Reg. No.

MANIPAL INSTITUTE OF TECHNOLOGY

VII SEMESTER B.TECH (MECHANICAL/I&P ENGG.) END SEMESTER

MAKE-UP EXAMINATIONS, DEC 2017

SUBJECT: PE V: TRIBOLOGY [MME 4004]

REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

* Answer **ALL the** questions.

1A.	Define Regime indicator, how it is used to classify the various regimes of lubrication.	03
1B.	What is viscosity index? With a neat sketch explain how it is calculated	04
1C.	What are the different additives added to a lubricant and their functions	03
2A.	Derive an expression for load carrying capacity of hydrostatic step bearing. State the assumptions.	05
2B.	Derive the Reynolds equation in two dimensions. State the assumptions made.	05
3A.	Explain the Adhesion theory of friction. What are the limitations of this theory	03
3B.	With neat sketches explain any two techniques of measuring the friction force.	05
3C.	Explain the hypothesis of Burwell and Strang.	02
4A.	Describe the mechanical and physical techniques of formation of technological surface layers	05
4B.	With a neat sketch explain the 4-zone model of the structure of the superficial layer.	05
5A.	Explain elastohydrodynamic lubrication in rolling contact bearings with a neat sketch.	05
5B.	Discuss the difference between time domain and frequency domain analysis and their application in bearing condition monitoring	05