*Total number of printed pages – 4* **B. Tech**

**PEME 6410**

## Eighth Semester Examination – 2008

### TRIBOLOGY

**Full Marks – 70**

**Time : 3 Hours**

*Answer Question No. **1** which is compulsory and any **five** from the rest.*

*The figures in the right-hand margin indicate marks.*

1. Answer the following questions : 2 ×10

   (a) Distinguish between static and kinetic friction.

   (b) Define the term 'wear'.

   (c) What do you mean by 'solid film lubrication' ?



   (d) What are the disadvantages of hydro-dynamic bearings ?

   (e) What do you understand by *solid particle erosion* ?

   (f) Name some equipment / test set ups used for wear measurement.

   (g) What are the effects of sliding speed on friction ?

   (h) Write the Petroff's equation for a lightly loaded bearing mechanism.

   (i) Distinguish between two body abrasion and three body abrasion.

   (j) How surface contamination cause loss of material from the component surface ?

2. (a) What do you mean by lubrication ? 3

   (b) Discuss the properties of an ideal lubricant. 7

3. What are the different modes of wear ? Describe the standard pin-on-disc test method to determine the material loss due to sliding wear. 10

4. Derive Reynold's equation in two dimensions. State all the assumptions. 10

5. A full journal bearing of width 100 cm operates with a shaft of 20 cm diameter rotating at 1200 rpm and having a diametral clearance of 200 micrometer. The lubricating oil has an absolute viscosity of 40 cp at an inlet temperature of 20 °C. For an eccentricity ratio of 0.7, calculate minimum film thickness, attitude angle, maximum film pressure, its location and load capacity. 10

6. What is meant by a hydrostatic circular step thrust bearing ? Find an expression for its load carrying capacity. 10



7. Describe the design methodology and selection criteria of anti-friction bearings. 10

8. Write short notes on any *two* : 10

   (a) Classification of wear resistant materials

   (b) Power loss in bearing due to friction

   (c) Gas lubricated bearings.

_____