Enrollment No:

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LDRP INSTITUTE OF TECHNOLOGY AND RESEARCH, GANDHINAGAR
DEPARTMENT OF MECHANICAL ENGINEERING
B.E. 5th SEMESTER
MID SEMESTER EXAMINATION AUGUST-2014

Date: 25th August 2014 | **Branch: MECHANICAL**
Subject: MD-I | **Subject Code:**
Time: 8:30 AM to 10 AM | **Total Marks: 30**

Instructions:

(1) All Questions are compulsory.
(2) Figures to the right indicate full marks.
(3) Use of scientific calculator is permitted.
(4) Make suitable assumption, wherever necessary.

Que. 1 (A)	For SKF 6207 bearing is to operate on the following work cycle. Radial load of 6370N at 200 rpm for 25% of the time. Radial load of 9080N at 600 rpm for 20% of the time. Radial load of 3638N at 400 rpm for 55% of the time. The inner ring rotates. The loads are steady. Find the expected average life of this bearing in hours.	7
(B)	Explain the performance of a hydrodynamic bearing with the curve of μ versus Z.N / p. OR Explain the design for assembly.	3
Que. 2 (A)	A hot rolled steel rod is to be subjected to a torsional load that will vary from a -100 Nm to +400 Nm. Determine the diameter of rod using a factor of safety 1.75 for the material of the rod take σ_{ut} = 489 MN/m2, σ_{yp} = 315 MN/m2 .Take surface condition modifying factor = 0.68, Size factor = 0.85, Load factor = 0.58, Stress concentration factor = 1.	7
(B)	What do you mean by standardization? Explain role of preferred numbers in standardization?	3
	OR	
(A)	A lightly loaded bearing 80mm long has 80mm diameter and supports a radial load of 3000N. The clearance ratio is 0.001. The lubricating oil SAE 30 has viscosity of $33*10^{-3}$ Pas at 60C. The shaft speed is 750rpm. The end leakage factor (k) = 0.002. Find (i) Co-efficient of friction. (ii) Friction torque developed (iii) power lost in friction.	7

	(B)	Design of transverse fillet welded joint.	3
Que.3	(A)	A simple shoe brake as shown in fig 1 is operated through linkage. The force applied is 120N. Determine the torque developed. If the allowable pressure intensity between the shoe and the drum is 0.8MPa, find the dimensions of the shoe. Take $\mu = 0.3$.	7
	(B)	Difference between self energizing and self locking brake.	3
		OR	
	(A)	Fig 2 shows an arrangement of a transmission brake. When the force is applied at the end of lever, the screw rotates. The screw has left hand and right hand thread as shown in figure. The screw works in the nuts on the arms ends. The screw has square threads of mean diameter 25mm and lead of 60mm. The length of lever is 420mm from the axis of the screw, and the drum diameter is 200mm. If $\mu = 0.15$ for threads and 0.3 for shoes, find 1) Force required at the end of lever to set the brake, when the braking torque is 225Nm. 2) Cross section of the lever if $h = 2.5t$ and $\sigma_t = 70$ MN/m^2. 3) Find the dimension of the shoe.	10

FIG:1

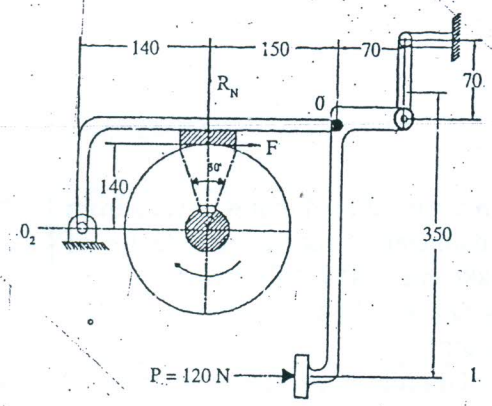
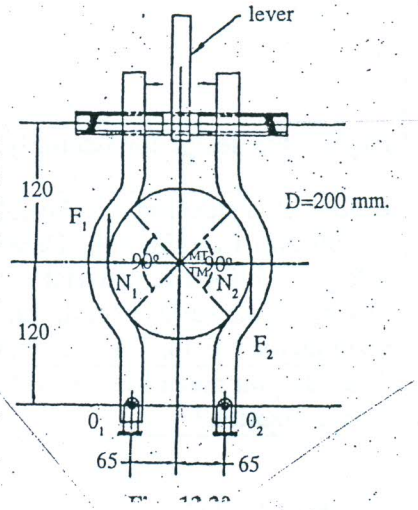


FIG: 2



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