

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII • EXAMINATION – WINTER • 2014****Subject Code: 171905****Date: 29-11-2014****Subject Name: Industrial Tribology****Time: 10:30 am - 01:00 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) Define the term 'Tribology'. Discuss the basic Principles of Tribology. **07**
(b) Define: Profilometry, Viscosity index, Friction, Kinematic Viscosity, Wear, and Fluidity. **07**

- Q.2** (a) Explain the basic Law of friction and Discuss the various causes of Friction. **07**
(b) Explain in detail, the Difference between hydrostatic bearing and hydro dynamic bearing. **07**

OR

- (b) Classify the Lubricants. Discuss various properties and characteristics of Lubricants. **07**

- Q.3** (a) Derive the load carrying equation of Hydrostatic step bearing. **07**
(b) Discuss about wear of metal and nonmetal in detail. **07**

OR

- Q.3** (a) A hydrostatic circular step thrust bearing has the outside pad diameter of 300 mm and recess diameter of 200 mm. Calculate: (a) the recess pressure for a thrust load of 100 kN, (b) the oil flow rate to maintain the film thickness of 120 μm with an oil viscosity of 0.03 Pa-s, (c) the film stiffness. (d) the pumping loss (e) the oil temperature rise. Take mass density of oil as 880 kg/m³ and specific heat as 1.88 J/g-k. **07**
(b) Discuss about various power losses in hydrostatic step bearing. **07**

- Q.4** (a) Write short note on Delamination theory of Wear and also mention various testing methods for wear measurement with figurer. **07**
(b) Derive Reynolds's equation for hydrodynamic lubrication. Also state the assumptions to drive Reynolds's equation for hydrodynamic lubrication. **07**

OR

- Q.4** (a) A fixed inclination slider bearing of length 100 mm and width 600 mm, with a minimum film thickness of 40 μm . operate at a sliding velocity of 1m/s with a mineral oil of absolute viscosity of 0.035 Pa-s. Film thickness ration is adjusted to have maximum load capacity. Calculate the normal load capacity, the shear force experiences by the sliding by the sliding surface and the coefficient of friction. **07**
(b) Write selection procedure for Bearing and also mention requirements for good bearing materials. **07**

- Q.5** (a) Discuss about tribological consideration to diagnostic maintenance of various components of IC Engine. **07**
(b) Explain the Air/Gas bearing in brief, and also discuss about advantage and dis advantage of air/gas bearing. **07**

OR

- Q.5** (a) Discuss the important of Tribology in Engineering. How it is help full to minimize wear and frication **07**

- (b) State the difference between
1. Roller bearing and Ball bearing
 2. Adhesive wear and Abrasive wear.
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