




FIRST SEMESTER EXAMINATIONS

2017/2018 ACADEMIC SESSION

COURSE: MEE 509-Tribology (2 Units)
CLASS: 500 Level Mechanical Engineering
TIME ALLOWED: 2 Hours
INSTRUCTIONS: Answer any three questions


HOD'S SIGNATURE

Date: March, 2018

QUESTION ONE

- 1a. What is fluid bearing? Mention the two main types (5 Marks)
- 1b. Differentiate between Hydrodynamic bearings and hydrostatic bearings (6 Marks)
- 1c. Mention Four typical Lubricants and their applications (4 Marks)
- 1d. Mention five characteristics of a hydrodynamics lubrication (5 Marks)

QUESTION TWO

- 2a. The science of Tribology concentrates on contact mechanics of moving interfaces that generally involve energy dissipation. Explain? (5 Marks)
- 2b. i. With a sketch diagram, discuss two causes of friction (4 Marks)
ii. What is kinetic friction coefficient? (4 Marks)
- 2c. What is Adhesion theory of friction according to Bowden and Tabor? Explain with mathematical illustration. (7 Marks)

QUESTION THREE

- 3a. What is frictional force? (5 Marks)
- 3b. Discuss the laws of friction (5 Marks)
- 3c. Explain with a sketch diagram, the process of measuring friction (5 Marks)

3d. Write short notes on the properties of lubricants **(5 Marks)**

QUESTION FOUR

4a. Derive the characteristic equations for the lightly loaded journal bearings (Petroff equation)
(7 Marks)

4b. Define the following; **(8 Marks)**

- i. Adhesive wear
- ii. Boundary Lubrication
- iii. Types of Lubrication
- iv. Function of lubrication

4c. What is Archard's Elastic Model of Friction? **(5 Marks)**