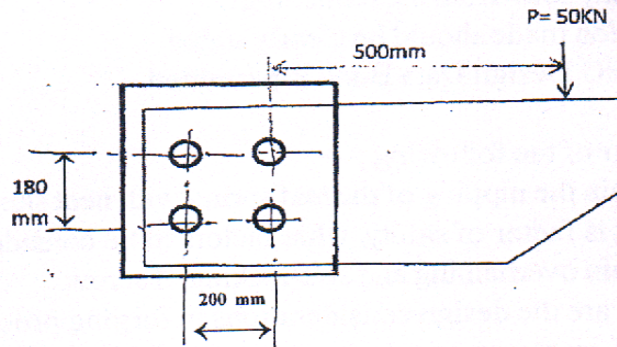


5. (a) What are the advantages and disadvantages of Weld Joints over the Bolt Joints? 8
 (b) A bracket is supported by four rivet of equal diameter as shown to support a load of 50KN. Determine the size of the rivet taking the permissible shear stress as 80MPa. 12



6. (a) Explain with the neat sketch, the polygon effect of the chain. 5
 (b) Design a Rubber belt to drive a dynamo generating 20KW at 2200 rpm. It is fitted with a pulley of 200mm diameter. Allowable stress for the belt is 2.4MPa, Density of the Rubber is 1000 Kg/m^3 , Angle of contact for the dynamo pulley is 165° , coefficient of friction is 0.3 and dynamo efficiency is 80 percent. 15
7. (a) Design a spring for a balance to measure 0 to 1000N over a scale of length 80mm. The spring is to be enclosed in a casing of 25mm diameter. The approximate number of turn is 30. The modulus of rigidity is 85 KN/mm^2 . Also calculate maximum shear stress induced. 10
 (b) A screw Clamp used on the shop floor. The screw has single start square threads of 22mm nominal diameter and 5mm pitch. Coefficient of friction for the thread and collar is 0.15. The mean radius of collar is 15mm. The capacity of clamp is 750N. The handle is made of steel 30C8 ($S_{yt} = 400 \text{ N/mm}^2$) It can be assumed that the operator exerts a force of 20N on the handle. 10
 (i) What torque is required to tighten the clamp to full capacity
 (ii) Determine the length and diameter of the handle such that it will bend with a permanent set, when the rated capacity of the clamp is exceeded.