 kN. Determine the maximum normal and shear stresses induced. 20
- 6 a. Design a rigid coupling to transmit 18 kW at 1440 rpm. The allowable shear stress for CI flange is 4 MPa. The shafts, Keys and bolts are made of annealed steel having allowable shear stress of 93 MPa. Allowable crushing stress for key = 186 MPa. 20

UNIT - IV

- 7 a. The cylinder head of steam engine is subjected to a steam pressure of 0.7 N/mm². It is held in position by means of 12 bolts. A soft copper gasket is used to make the joint leak proof. The effective diameter of the cylinder is 300 mm. Find the size of the bolt so that the stress in the bolt is not to exceed 100 N/mm². 8
- b. A flat circular plate is used to close the flagged end of a pressure vessel of internal diameter 300 mm. the vessel carries a fluid at a pressure of 0.7 N/mm². A soft copper gasket is used to make the joint leak proof. Twelve bolts are used to fasten the cover plate on to the pressure vessel. Find the size of bolts so that the stress in the bolt is not to exceed 100 N/mm². 12
- 8 a. A power screw has 6 mm pitch and 40 mm diameter. The screw is subjected to an axial load of 6 kN. The length of the nut is 12 mm. Determine; 12
 - i) The bearing pressure between the threads ii) The shear stress on the threads
 - iii) The compressive stress in the screw.
- b. A pulley bracket is as shown in the Fig is supported by 4 bolts, two at A-A and two at B-B. Find the major and minor dia of the bolt, if allowable shear stress is 25 N/mm² for the material of bolt.



UNIT - V

- 9 a. Design a double riveted double strap butt joint for the longitudinal beam of a boiler of diameter 1.3 m with a steam pressure of 2.4 MPa. The working stresses to be used are 77 MPa in tension, 54 MPa in shear and 120 MPa in crushing. 20
Assume joint efficiency as 81%.
- 10 a. Determine the load carrying capacity of a welded joint loaded as shown in Fig. 2. The allowable shear stress for 10 mm weld used is 50 MPa.

