

Roll No

MMMD/MMPD-302(A)**M.E./M.Tech., III Semester**

Examination, June 2016

Fluid Film Lubrication (Elective-II)*Time : Three Hours**Maximum Marks: 70*

Note : Attempt any five questions. All questions carry equal marks. Use of design data hand book is permitted. Assume suitable data or dimensions, if necessary, clearly mentioned it.

1. a) Give the classification of Bearings with their illustrations and applications.
b) Derive the Reynolds equations for bearing lubrication from continuity equation.
2. a) Write and explain the boundary conditions for infinitely long full journal bearing.
b) What is hydrostatic lubrication? What are its advantages and disadvantages over hydrodynamic lubrications?
3. a) Derive the Petroff's equation for coefficient of friction for a vertical shaft rotating in a guide bearing.
b) Discuss the geometry of different types of non-circular bearings.
4. a) Derive the governing equation for gas bearings.
b) Discuss the thermal analysis for the finite length fluid film lubrication bearings.

5. a) What are rolling contact bearings? Discuss their advantages over sliding contact bearings.
b) List the Numerical methods for solution of fluid film equations for bearing and explain any one of them.

6. Design a journal bearing for a centrifugal pump from the following data :

Load on the journal	=	25000N
Speed of the journal	=	1000 RPM
Lubricant	=	SAE 10
Absolute viscosity at 55°C	=	0.017kg/m-s
Ambient temperature of oil	=	15.5°C
Maximum bearing pressure	=	105 N/mm ²

Also calculate the mass of the lubricating oil required artificial cooling, if the temperature of oil be limited to 10°C. Take heat dissipation coefficient is 1230 W/m²/°C.

7. A SKF bearing 6200 is used to support a radial load of 1000 N. Determine Rated life and life at 99% survival rate.
8. Write short notes on following (Any four)
 - a) Hydrostatic lubrication
 - b) Rayleigh-step bearings
 - c) Sommerfeld Conditions
 - d) Finite element method
 - e) Boundary lubrications
 - f) Performance characteristics of bearing
