Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II– EXAMINATION – WINTER - 2016

Subject Code: 2720911 **Date: 19/11/ 2016**

Subject Name: Tribology

Time: 2:30 pm to 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 governing differential equation for hydrodynamic journal bearing.	**07**
	(b)	Explain the physical interpretation of various terms of the Reynold's equation.	**07**
Q.2	**(a)**	Explain Ramondi and Boyd method for the design of hydrodynamic journal bearing.	**07**
	(b)	State laws of friction and discuss Coulomb's law in detail.	**07**
		OR	
	(b)	Explain the difference between the short and long hydrodynamic journal bearing	**07**
Q.3	**(a)**	Derive the Stribeck equation for basic static capacity of ball bearing.	**07**
	(b)	Explain Archard's theory of adhesive wear.	**07**
		OR	
Q.3	**(a)**	Explain equivalent dynamic load for bearing under cyclic loading.	**07**
	(b)	Explain the junction growth theory	**07**
Q.4	**(a)**	Discuss various methods for measuring the coefficient of friction and explain any two in detail.	**07**
	(b)	Derive the Stribeck equation for basic static capacity of bearing.	**07**
		OR	
Q.4	**(a)**	Derive the equation for pressure distribution in Rayleigh step bearing.	**07**
	(b)	Show that in an infinite width tapered pad bearing of length L, the pressure is maximum at a distance of $\frac{nL}{n+1}$ from the leading edge.	**07**
Q.5	**(a)**	Explain elasto-hydrodynamic lubrication theory.	**07**
	(b)	Derive the expression for pressure distribution of hydrostatic conical thrust bearing.	**07**
		OR	
Q.5	**(a)**	Define: Bearing life, static load carrying capacity and dynamic load carrying capacity.	**07**
	(b)	Using modified adhesion theory of friction, show that the coefficient of friction due to adhesion is $f_a = \frac{k}{\left\{\alpha\left(1-k^2\right)\right\}^{1/2}}$	**07**

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