

FACULTY OF ENGINEERING

B.E. 3/4 (M/P) I-Semester (Supplementary) Examination, June/July 2011

DESIGN OF MACHINE ELEMENTS

Time : Three Hours]

[Maximum Marks : 75

Answer ALL questions from Part-A.
Answer any FIVE questions from Part-B.
Any missing data may be assumed suitably.

PART—A (Marks : 25)

1. Sketch the states of stress in biaxial and tri-axial systems of loading.
2. Distinguish between gradually applied load, suddenly applied load and an impact load.
3. Distinguish fatigue strength and fatigue life.
4. What is S-N Curve ?
5. Sketch a splined shaft.
6. Why Gib head is provided to a key ?
7. Sketch any two locking devices for joints with bolts and nuts.
8. Why gaskets are provided at joints ?
9. Sketch a screw joint.
10. What are possible failures in riveted joints ?

PART—B (Marks : 50)

11. For the state of stress at a point of a bi-axially loaded member shown in the Figure 1, determine the factor of safety using :
 - (a) Rankine theory
 - (b) Tresca criterion
 - (c) Von Mises criterion.

Take the critical stress of the material as 300 N/mm^2 .

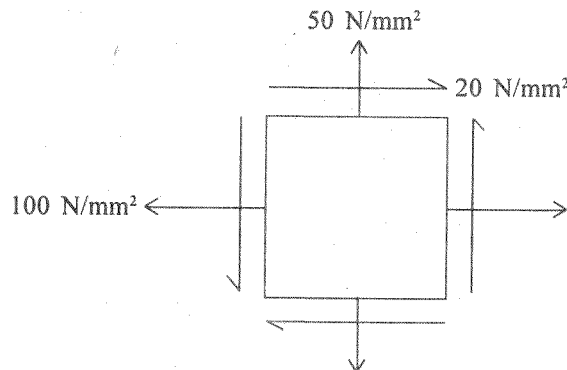
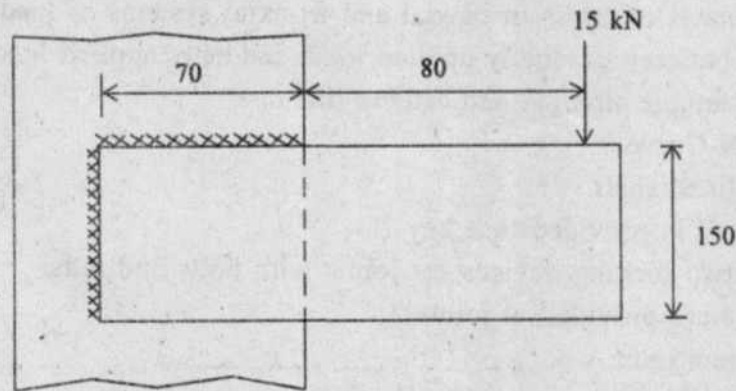


Figure 1

1

12. A rod is subjected to a variable axial load which varies from -300 to 900 N. If the endurance limit and the yield point of the material are 200 and 350 N/mm², respectively, determine the diameter of the rod, using a factor of safety of 3.
13. Design a marine type flange coupling to transmit 2500 kW at 110 rpm. Allowable shear stress may be taken as 30 N/mm².
14. Design a Cotter joint to transmit a load of 2 kN. Take allowable stress values in tension and shear as 70 N/mm² and 30 N/mm², respectively.
15. Determine the size of the weld required for the joint shown in the Figure 2. Allowable stress for the weld material is 80 N/mm².



All dimensions are in mm.

Figure 2

16. Design a screw jack to lift a load of 50 kN.
17. Sketch :
- Triple riveted double cover butt joint
 - Foundation bolt
 - Hooke's joint
 - Uniform strength bolts.