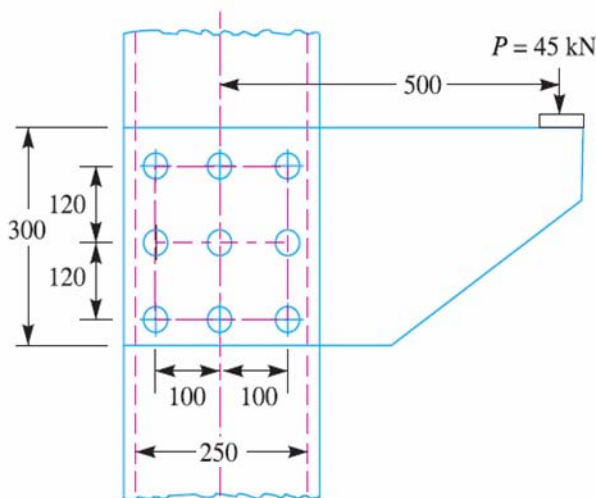
	Alexandria Higher Institute of Engineering & Technology (AIET)	
	IE Department	
	ME142	Design of Machine Elements
	Examiners:	Dr. Rola Afify and committee
		1 <sup>st</sup> Year
		Final, May, 30, 2013
		Time: 3 hour

**Answer the following questions:**

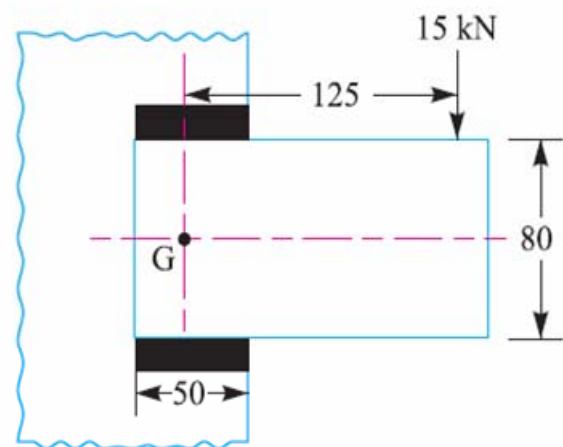
**Question one (10 marks)**

- Explain using neat sketches Flat and Woodruff keys.
- A bracket, shown in Fig.1, is to carry a load of 45kN. Determine the size of rivet if the shear stress is not to exceed 40 MPa. Assume all rivets of the same size.



**Fig.1**

All dimensions in mm.



**Fig.2**

**Question two (10 marks)**

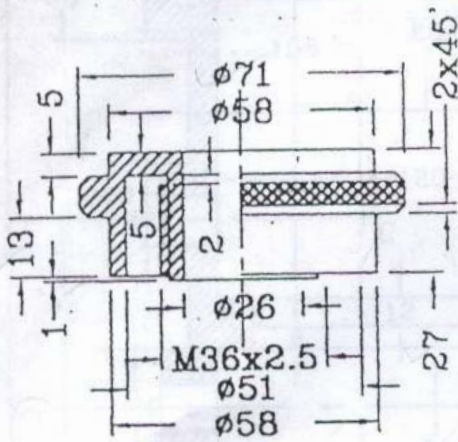
- Name types of fillet welding (without sketches).
- A bracket carrying a load of 15 KN is to be welded as shown in Fig.2. Find the size of the weld required if the allowable shear stress is not to exceed 80 MPa.

**Question three (10 marks)**

- What are the types of belt drives ?
- 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/m<sup>3</sup>. Let  $\sigma_{all} = 2$  MPa for belt material.

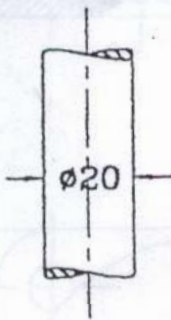
You may use this  $\theta_1 = 180 - 2 \sin^{-1} \left( \frac{d_2 - d_1}{2C} \right)$

**Question Four (30 marks)**



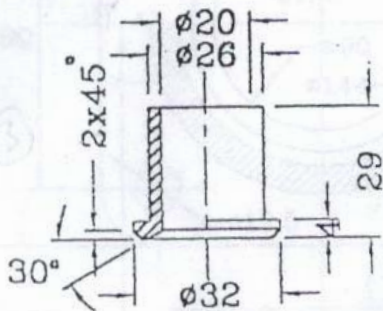
GLAND(BRZ.)

NO. OFF1



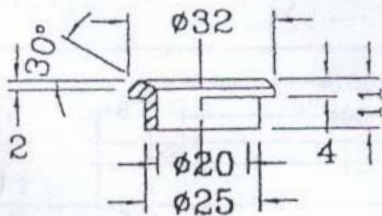
SHAFT(ST.)

NO. OFF1



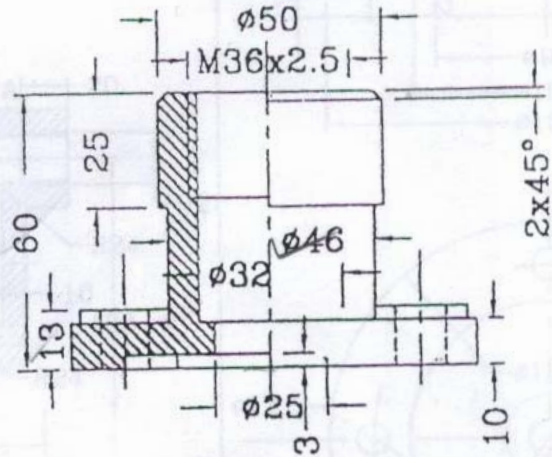
BUSH(BRZ.)

NO. OFF1

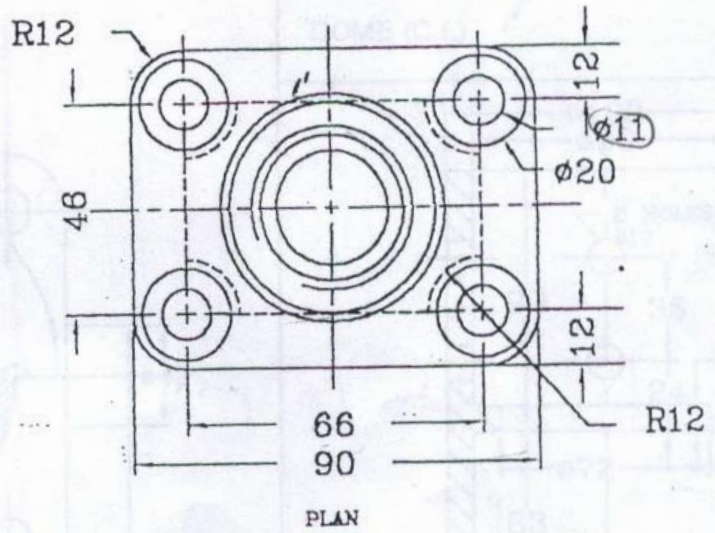


BUSH(BRZ.)

NO. OFF1



H. SEC. ELEV.



PLAN

BODY(BRZ.)

NO. OFF1

The details of a STUFFING BOX are given above. Assemble all parts and draw the following:

- a) H. SEC. ELEV.
- b) PLAN

All dimensions are in mm .  
All unspecified radii are R2 .