Reg. No.

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

VII SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)
END SEMESTER EXAMINATIONS (ONLINE), NOV/DEC 2020

SUBJECT: ENGINE TRIBOLOGY [AAE 4019]
REVISED CREDIT SYSTEM
(03/02/2021)

Time: 3 Hours   MAX. MARKS: 50

Instructions to Candidates:
❖ Answer **ALL** the questions.
❖ Missing data may be suitably assumed.

1A.	Using the Tresca's criterion and the normal & shear stress of the material, derive the expression for friction coefficient using junction growth theory.	**(04)**
1B.	Explain any two friction measuring methods with a schematic diagram.	**(03)**
1C.	Explain with a neat plot how oxide film and load influences the friction coefficient of metals.	**(03)**
2A.	Explain the wear phenomenon of polymers and how liquid lubricants interact with polymers.	**(04)**
2B.	Define wear and state the classifications of wear.	**(03)**
2C.	Explain the phenomenon of fatigue wear and also mention the machine elements which are subjected to such type of wear.	**(03)**
3A.	Explain with neat sketches, the phenomenon of pressure generation between two inclined plane surfaces having relative motion between them.	**(04)**
3B.	State and explain the different criteria used to select a lubricant for a particular application.	**(03)**
3C.	Explain viscosity index of a lubricant using a neat sketch.	**(03)**
4A.	Explain the phenomenon of Elastohydrodynamic lubrication. Also state any two differences between hard EHL and soft EHL.	**(04)**
4B.	Explain why bronze material is popularly used as bearing material for journal bearings.	**(03)**
4C.	Explain the Chemical Vapor Deposition technique using a schematic sketch.	**(03)**

5A.	What is squeeze film lubrication? State the applications and the governing Reynolds equation of squeeze film lubrication explaining all the variables.	**(04)**
5B.	Explain hydrostatic journal bearing, state the types and the applications of it.	**(03)**
5C.	Explain the constant supply pressure system of hydrostatic lubrication with a schematic sketch.	**(03)**