TRIBOLOGY BEARINGS
Syllabus

Unit-I:
Lubrication

Definition, Types of lubricants, Viscosity, Types of Viscometers, Effect of temperature on Viscosity, Effect of pressure on Viscosity, Other physical properties of mineral oils.

Unit-II: Basic Equations

Generalized Reynolds equation, Flow and shear stress, Energy equation, Equation of state.

Unit-III: Idealized Hydrodynamic Bearings

Mechanism of pressure development in bearings, Plain slider bearing, Idealized slider bearing with a pivoted shoe, Step (Rayleigh step) bearing, Infinitely long journal bearing, Infinitely short journal bearing.

Unit-IV: Squeeze Film Bearings

Parallel surface bearing, Step bearing, A Circular cylinder near a plane, A Parallel circular plate, A Sphere near a plane, A Sphere in a spherical seat, A Rectangular plate on a plane surface, A Journal bearing.

Unit-V: Elastohydrodynamic Lubrication

Hydrodynamic equation, Elastic deformation, Grubin type solution, Accurate solution, Point contact, Dimensionless parameters, Film thickness equations, Different regimes in EHL contacts.

Reference Book:

Introduction to Tribology of Bearings – B.C.MAJUMDAR, S.CHAND

TRIBOLOGY BEARINGS
MODEL QUESTION PAPER

Time: 3 hours   Max. Marks: 100

 Answer any FIVE Questions. Each Question carries 20 Marks.

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1. Write short notes on:

    (a) Mineral oils

    (b)Greases

2. With neat sketches, explain about capillary and efflux viscometers.

3. Derive Reynolds equation with usual notations. State the assumptions made in the equation.

4. Derive an expression for the total load capacity of infinitely short journal bearings.

5. Derive the expressions for hydrodynamic pressure and load carrying capacity of plane-slider bearing.

6. Write the situations under squeeze film lubrication of a circular cylinder near a plane.

7. Write the squeeze film situation in a journal bearing.

8. Explain the Grubin type solution for Elastohydrodynamic line contact of roller bearing.