Menoufia University
Faculty of Engineering , Shebin El-Kom
Production Engg. & Mech. Design Dept.
First Semester Examination,2015-2016
Date of Exam. : 24 / 1 / 201

Minufiya University

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

Answer the following questions : (Tables & Graphs are allowed to use)

Question 1 (20 marks)

For the following data :

Pulley diameter	=	*250*	*mm.*
Power	=	*10*	*HP*
Shaft speed	=	*900*	*r.p.m.*
Shaft diameter	=	*25*	*mm.*
T_1 / T_2	=	*2.5*	

a- Working drawing of the designed Gib- Head kay . (5 Marks)
b- Working drawing of the designed Flat belt pulley . (15 Marks)

Question 2 (10 Marks)

For the following data :

Shaft diameter	=	*35*	*mm.*
Horizontal load	=	*250*	*Kg*
Vertical load	=	*36*	*Kg*
Axial load	=	*zero*	*Kg*
Service factor	=	*1.2*	
Shaft speed	=	*900*	*r.p.m.*

Select a suitable S.R . Deep Groove Ball Bearing .

With our best wishes Dr. GABER M. SHEHA

This exam contributes "by measuring"in achieving Programme Academic Standards according to NARS															
Ques. Number	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
Skills	a3-1	a4-1	a19-1			b17-1					c1-1	c13-1			
	Knowledge&Understanding Skills					Intellectual Skills					Professional Skills				

Answer the following question:-

Question No: 3 Power Screw *(20 marks)*

a) What are the applications of power screw? *(5 marks)*

b) The construction of a shaft straightener used on the shop floor is shown in the figure. The screw has single-start threads of 80 mm nominal diameter and 10 mm pitch. The screw is required to exert a maximum axial force of 10 kN. The mean radius of the friction collar is 30 mm. The axial length of the nut is 40 mm. The coefficient of friction at the threads and the collar is 0.12. The mean diameter of the rim of the hand wheel is 500 mm. Calculate: -

(i) The force exerted at the rim to drive the screw; *(7 marks)*

(ii) The efficiency of the straightener; and *(3 marks)*

(iii) The bearing pressure on the threads in the nut. *(5 marks)*

Answer only one of the two following questions:-

Question No: 4 Welded Joints:- *(15 marks)*

a) What are the types of welded joints (Draw and Explain)? *(5 marks)*

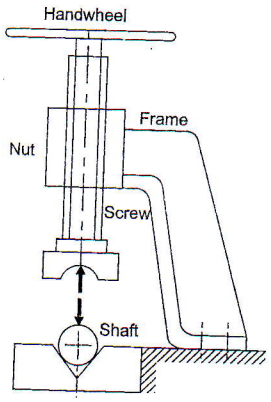
b) A welded connection, as shown in the Figure is subjected to an eccentric force of 7.5 kN. Determine the size of the welds, if the permissible shear stress is limited to 100 N/mm^2. (The polar moment of inertia of two welds is given by J= (83334t_w) mm^4. *(10 marks)*

Question No: 5 Riveted and Threaded Joints :- *(15 marks)*

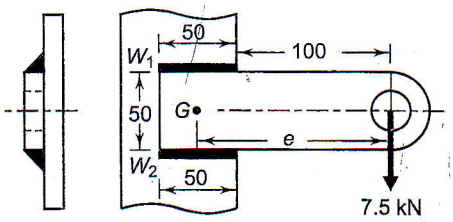
a) State maximum shear stress theory of failure and where it used? *(3 marks)*

b) What are the yield point, ultimate point and allowable stress? *(2 marks)*

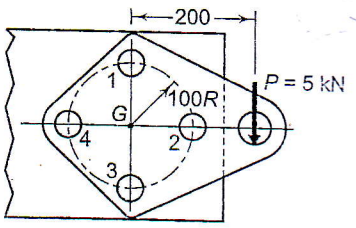
c) A riveted joint, consisting of four identical rivets, is subjected to an eccentric force of 5kN as shown in Fig. Determine the diameter of the rivets, if the permissible tensile stress in the rivets is limited to 60 N/mm^2. *(10 marks)*



Power Screw



Welded Joints



Riveted and Threaded Joints

Question 6-(35 mark)

6-1:-(20 mark)

- Design a pair of straight teeth spur gears, having 20° involute full depth teeth is to transmit 12KW at 300 rpm of the pinion. The speed ratio is 3:1. The allowable ultimate tensile stress for gear and pinion are 5500 and 6000Kg/Cm² respectively.
Number of teeth of pinion=16,Face width=14 times module, α=20°, Kd=1.3,ft=1,andηt=0.9.

6-2:-(15 mark)

-Design a pair of helical gears to transmit 2HP in power and 1440rpm ,i=4, the allowable ultimate tensile stress for gear driver and gear driven are 88 and 69Kg/ mm² respectively, HB=260 for gear driver,200 for gear driven. Ψa =0.3 , Kd=1.4,ß=10°
,η=0.98,mn=0.02A,and λa=1.3.
Standard modules are 1.5,1.75,and 2.00mm.Allowable error up to5%,andψ=18.

Good luck Dr.H.Gaffer24 jan2016

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Question Number	Q6-1	Q6-2				Q6-1	Q6-2				Q6-1	Q6-2			
Skills	a4-1,a1 9-1	a4-1,a1 9-1				b17-1	b17-1				c1-1	c1-1			
	Knowledge & Understanding Skills					Intellectual Skills					Professional Skills				