



IE Department		1 st Year
ME142	Design of Machine elements	Final, June, 28, 2011
Examiners:	Dr. Rola Afify and committee	Time: 3 hour

Answer the following questions:

Question one (10 marks)

- Mention two types of keys and pins (using neat sketches).
- A bracket is riveted to a column by 6 rivets of equal size as shown in Fig.1. It carries a load of 60 kN at a distance of 200 mm from the center of the column. If the maximum shear stress in the rivet is limited to 150 MPa, determine the diameter of the rivet.

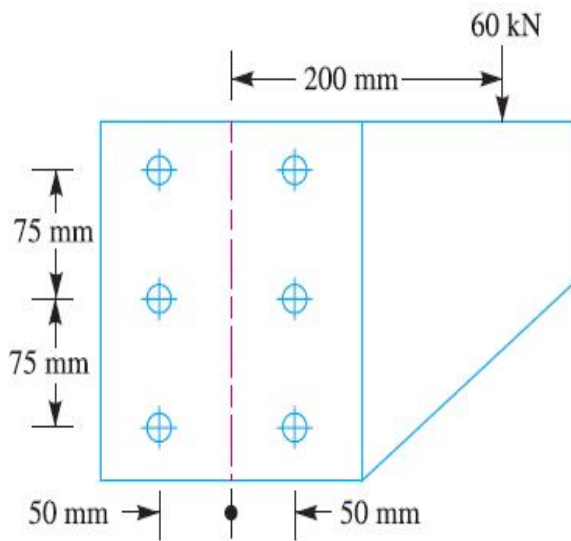
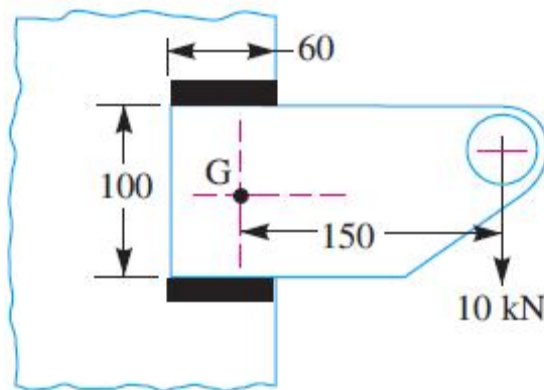


Fig.1



All dimensions in mm.

Fig.2

Question two (10 marks)

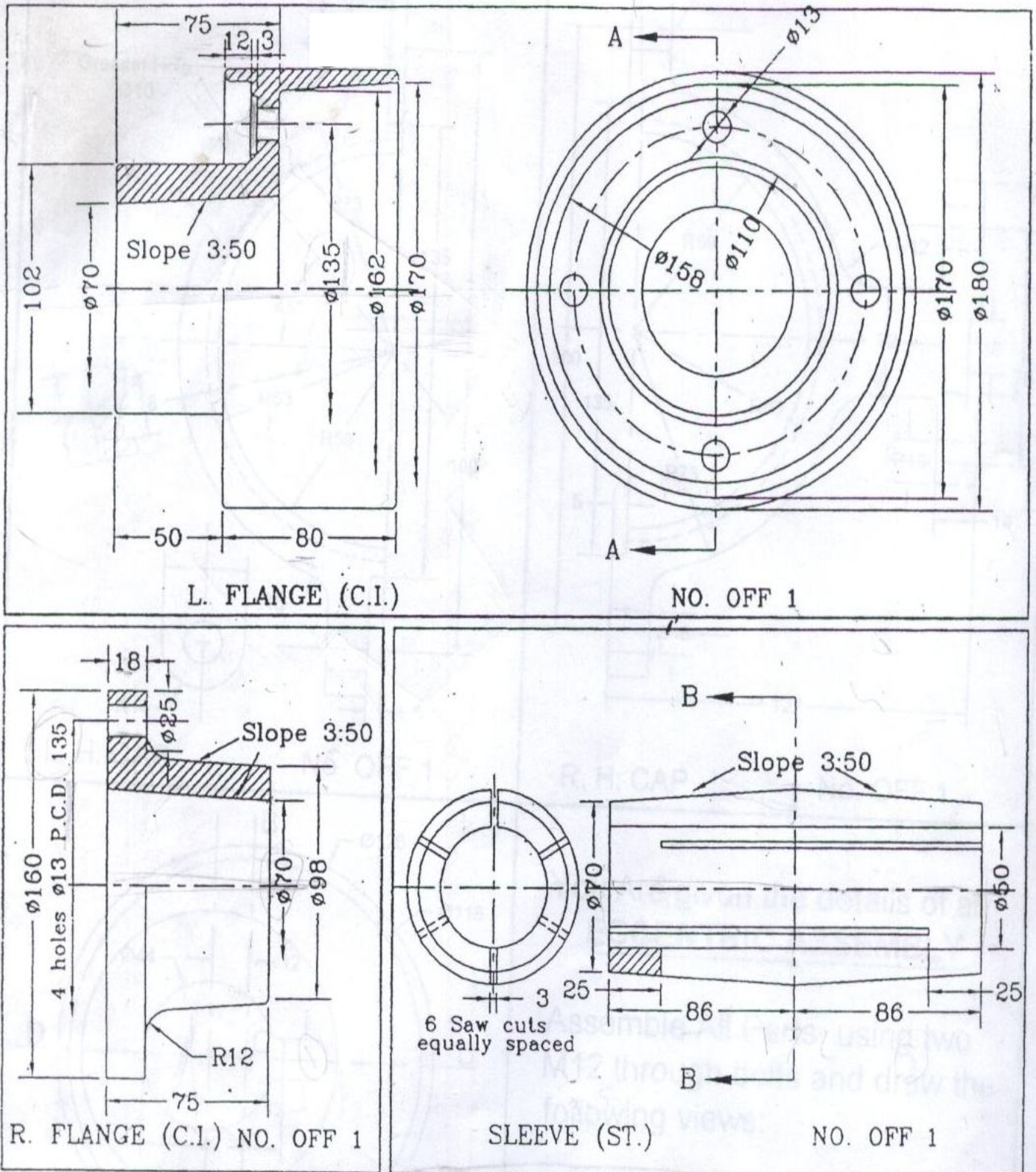
- Name types of fillet welding (without drawing).
- A bracket, shown in Fig.2, is to carry a load of 10 kN. Find the size of the weld if the allowable shear stress is not to exceed 80 MPa.

Question three (10 marks)

- What are the advantages of using belt drive ?
- Find the power that can be transmitted from a 200 mm pulley to a 400 mm one. The two pulleys are 1.5 m apart. The small pulley rotates at 900 rpm and the belt is 50 x 5 mm. You may assume a coefficient of friction between the belt and pulley of 0.3 and the belt weight 11 kN/m³. Let $\sigma_{all} = 2$ MPa for belt material.

You may use this $\theta_1 = 180 - 2 \sin^{-1} \left(\frac{d_2 - d_1}{2C} \right)$

Question Four (30 marks)



You are given the details of a COMPRESSION COUPLING. Assemble all parts using 4M10 through bolts. Draw the following views.

a) H.SEC ELEVATION

b) SIDE VIEW

All dimension in mms

All unspecified radii are R3