	Alexandria Higher Institute of Engineering & Technology (AIET)		
	IE Department		1st Year
	ME142	Design of Machine Elements	Final, June, 8, 2013
	Examiners:	Dr. Rola Afify and committee	Time: 3 hour

Answer the following questions:

Question one (10 marks)

a) Mention two types of keys and pins (using neat sketches).

b) 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.

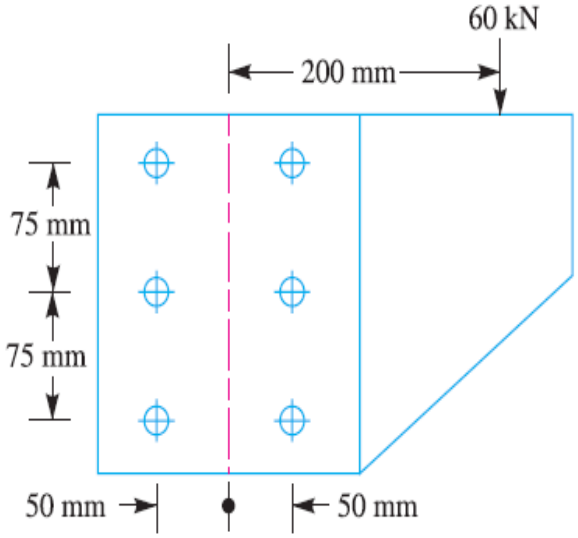

Fig.1

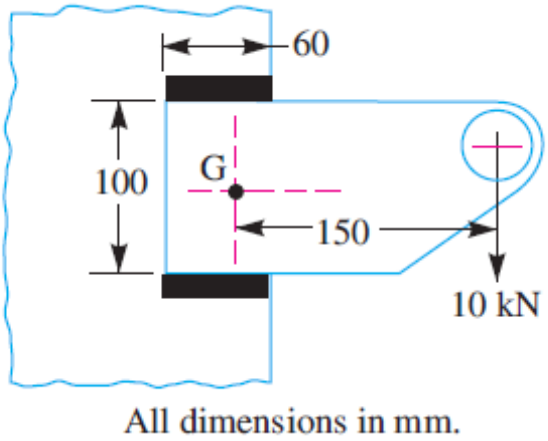

Fig.2

Question two (10 marks)

a) Name types of fillet welding (without sketches).

b) 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)

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 μ = 0.3, W = 11 kN/m^3, A = 140 mm^2, σ_{all} = 2.5 MPa, groove angle = 38^o, and service factor is unity.

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

Question Four (30 marks)