طالب علم الآلات

معلومات هامة

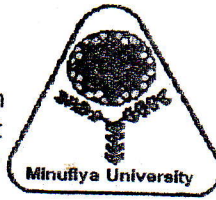Menoufia University
Faculty of Engineering , Shebin El-Kom
Producion Engg. & Mech. Design Dept
First Semester Examination,2013 -2014
Date of Exam. : 5 / 1 / 2014

Minufiya University

Subject : Machine Elements Design
Code :   PRE 211
Year :   Second
Time Allowed : 4 hours
Total Marks : 100 marks

Part (1)

Answer the following questions :

Question 1 (40 marks)

A transmission shaft bedded on two rolling bearings A & D . Power of 20 HP is received by pulley C whose diameter 650 mm. at a speed of 200 r.p.m. and transferred to a straight toothed spur gear B with a pitch diameter 300 mm. The pulley weights 100 Kg and the gear weights 50 Kg . Both the gear and pulley are hold to the shaft by a feather key .The shaft is machined from Alloy Steel [τ = 900 Kg / cm2].

Determine the following : (See Fig. 1)

- a- Design the shaft diameters required .(8 marks)
- b- Design the required keys .(8 marks)
- c- Select the suitable rolling bearings A & D .(8 marks)
- d- Submit a preliminary design drawing of the shaft . (8 marks) &
- e- Design of a flat leather belt pulley. [T] = 55 Kg / cm. (8 marks)

Question 2 (10 marks)

Two shafts are connected by means of a coupling to transmit 5 H.P. at 1440 r.p.m. The flanges of the coupling fastened by means of 4 bolts at a radius of 30 mm. Permissible shear stress in the bolts = 3 Kg / sq..mm. Design the bolts.
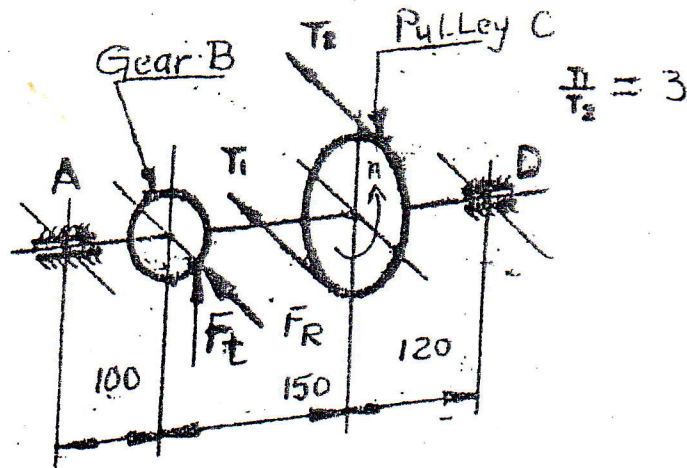

Fig.(1)

$\frac{T_1}{T_2} = 3$

With our best wishes

(Question 3):(15marks)

- Design a lap joint for a mild steel tie-bar 320mmx16mm thick. Assume allowable stresses in tension and compression of the plate material as 112MPa and200MPa respectively and shear stress of the rivets as 84MPa.Take $d_o=6 \times S^{\frac{1}{2}}$ k=1, ψ = ⅔, and P =196KN.

(Question 4):(10marks)

-Determine the requisite length of welds joining alap steel strip to a plate . The strip dimensions are 150x 10 mm. Load =48 ton. Material of strip and plate are St-3.plate width is200mm,12mm in thickness, and Electrodes EL- 42. τshp =11 Kg/mm² ., $\sigma brakep$ = 27 Kg/mm² , $\sigma tenp$ = 18 Kg/mm².

| C1	compression	tension	shear
	1.00	0.90	0.60

(Question 5):(25marks)

An electric motor, its power is 75 KW and its speed is 1440 r.p.m. its movement is transmitted by a flange coupling to a gear box with three reduction levels. The first one is spur and the second one is helical and the third one is bevel. If the reduction ratio for the bevel one is (i_3 = 3). If the last column with a pulley fixed to it with a diameter 20 cm and its speed is 60 m/min. And if the belt connection is working at the full motor power.

Design the set of spur gear and determine the tangential force that applied to the pulley.

b=15m,i_2=2, σu driver=53kg/mm²,σu driven=49kg/mm²,Kd=1.3, €=0.02,α=20°,ft=1,h1=m. And Zpinion=48teeth
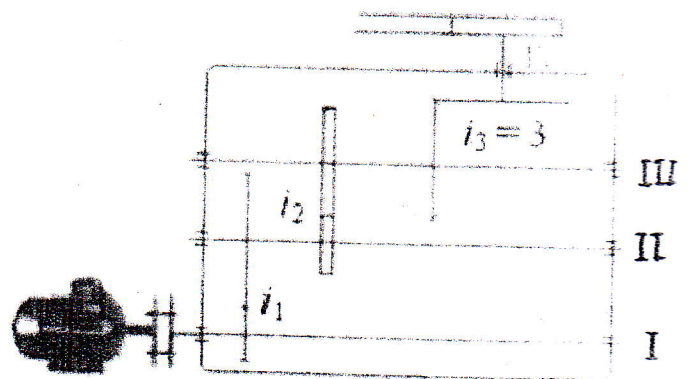
This exam contributes "by measuring" in achieving Programme Academic Standards according to NARS												
Question Number	Q3	Q4	Q5		Q3	Q4	Q5			Q3	Q4	Q5
Skills	a4-1,a1 9-1	a4-1,a1 9-1	a4-1		b17-1	b17-1	b16-1,b1 7-1			c1-1	c1-1	c1-1
	Knowledge&Understanding Skills				Intellectual Skills					Professional Skills		