Alexandria Higher Institute of Engineering & Technology (AIET)		
IE Department		1st Year
ME142	Design of Machine elements	Final, June, 3, 2012
Examiners:	Dr. Rola Afify and committee	Time: 3 hour

Answer the following questions:

Question one (10 marks)

a) Compare, using neat sketches, between kennedy key and woodruff key.

b) Find the value of P for the joint shown in Fig. 1 based on a working shear stress of 100 MPa for the rivets. The four rivets are equal, each of 20 mm diameter.
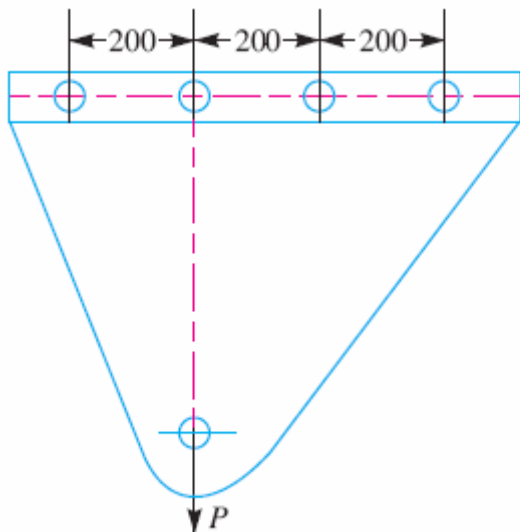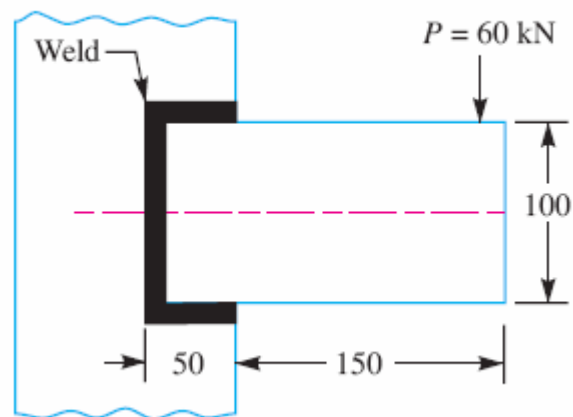

Fig. 1   Fig. 2
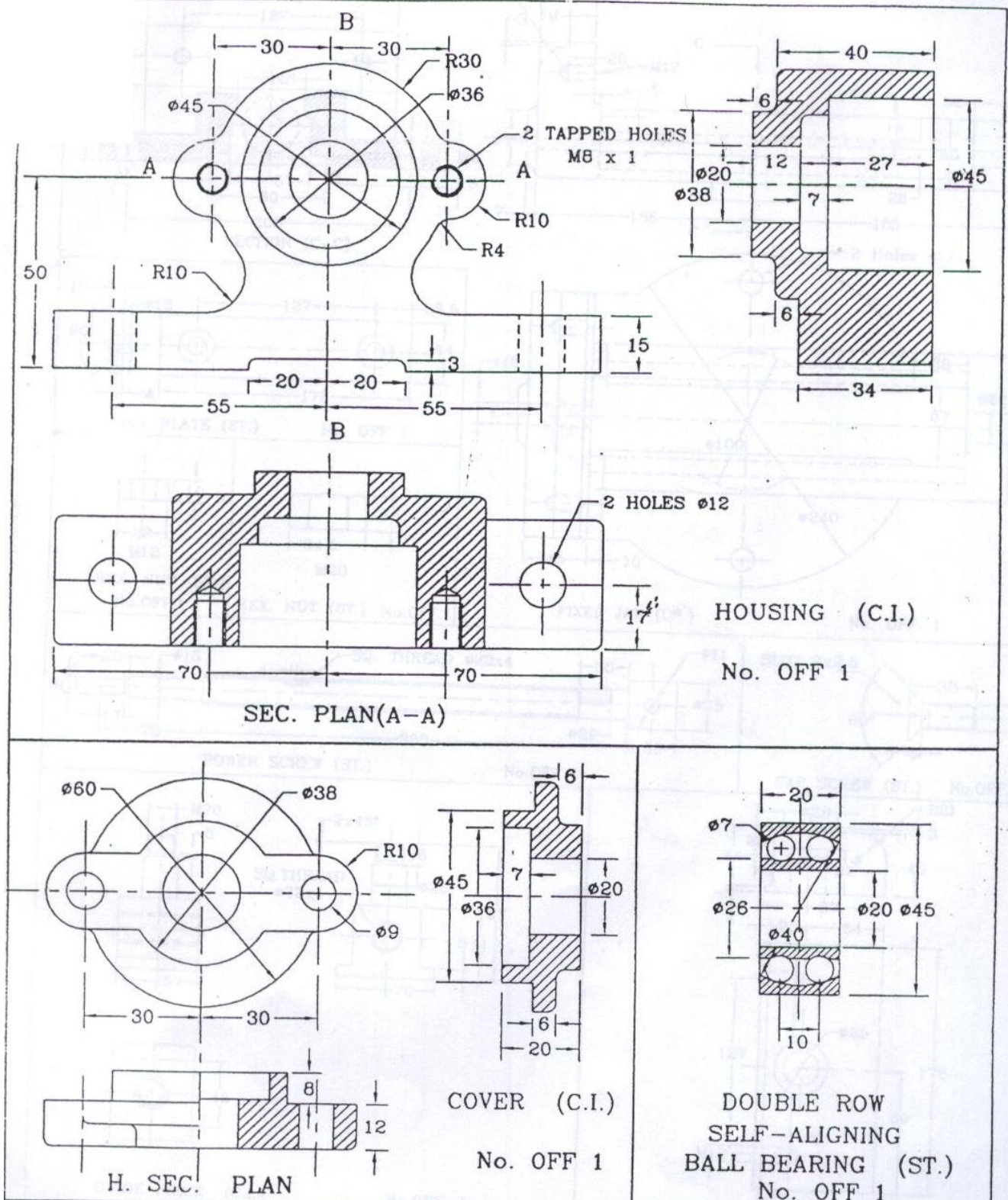
Question two (10 marks)

a) Discuss, using neat sketches, types of fillet welding.

b) A rectangular steel plate is welded as a cantilever to a vertical column and supports a single concentrated load P, as shown in Fig. 2. Determine the weld size if shear stress is not exceed 140 MPa.

Question three (10 marks)

a) What are the disadvantages of using belt drive ?

b) Find the number of v-belt required to transmit 2 kW from a motor running with 900 rpm and has a sheave diameter of 200 mm to a 400 mm sheave 1.5 m apart. You may assume a coefficient of friction $\mu = 0.3$, W = 11 kN/m³, A = 140 mm², σ_{all} = 2.5 MPa, groove angle = 38°, and service factor is unity.

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

Question Four (30 marks)

SEC. PLAN(A—A)

HOUSING (C.I.)

No. OFF 1

H. SEC. PLAN

COVER (C.I.)

No. OFF 1

DOUBLE ROW
SELF—ALIGNING
BALL BEARING (ST.)
No. OFF 1

You are given the details of a **BALL BEARING ASSEMBLY**. Assemble the bearing in position and secure the cover with two M8 Tap bolts. Draw the following views.

a) ELEVATION

b) SEC. SIDE VIEW

All dimension in mm.

All unspecified radii are R3