

UNIT-III (DESIGN OF FASTNERS AND WELDED JOINTS)

PART-A

1. What are the purposes of screws?
2. How is a bolt designated?
3. Define the term self-locking of power screws.
4. Why are welded joints preferred over riveted joints?
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5. What are the types of welded joints?
6. Write down the formula for the strength of single transverse fillet weld
7. Differentiate with a neat sketch the fillet welds subjected to parallel loading and transverse loading.
8. When will the weld deposit be weaker?
9. Define eccentrically loaded welded joints.
10. What are the two types of stresses are induced in eccentric loading of loaded joint?

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PART-B

1. The cylinder head of a steam engine with 250mm bore is fastened by eight stud bolts made of 30C8 steel. Maximum pressure inside the cylinder is 1MPa. Determine the bolt size and approximate tightening torque. Take 20% over load. Assume $\sigma_y = 300\text{MPa}$. (16)
2. A steam of effective diameter 300mm is subjected to a steam pressure of 1.5N/mm^2 . The cylinder head is connected by 8 bolts having yield point 330MPa and endurance limit at 240MPa. The bolts are tightened with an initial per load 1.5 times the steam load. A soft copper gasket is used to make the joint leak proof. Assuming a factor of safety 2, find engine size of bolt required. The stiffness factor for copper gasket may be taken as 0.5. (16)
3. A steam engine cylinder has an effective diameter of 350mm and the maximum steam pressure acting on the cylinder cover is 1.25N/mm^2 . Calculate the number and the size of studs are required to fix the cylinder cover. Assume the permissible stress in the stud 70N/mm^2 . (16)
4. A plate 100mm wide and 12.5mm thick is to be welded to another plate by means of two parallel fillet welds. The plates are subjected to a load of 50kN. Find the length of the weld so that the maximum stress does not exceed 56N/mm^2 . (Do the calculations under static loading). (16)
5. A plate 75mm wide and 10mm thick is jointed with another plate by a single transverse weld and double parallel fillet as shown in fig. The joint is subjected to a maximum tensile force of 55kN. The

permissible tensile and shear stress are 70MPa and 50MPa respectively. Find the length of each parallel fillet weld. (16)

6. Determine the length of the weld run for a plate of size 120mm wide and 15mm thick to be welded to another plate by means of (1) A single transverse weld (2) Double parallel fillet welds when the joint is subjected to variable loads. Assume (Tensile stress =70MPa, shear stress =56MPa.) (16)