	Alexandria Higher Institute of Engineering & Technology (AIET)		
	Industrial Department		First Year
	EME142	Design of Machine elements	Final, June, 8,2010
	Examiners:	Dr. Rola Afify	Time: 3 hour

Answer the following questions:

Question one (10 marks)

- a) Define the keys and pins. Also, name their types.
- b) A bracket is supported by means of 4 bolts of the same size, as shown in Fig.1. Determine the diameter of the bolts if the maximum shear stress is 140 MPa.

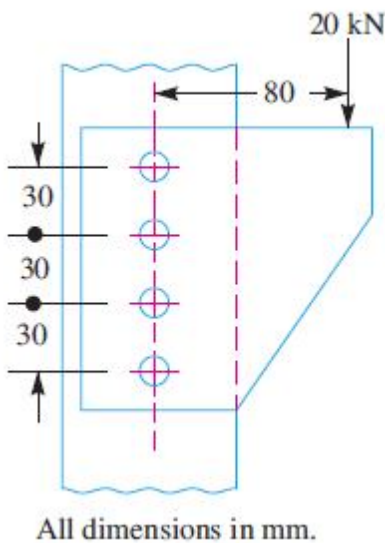


Fig. 1

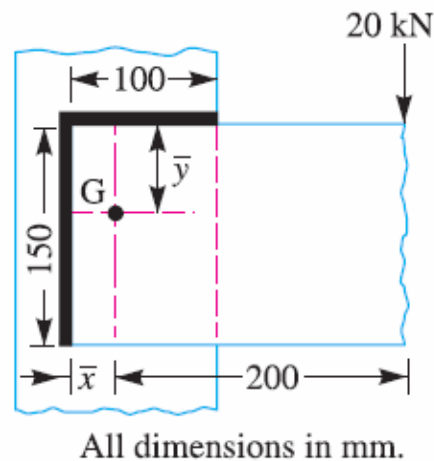


Fig. 2

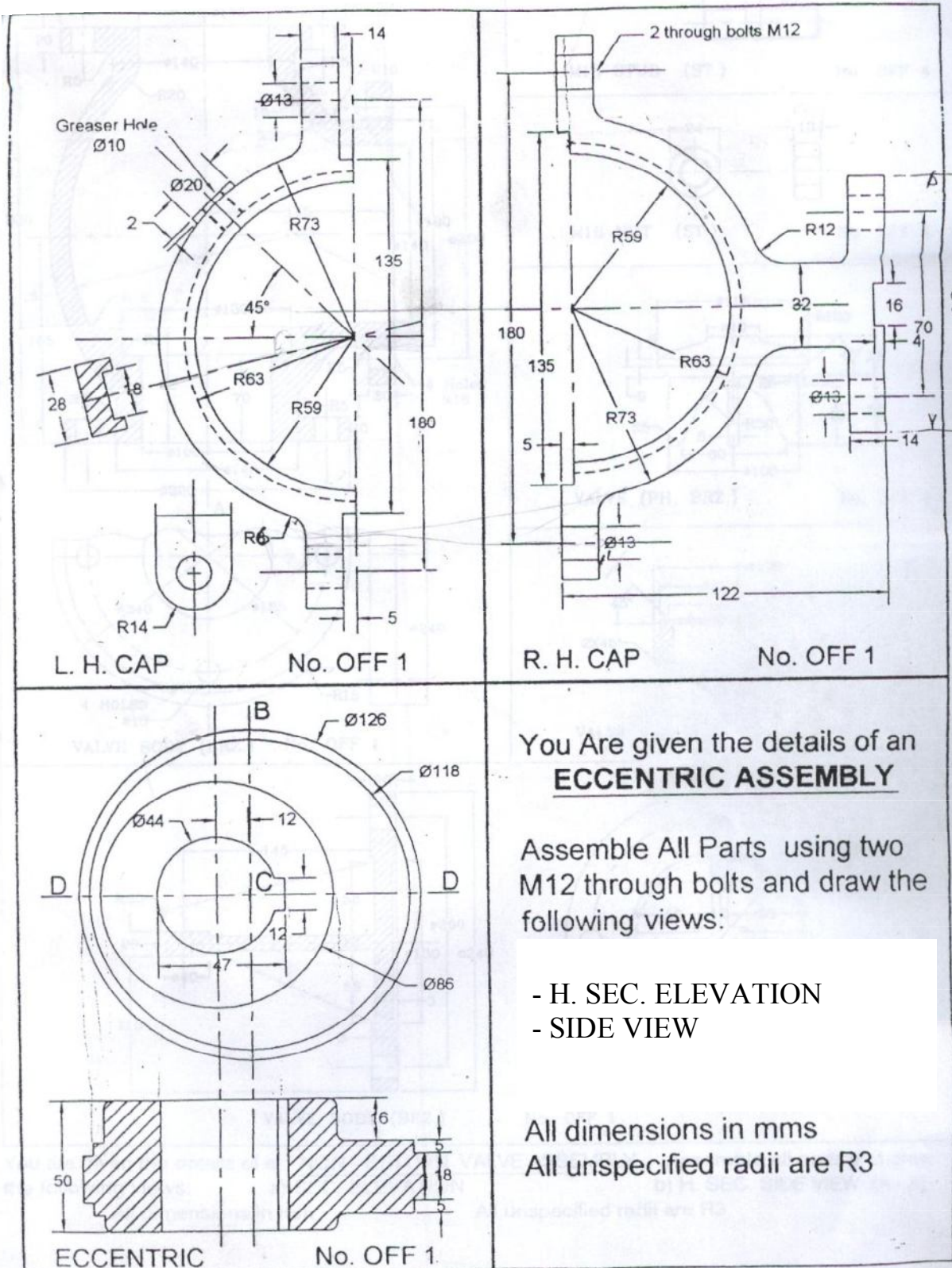
Question two (10 marks)

- a) Welding is used as a repair medium (explain).
- b) Fig. 2 shows a welded joint subjected to an eccentric load of 20 kN. The welding is only on one side. Determine the uniform size of the weld on the entire length of two legs (h). Take the allowable shear stress for the weld material is 80 MPa.

Question three (10 marks)

- a) What are the disadvantages of using belt drive ?
- b) Find the number of 80 mm² V-belts required to transmit 5 kW from a 200 mm sheave running with 900 rpm to another sheave 1 m apart with a reduction ratio of 3:1. The belt weight 11 kN/m³ and has $\sigma_{all} = 2$ MPa. You may assume $\mu = 0.3$ and the groove angle is 38°. The service factor is 1.2.

Question Four (30 marks)



You Are given the details of an **ECCENTRIC ASSEMBLY**

Assemble All Parts using two M12 through bolts and draw the following views:

- H. SEC. ELEVATION
- SIDE VIEW

All dimensions in mms
All unspecified radii are R3

Good Luck