CBCS SCHEME

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18ME822

Eighth 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 Data hand book is permitted.

Module-1

1 a. Define Tribology. Briefly explain the practical applications of Tribology. **(10 Marks)**

b. Define Viscosity. State and explain Newton's law of viscosity, with neat sketch. **(10 Marks)**

OR

2 a. Define lubrication. Briefly explain the properties of lubricant oils. **(10 Marks)**

b. Explain the effect of temperature and pressure on viscosity. **(10 Marks)**

Module-2

3 a. Define friction. List the different types of friction. **(05 Marks)**

b. Briefly explain any one friction measuring technique. **(05 Marks)**

c. With neat sketch, explain Bowden and Tabor's theory of friction. **(10 Marks)**

OR

4 a. Define wear. List the different types of wear. Briefly explain any two. **(10 Marks)**

b. List various wear testing methods. With neat sketch, explain Abrasive wear testing method. **(10 Marks)**

Module-3

5 a. Derive Petroff's equation for lightly loaded journal bearing. Also state the assumptions. **(10 Marks)**

b. A full journal bearing has following specifications:
Journal diameter = 45 mm, Length = 65 mm, Speed = 2800 rpm,
Radial clearance ratio = 0.0015, Radial load = 800 N,
Average viscosity of oil = 8.274×10^{-3} Pa.Sec.
Calculate : (i) Frictional torque at the shaft.
(ii) Co-efficient of friction.
(iii) Power loss in bearing. **(10 Marks)**

OR

6 State the assumption and derive Reynold's equation in 2D with usual notations. **(20 Marks)**

Module-4

7 Derive an expression for pressure and load carrying capacity in a plane slider bearing with a fixed shoe. Also state the assumptions. **(20 Marks)**

OR

8 a. Derive an expression for rate of oil flow in an Hydrostatic step bearing. **(10 Marks)**

b. A hydrostatic circular thrust bearing has the following data: Shaft dia = 300 mm, dia of pocket = 200 mm, Shaft speed = 100 rpm, Pressure at the pocket = 500 kN/m^2, Film thickness = 0.07 mm, Viscosity of lubricant = 0.05 Pa.sec.
Determine :
(i) Load carrying capacity
(ii) Oil flow rate
(iii) Powerloss due to friction. **(10 Marks)**

Module-5

9 a. List commonly used bearing materials. **(05 Marks)**

b. Briefly explain the properties of bearing materials. **(05 Marks)**

c. What are the advantages and disadvantages of bearing materials? **(10 Marks)**

OR

10 a. List different surface coating techniques. Explain any two. **(10 Marks)**

b. Write a short note on :
(i) Scope of surface engineering.
(ii) Surface hardening. **(10 Marks)**

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