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10ME831

Eighth Semester B.E. Degree Examination, Jan./Feb. 2021
Tribology

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, selecting at least TWO questions from each part.
2. Use of Data hand book is permitted.

PART – A

- 1 a. List out the Properties of Lubricating Oil? Explain any two. (10 Marks)
b. Derive an Expression for Hagen Poiseuille Law with assumptions? (10 Marks)
- 2 Derive an expression for Reynold's 2D equation with assumptions? (20 Marks)
- 3 a. Derive an expression for Load carrying capacity of a Idealized Journal bearing. (12 Marks)
b. Explain the mechanism of Formation of continuous oil film in a full Journal bearing. (08 Marks)
- 4 a. Derive an Expression for Pressure distribution of a plane slider bearing with a fixed shoe. (15 Marks)
b. Derive an Expression for the oil film thickness of a plane slides bearing with a fixed shoe. (05 Marks)

PART – B

- 5 An oil ring of a full Journal bearing is to operate in still air. The bearing diameter is 75mm and the length is 75mm. Bearing is subjected to a load of 5KN and is rotating at 500 rpm. Radial clearance is 0.0625mm. The oil is SAE 30. The ambient air temp is 20⁰Centigrade. Determine the equilibrium temperature and viscosity of oil. (20 Marks)
- 6 a. Derive an expression for pressure distribution of an Hydro Static step bearing. (10 Marks)
b. A hydrostatic step bearing has the following specifications
Diameter of the shaft = 152mm
Diameter of the pocket = 102mm
Vertical thrust on the bearing = 45000N.
External Pressure = Zero
Shaft Speed = 900rpm
Viscosity = 24.15cp
Oil film thickness is = 0.127mm. Find
i) inlet pressure ii) supply pressure iii) Quantity of oil flow
iv) power loss v) frictional force
Torque and Co-efficient as friction on the shaft? (10 Marks)
- 7 a. List out the properties of a typical bearing material? Explain any two. (10 Marks)
b. What are the advantages and disadvantages of bearing materials? (10 Marks)
- 8 a. List out the characteristics taken into account for bearing selection. Explain any two. (10 Marks)
b. Explain different ways to reduce friction in addition to Lubricants to improve tribological behavior of components? (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.