Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2181926 **Date: 06/05/2017**

Subject Name: Tribology(Department Elective III)

Time: 10:30 AM to 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)** Enlist different methods of studying surface and explain with neat sketch Electron Microscopy. **07**

(b) Explain the Areas of Tribology. **07**

Q.2 **(a)** Explain PETROFF'S equation for hydrodynamic journal bearing **07**

(b) Following data is given for hydrostatic step bearing: **07**

1, Thrust load	450 KN.
2,Shaft speed	750 rpm
3,Shaft diameter	400 mm
4, Recess Diameter	250 mm.
5,Viscocity of lubricant	30 cP
6,Specific Gravity of lubricant	0.86
7,Specific heat of lubricant	2 KJ/kg°C

Calculate:

1,Otimum oil-film thickness for minimum power loss

2,Frictional power loss

3,Pumping power loss

4, Temperature rise assuming total power loss in bearing is converted into frictional heat.

OR

(b) Explain Tomlinson's Theory of Molecular Attraction. **07**

Q.3 **(a)** Comparison of Oil lubricated & Gas lubricated Bearings **07**

(b) Explain Hertz Contact & Non-Contact Stress Theory. **07**

OR

Q.3 **(a)** Explain methods of disposal of used oil in Industry **07**

(b) Define following terms: Dynamic Viscosity, Say bolt Universal Viscometer, Hertz Contact stress, Hydrodynamic bearing **07**

Q.4 **(a)** A guide way bearing of machine tool operates under hydrodynamic condition & has following details: **07**

Width of bearing	150 mm
Length of Bearing	750 mm
Sliding Velocity	2.5 m/s
Minimum Oil Film Thickness	15 microns
Absolute Viscosity	0.025 Pa-s

Assuming the ratio of film thickness as 2,
Calculate:
1,Load carrying capacity
2,Coeffiocient of Friction
3,Power Lost in friction
4, Pressure at distance of 500 mm from leading edge.

(b) Explain Tribological consideration & Lubrication System in Automobile. **07**

OR

Q.4 **(a)** Short note on Gaskets & Seals. **07**

(b) Short note on Type of lubrication in Metal Working Process **07**

Q.5 **(a)** Enlist selection of coating for wear & corrosion resistance **07**

(b) Explain Measurement of Wear & its Technique. **07**

OR

Q.5 **(a)** Explain Rayleigh equation **07**

(b) Enlist factors affecting Wear Rate. **07**

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