Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

II SEMESTER M.TECH. (COMPUTER AIDED ANALYSIS AND DESIGN)

END SEMESTER EXAMINATIONS, APRIL/MAY 2017

SUBJECT: LUBRICATION OF BEARINGS [MME 5201]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A. Explain the effect of pressure and temperature on the viscosity of a lubricating oil. With a neat sketch explain Viscosity Index. **03**

1B. From first principles derive the continuity equation for a fluid with density ρ and flowing with velocities u, v, and w along the x, y and z axes respectively. **04**

1C. Define Regime indicator, how it is used to classify the various regimes of lubrication. **03**

2A. Describe a numerical method for solution of finite journal bearings. **04**

2B. What is hydrodynamic instability? Explain with sketches the methods by which the instability can be controlled and minimized. **04**

2C. With a neat sketch explain the 04 different regimes of elastohydrodynamic lubrication. **02**

3A. Discuss the modern methods of solid lubricant deposition **03**

3B. Write a note on rolling bearing failures. **03**

3C. Discuss the constant pressure system and constant flow system of Hydrostatic lubrication with neat sketches. **04**

4A. Discuss the long and short bearing solutions for the Reynolds equation. **04**

4B. Write a note on ISO standards for rolling element bearings. **03**

4C. What are the forces acting on an element within a moving fluid. Derive an expression for element acceleration. **03**

5A. With a neat sketch explain the mechanism of lubrication in lamellar solids. **04**

5B. Write a note on Thermal, Inertia and Turbulence effects in fluid film bearings. **03**

5C. Discuss any one type of special bearing. **03**