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Model Question Paper- CBCS scheme

Seventh Semester B.E. Degree Examination, Dec- 2018 / Jan 2019

Tribology

Time: 3hrs.

Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing one full question from each module.

2. Use of Tribology data handbook is permitted

MODULE – I

- 1 a. Define the following (i) Tribology (ii) Lubrication (iii) Viscosity (iv) Newtonian fluid (08 Marks)
- b. Explain with neat sketch construction and working of Saybolt and Ostwald viscometers. (08 Marks)

OR

- 2 a. Explain with neat sketch construction and working of Saybolt and falling sphere viscometers. (08 Marks)
- b. Distinguish between (i) Dynamic and Kinematic viscosity (ii) Fluidity and viscosity (iii) Newtonian and Non Newtonian fluid (08 Marks)

MODULE – II

- 3 a. Define friction. State laws for friction. (08 Marks)
- b. Explain in brief friction measuring methods. (08 Marks)

- 4 a. Explain in brief types of wear. (08 Marks)
- b. Explain with neat sketch abrasive wear tester. (08 Marks)

MODULE – III

- 5 a. Derive Reynold's equation in two dimensions. Also state the assumptions (16 Marks)

OR

- 6 a. Define Idealized plane slider bearing. (08 Marks)
- b. A runner of the thrust bearing has diameter $D= 0.38\text{m}$, $D/d = 2.55$, Viscosity of oil is 0.03792 N-s/m^2 . Find (i) The speed at which this bearing must operate in order to support an axial load of 53376N . If permissible oil film thickness is $5.588 \times 10^{-5}\text{m}$. Find (i) Speed of the bearing (ii) Coefficient of friction (iii) Power loss. (08 Marks)

MODULE – IV

- 7 a. Derive an expression for load carrying capacity of hydrostatic bearing (08 Marks)
- b. The following data refers to the hydrostatic thrust bearing. $W = 460\text{KN}$, outside dia = 400mm , pocket dia = 250mm , oil film thickness = 0.15m , speed = 2800rpm , viscosity = 0.033 pa-s . Determine Inlet pressure, Energy lost in pumping, Power loss due to friction, Total energy lost, and Coefficient of friction. (08 Marks)

OR

- 8 a. Distinguish a pivoted shoe slider bearing from a fixed shoe slider bearing (04 Marks)
- b. Discuss locating center of pressure in fixed slider bearing (04 Marks)
- c. A pivoted shoe of a slider bearing has square shape. The load acting on the bearing is 13.34kN , velocity of the moving member is 5.08m/s . lubricating oil is SAE 40. The expected mean temperature of oil film is 90°C . permissible minimum oil film thickness is $1.905 \times 10^{-5}\text{m}$. Find
- i) Required dimensions of the shoe
- ii) Coefficient of friction in the bearing under given operating condition
- iii) Power loss (08 Marks)

Assume that inclination of surface corresponds to maximum load carrying capacity.
Neglect effect of end flow of oil

MODULE – V

- 9 a. What properties are expected from bearing materials? List them (08 Marks)
b. List the commonly used bearing materials. Explain any five of them with respect to their typical properties and advantages. (08 Marks)

OR

- 10 a. Define Surface Engineering. Explain Ion Implantation method. (08 Marks)
b. Explain Electroless and Electro plating with neat sketches. (08 Marks)

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