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 معارف

Menoufia University
 Faculty of Engineering, Shebin El-Kom
 Production Engineering & Mechanical
 Design Department
 First Semester Examination, 2013-2014
 Date of Exam.: 23 / 1 / 2014



Subject: Tribology
 Code: PRE 414 B
 Year : 4 th Year
 Time Allowed : 3 hours
 Total Marks : 70 marks

Answer the following questions

(Question 1): (15 marks)

- a- Tribology ! What does it mean?
- b- Why do we need lubrication?
- c- How do lubricants control Friction & Wear?

(Question 2): (15 marks)

- a- Remember the tribology parameters affecting on dry sliding wear .
- b- Sketch and explain the Pin- on-Disc Machine .
- c- If the rate of wear was measured by weight loss method , write a brief report about the effect of only three parameters on wear rate .

(Question 3) : (15 marks)

Write a report about the following types of lubrication :

- a- Boundary
- b- Hydrodynamic &
- c- Hydrostatic

(Question 4) : (25 marks)

- a- Prove that : $f = 2 \pi^2 (\mu N / P) \cdot (r/c)$
- b- A lightly loaded bearing has a load of 2700 N . The journal (D= L = 75 mm.) rotates at 420 r.p.m. & is lubricated with oil ($\mu = 0.02 \text{ N/ m}^2 \cdot \text{s}$) . Estimate the coefficient of friction if the bearing clearance is 0.035 mm.

With our best wishes

This exam contributes "by measuring" in achieving Programme Academic Standards according to NARS														
Question Number	Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4
Skills	a1	a16				b13	b17				c13	c16		
	Knowledge&Understanding Skills					Intellectual Skills					Professional Skills			