Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY

VII SEMESTER B.TECH. (AUTOMOBILE ENGINEERING) END SEMESTER EXAMINATIONS, DEC/JAN 2017-18

SUBJECT: ENGINE TRIBOLOGY [AAE 4019]

REVISED CREDIT SYSTEM (02/01/2018)

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ALL FIVE questions.
- Missing data may be suitable assumed.
- **1A.** What are the necessary characteristics for a retainer material? (02)
- **1B.** Categorise different types of lubricants and state few advantages of synthetic **(03)** oils.
- **1C.** What is terotechnology? Justify the importance of Terotechnological **(05)** implementation using life cycle assessment.
- 2A. What is friction? Give a brief note on its origination and classification. (02)
- **2B.** What is PAO and where is it used? Give an example of it along with chemical **(03)** formula.
- **2C.** Derive the following characteristics of a titled pad bearing with the aid of a neat **(05)** diagram bearing geometry and the pressure distribution.
- **3A.** What are efflux viscometers? Give the working principle of these viscometers **(02)** and name some of them.
- **3B.** Classify Non-Newtonian and explain their behaviors with the help of an **(03)** illustration.
- 3C. A car owner removes water using a cotton cloth with a speed of 15 m/s. He is applying a tangential force of 30N. The thickness of the fabric and the car body is 0.9mm. If a soap solution (cleaning agent) spills over the car body which is having a viscosity of 0.58 stokes, what is the force required to maintain the same speed? The viscosity of water is 0.01 Stokes.
- **4A.** Differentiate between CLA and RMS statistical height descriptors. **(02)**

4B.	Define the following surface roughness parameters i. Peak-to-valley height ii. Average peak-to-valley height	(03)
4C.	Describe the working of surface profilometer with the aid of a diagram.	(05)
5A.	Derive the coefficient of friction of a journal bearing using Petroffs equation.	(04)
5B.	Derive the expression for the following bearing performance characteristics of	(06)

- a hydrostatic bearing. i. Flow Rate Capacity
- Load Capacity ii.