MENOUFIA UNIVERSITY
Faculty of Engineering,Shebin El-Kom
Prod. Eng.& Mechanical Design Dept.
First Semester Exam. , 2017 – 2018
Date of Exam. : 10 / 1 / 2018

Minufiya University

TRIBOLOGY
PRE 527
First year diploma
3 Hours
100 Marks

Allowed tables and charts

Answer the following questions

Question 1(40 Marks)

A 40x40 mm. sleeve bearing uses SAE 20 lubricant. The inlet temperature is 40 °C & clearance is 0.0445 mm.. The journal speed is 1800 R.P.M. & the radial load 230 Kg . Estimate :

A – Isoviscous performance of the lubricant (μ_{iso}). (15 Marks)
B – The magnitude of the Min. oil – film thickness. (5 Marks)
C – The eccentricity & the eccentricity ratio. (5 Marks)
D – The coefficient of friction & the power loss rate. (5 Marks)
E - Both the total and side oil – flow rates. (5 Marks)
F – The maximum oil – film pressure . (5 Marks)

Question 2 (20 Marks)

For the data of the Question 1 :

A – Draw the bearing performance characteristics (Q , h_o & f) With respect to radial clearance (c = 0.025 - 0.035 – 0.045 - 0.055 - 0.065 – 0.075 mm.). (10 Marks)
B – Explain how the radial clearance has a major effect on the bearing life . (10 Marks)

Question 3 (20 Marks)

a-Remember the TRIBOLOGY parameters affecting on dry sliding wear. (5 Marks)
b- If the wear rate was measured by weight loss method write a report about the effect of only three parameters on wear rate . **(15 Marks)**

Question 4(20 marks)

a- The difference between lubrication regimes has been defined by plot the change in coefficient of friction versus the bearing characteristic μ N/P . How this relation illustrates the stable & un-Stable lubrication regimes in journal bearings . (10 Marks)
b- Prove the PETROFF' S Law to estimate f in hydrodynamic lubrication . Compare between f values according to PETROFF'S & the result value from the Question 1 . (10 Marks)

Good luck ! Dr. G. SHEHA