

التصميم  
مهندسة



Kafrelsheikh University  
Mechanical Engineering Department

DATE: 16-06-2019 TIME ALLOWED: 4 HOUR

FINAL EXAM

تصميم الآلات

Assume any missing data.

(Total mark 100)

**Question One**

A train of gears transmitting power from a 10 kW, 1440 rpm motor to a rope drum is shown in Figure 1 (a). The number of teeth on the various gears is as follows:

$$\begin{array}{lll} z_1 = 20 & z_2 = 100 & z_3 = 25 \\ z_4 = 150 & z_5 = 25 & z_6 = 150 \end{array}$$

The module of gears 1 and 2 is 5 mm, while that of all other gears is 6 mm. The pressure angle is  $20^\circ$ .

- 1) Design the muff coupling (including the keys) connected between the motor and gear 1 shown in Figure 1 (a) based on the various dimensions of the flange coupling shown in Figure 1 (b).  
(15 Marks)
- 2) Draw the gears transmitting power system (including motor, coupling, shafts, keys, and gears) using SOLIDWORKS. (The width of the gears is 15 mm)  
(45 Marks)

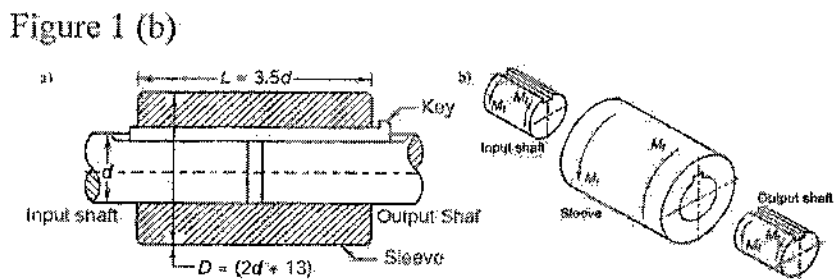
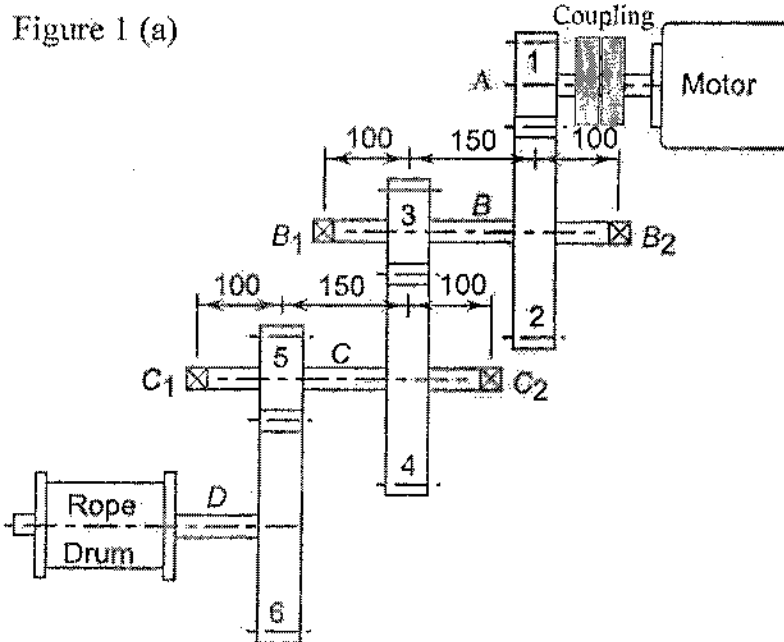
**Question Two**

It is required to design a knuckle joint to connect two circular rods subjected to an axial tensile force of 50 kN. The rods are co-axial and a small amount of angular movement between their axes is permissible. Select suitable materials for the parts.

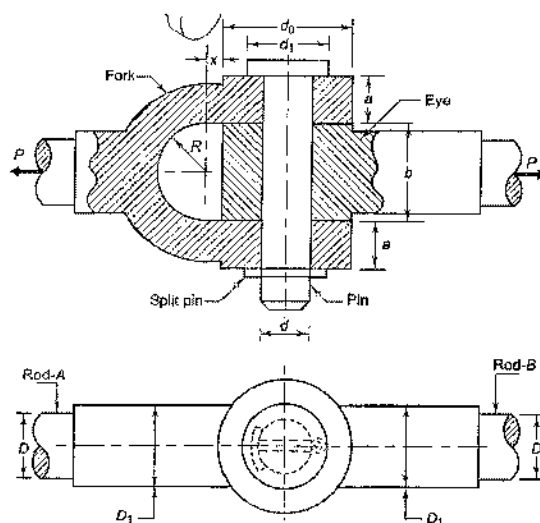
- a) Design the joint and specify the dimensions of its components. (20 Marks)
- b) Draw the knuckle joint using SOLIDWORKS. (30 Marks)

You can achieve it.

Dr. Ammar Elsheikh



Dimensions in mm.



You can achieve it.

Dr. Ammar Elsheikh