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10ME831

Eighth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Tribology

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. With neat sketch, explain different types of Sliding Lubrication. **(09 Marks)**

b. Derive an expression for the flow of liquid between parallel stationary plates. State the assumptions while deriving the expression. **(11 Marks)**

2 a. Discuss the mechanism of pressure development in an oil film. **(08 Marks)**

b. Explain the velocity distribution across converging oil film and pressure distribution in the film in partial journal bearing. **(06 Marks)**

c. Write a note on towers experiments. **(06 Marks)**

3 a. Derive an expression for pressure distribution of a plane slider bearing with fixed shoe. **(12 Marks)**

b. The following data refer to a short journal bearing : Diameter of journal = 30 mm ; Length of bearing = 20mm ; Viscosity of Lubricant = 55 mPa.sec ; Eccentricity ratio = 0.6. Taking the r/c ratio as 1000, calculate i) the load carrying capacity and attitude ii) the power lost in friction. **(08 Marks)**

4 Derive an expression for :

a. Load carrying capacity.

b. Frictional forces and

c. Co-efficient of friction of idealized slider bearing with a pivoted shoe. **(20 Marks)**

PART – B

5 a. With neat sketch explain : i) Full journal bearing lubricated through a single hole. ii) Typical design of oil grove. **(10 Marks)**

b. Discuss the factors considered while selecting the bearing length to diameter ratio. **(10 Marks)**

6 a. Derive an expression for load carrying capacity for a hydrostatic bearing. **(10 Marks)**

b. A hydrostatic step bearing has the following data :
Diameter of the shaft = 150mm ; Diameter of pocket = 100mm ; Vertical thrust on bearing = 60,000N ; External pressure equals atm pressure ; Shaft speed = 1500 rpm ; Viscosity of the lubricant = 30cp ; Desirable oil film thickness = 0.0125 cm.
Determine i) Rate of flow of oil ii) Power loss due to friction iii) Co-efficient of friction. **(10 Marks)**

7 a. Write a note on common bearing alloys and explain Bronze , Aℓ - alloy and copper – lead alloy bearing material. **(10 Marks)**

b. Enlist the requirements of good bearing material. Discuss in brief. **(10 Marks)**

8 a. Explain the effect of molecular attraction and electrostatic forces on friction of materials. **(10 Marks)**

b. Define Wear. Explain mechanism of Wear. **(10 Marks)**

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