Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME- SEMESTER II– EXAMINATION – SUMMER 2015

Subject Code: 2720911 **Date: 30/05/2015**

Subject Name: Tribology

Time: 2:30 PM – 5:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Derive the Reynolds equation using the concept of Navier-Stoke equation.	**07**
	(b)	Discuss the physical interpretation of various terms of Reynolds equation.	**07**
Q.2	**(a)**	Derive an equation for pressure distribution in infinitely short hydrodynamic journal bearing.	**07**
	(b)	Derive an expression for temperature rise in hydrodynamic bearings with feed lubrication.	**07**
		OR	
	(b)	Derive an expression for temperature rise in hydrodynamic self cooled bearings.	**07**
Q.3	**(a)**	Derive an equation for pressure distribution in narrow width taper pad bearing.	**07**
	(b)	A hydrodynamic plane slider bearing operates under the following conditions • Required load carrying capacity = 30.5 N • Bearing width to length ratio = 3.75 • Attitude = 2 • Minimum oil film thickness = 0.02 mm • Viscosity of oil = 20 cP • Sliding speed = 2 m/s Neglecting the side leakage, calculate (1) the bearing dimensions, (2) a pressure at a distance of 50 mm from leading edge, (3) the tractive effort of the bearing, (4) the coefficient of friction, and (5) the power lost in friction.	**07**
		OR	
Q.3	**(a)**	Derive an equation for pressure distribution in entry zone of Rayleigh step bearing.	**07**
	(b)	Explain: Elasto-hydrodynamic lubrication.	**07**
Q.4	**(a)**	Do the analysis of hydrostatic step bearing.	**07**
	(b)	Do the analysis of hydrostatic conical thrust bearing.	**07**
		OR	
Q.4	**(a)**	Derive an expression for pressure distribution in squeeze film lubrication between parallel circular plates.	**07**
	(b)	Do the analysis of aerostatic step bearing.	**07**
Q.5	**(a)**	Discuss the lubrication system in automobiles.	**07**
	(b)	Explain different types of frictions.	**07**
			07
		OR	
Q.5	**(a)**	Explain junction growth adhesion theory.	**07**
	(b)	Derive Archardôs equation for volume of adhesive wear.	**07**

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