Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

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

END SEMESTER EXAMINATIONS, APRIL 2019

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 suitable assumed.

1A. Discuss the different types of lubricants? Explain the functions of a lubricant? **03**

1B. Distinguish between the 'iso-viscous' and 'viscous' thermal analysis of hydrodynamic bearings. Explain the 'iterative method' for thermal analysis. **04**

1C. Explain with a neat sketch the importance of the 'squeeze film' mechanism of pressure development in hydrodynamic bearings. **03**

2A. Interpret power loss in a bearing and derive the Petroff's equation. **03**

2B. Using the Reynolds equation to start with, derive an expression for the pressure distribution in a short journal bearing **04**

2C. Explain hydrodynamic instability? How do you counter this instability? **03**

3A. Derive an expression for the radial load capacity of a rolling element bearing. **04**

3B. List the methods used to measure elastohydrodynamic film thickness. Explain any one method with a sketch of the set up. **03**

3C. Discuss the different materials and manufacturing methods used in rolling element bearings **03**

4A. Discuss how the Vogelphol parameter can improve the accuracy of numerical solutions of Reynolds Equation. **03**

4B. Examine how the various boundary conditions are satisfied in the numerical solution of Reynolds Equation, with neat sketches. **04**

4C. Explain the acceleration scheme used in the solution of Reynolds equation **03**

5A. For a capillary compensated bearing, evaluate the ratio of the capillary resistance to the bearing resistance is 0.5 for maximum stiffness. **04**

5B. List the different methods for deposition of solid lubricant. **03**

5C. Explain the working of an aerostatic bearing with a sketch. What is the difference with a Hydrostatic bearing? **03**