No. of Printed Pages : 4 + Drawing Sheet **BIME-008**

B.Tech. MECHANICAL ENGINEERING (BTMEVI)

01325

Term-End Examination
June, 2012

BIME-008 : MACHINE DESIGN - I

Time : 3 Hours *Maximum Marks : 70*

*Note: Attempted **any seven** questions. All questions have **equal** marks. All the questions are to be answered in English Language only. Design data book is allowed.*

1. Explain different types of riveted joint with neat and clean sketch. **10**

2. A 200 × 150 × 10 mm angle is to be welded to a steel plate by fillet welds as shown in fig. 1. If the angle is subjected to a static load of 200KN, find the length of the weld at the **10**

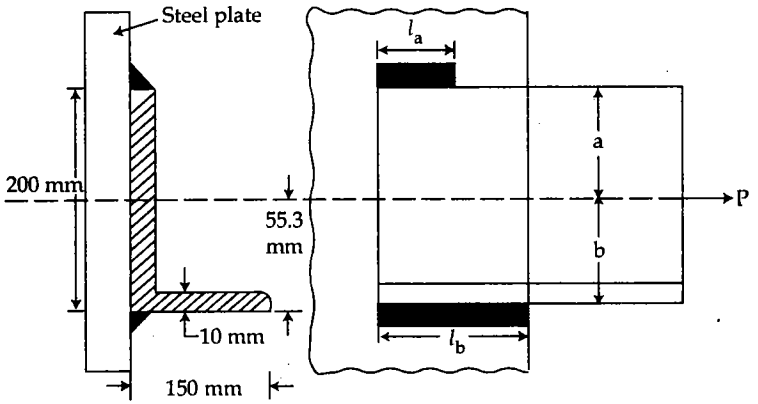

Fig - 1

Top and bottom. The allowable shear stress for static loading may be taken as 75 MPa.

3. Write short notes on **10**

(a) Effects of stress concentration

(b) Creep and fatigue.

4. A cantilever beam of rectangular cross - section is used to support a pulley as shown in fig. 2. The tension in the wire rope is 5KN. The beam is mode of cast iron FG 200 and the factor of safety is 2.5. The ratio of depth to width of cross section is 2. Determine the dimensions of the cross - section of the beam using the maximum - normal stress theory of failure. **10**

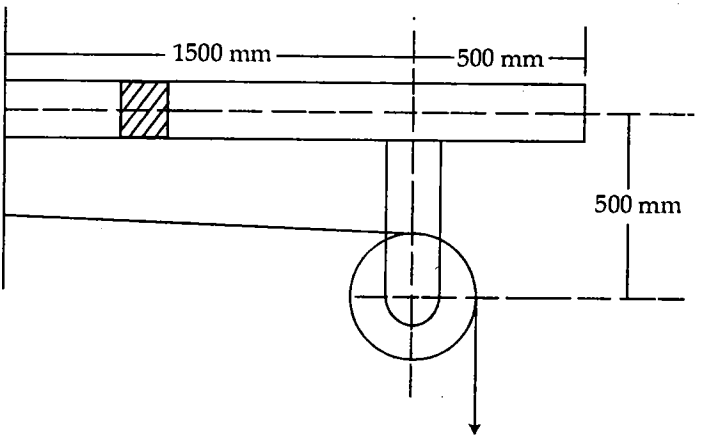

Fig. 2

5. Prove that the maximum stress developed in the plates of a leaf spring is given by. **10**

$$\sigma = \frac{3W.l}{2n.b.t^2}$$

Where W = Point load acting at the centre of leaf spring

l = Span of leaf spring or length of leaf spring

n = number of plates

b = Width of each plate, and

t = Thickness of each plate.

6. A vertical screw with single start square threads of 50mm mean diameter and 12.5 mm pitch is raised against a load of 10 KN by means of a hand wheel, the boss of which is threaded to act as nut. The axial load is taken up by a thrust collar which supports the wheel boss and has a mean diameter of 60mm. The coefficient of friction is 0.15 for the screw and 0.18 for the collar. If the tangential force applied by each hand to the wheel is 100N, find suitable diameter of the hand wheel. **10**

7. Discuss the system design cycle with neat and clean diagram. **10**

8. Discuss the basic requirments for machine elements and machines. **10**

9. Explain the maintenance and its type. What is reliability ? **10**

10. Write short notes : (Attempt *any two*) 10

(a) Hydraulic Press

(b) Pneumatic Press

(c) Screw Press.