U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

May / June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VIII**

Branch: Mechanical Engineering **Duration: 3 hrs.**

Course Code: 22ME8PETRI **Max Marks: 100**

Course: Tribology

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.
3. Use of Design data hand book is permitted.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	State and explain Newton's law of viscous flow	*CO1*	*PO1*	**06**
	b)	Explain the effect of temperature and pressure on viscosity of lubricating oil.	*CO1*	*PO1*	**06**
	c)	Explain with neat sketch the working of falling sphere type viscometer	*CO1*	*PO1*	**08**
		OR			
2	a)	Discuss in brief the various mechanisms of wear	*CO1*	*PO1*	**10**
	b)	In brief discuss the delamination theory of wear	*CO1*	*PO1*	**10**
		UNIT – II			
3		Stating clearly the assumptions made, derive the Reynold's equation in two dimensions	*CO2*	*PO2*	**20**
		OR			
4	a)	Derive Petroff 's equation for co-efficient of friction of lightly loaded journal bearing	*CO2*	*PO2*	**10**
	b)	A lightly loaded journal bearing as the following specifications, Bearing diameter, d=25mm Length of bearing, L=57mm Clearance, h=c=5.08x10-2mm Journal speed, N=25000rpm Load, W=910N Viscosity of the Lubricant, μ=2.4x10-3 Pa-Sec Determine (1). Power loss in the bearing and (2). Co-efficient of friction.	*CO2*	*PO2*	**10**

			UNIT - III			
	5	a)	Obtain an expression for load carrying capacity of plane slider bearing with fixed shoe.	*CO3*	*PO2*	**10**
		b)	A rectangular plane slider bearing with fixed shoe has following specifications. a. Bearing length, B = 8cm b. Width of shoe, L = 7.5 cm c. Load on bearing, W = 20000 N d. Slider velocity, U = 250 cm/s e. Inclination, α = -0.0004 radians f. Mean viscosity of oil, μ = 30cp Determine 1. Minimum film thickness. 2. Co – efficient of friction. 3. Power loss due to friction.	*CO3*	*PO2*	**10**
			OR			
	6	a)	Obtain an expression for load carrying capacity of an idealized full journal bearing	*CO3*	*PO2*	**12**
		b)	An idealized full journal bearing has the following specifications. Diameter of journal = 56 mm Length of bearing = 68 mm Speed of journal = 1800 rpm Attitude = 0.6 Diametral clearance = 0.10 mm Viscosity of lubricant = 14 cP Determine: i) Sommerfeld number ii) Load carrying capacity iii) Coefficient of friction iv) Frictional force v) Power loss vi) Minimum film thickness	*CO3*	*PO2*	**08**
			UNIT – IV			
	7	a)	Derive an expression for load carrying capacity of a hydrostatic circular thrust bearing	*CO4*	*PO2*	**10**
		b)	A hydrostatic step bearing for a turbine rotor has the following specifications, Diameter of shaft = 150 mm Diameter of pocket = 100 mm Thrust on the bearing = 60 KN Shaft speed = 1500 rpm. Viscosity of the lubricant at operating condition = 30 cp Desirable of film thickness h = 0.125 mm Find 1) rate of oil flow through the bearing 2) Power loss due to viscous friction 3) Co-efficient of friction.	*CO4*	*PO2*	**10**
			OR			

	8	a)	With sketches, explain different systems of hydrostatic lubrication.	*CO4*	*PO2*	**08**
		b)	List out different desirable properties of bearing materials and explain any four properties in details.	*CO4*	*PO2*	**12**
			UNIT - V			
	9	a)	Discuss the principle of physical vapour deposition technique with a neat sketch	*CO5*	*PO1*	**12**
		b)	Explain with neat sketch of working principle of electroplating	*CO5*	*PO1*	**08**
			OR			
	10	a)	Describe the following terms a) Carburizing b) Cyaniding	*CO5*	*PO1*	**10**
		b)	Explain with neat sketch of working principle Chemical Vapor Deposition (CVD)	*CO5*	*PO1*	**10**

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