CBCS SCHEME

USN | | | | | | | | | | **17ME742**

Seventh Semester B.E. Degree Examination, July/August 2022
Tribology

Time: 3 hrs.

Max. Marks: 100

Note: 1. *Answer any FIVE full questions, choosing ONE full question from each module.*
2. *Use of Tribology Data handbook is permitted.*
3. *Assume missing data suitably.*

Module-1

1 a. Explain different types of lubricants with examples. Standard grades of lubricants. **(10 Marks)**
   b. Explain Practical importance of tribology and subsequent use in different fields. **(10 Marks)**

OR

2 a. Explain different properties of Lubricants. **(10 Marks)**
   b. With graph, explain effect of temperature and pressure on viscosity. **(10 Marks)**

Module-2

3 a. Explain any two Friction Measuring methods. **(10 Marks)**
   b. Briefly explain any two theories of Friction. **(10 Marks)**

OR

4 a. With sketches, explain different mechanisms of Wear. **(10 Marks)**
   b. Explain any two testing methods for erosive wear. **(10 Marks)**

Module-3

5 Derive Reynolds equation in 2D. **(20 Marks)**

OR

6 a. Derive Petroff's equation for Lightly loaded bearings. **(10 Marks)**
   b. A full Journal bearing has following datas : Diameter of Journal = 50mm ;
      Length = 65mm ; Speed = 1200 rpm ; Radial clearance = 0.025mm ;
      Viscosity = 1.125×10^{-3} pa.sec ; Attitude = 0.8. Calculate i) Load carrying capacity
      ii) Coefficient of friction iii) Power loss of bearing. **(10 Marks)**

Module-4

7 a. Derive an expression for load carrying capacity for Pivoted Shoe Slider bearing. **(10 Marks)**
   b. A rectangular slider bearing with fixed shoe has data : Bearing length = 0.0762m ,
      Shoe width = 0.065m , Slides velocity = 2.54 m/sec , Load on bearing = 5383.9N ,
      Minimum oil film thickness = 1.27×10^{-5} m , Viscosity = 0.06805 N-S/m^2.
      Find Inclination in radians and degree , Coefficient of friction. **(10 Marks)**

OR

8 a. Derive an expression for rate of flow in an hydrostatic step bearings. **(10 Marks)**
   b. Hydrostatic step bearing has datas : Diameter of Shaft = 150mm ,
      Diameter of pocket = 100mm , Vertical thrust = 70kN , Speed = 1000 rpm ,
      Viscosity = 0.025 Pa.sec , Oil film thickness = 0.125mm. Determine i) Rate of oil flow
      ii) Coefficient of friction iii) Power loss. **(10 Marks)**

Module-5

9 a. Explain the common bearing materials with their typical properties and applications.

(10 Marks)

   b. Define Surface Engineering. List its merits, demerits and industrial applications.   (10 Marks)

OR

10 a. Explain Transformation hardening, with neat sketch.   (10 Marks)

   b. With sketch, explain Physical Vapour Deposition [P.V.D] process.   (10 Marks)

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