

R13

Code No: 5115H

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech I Semester Examinations, February - 2017

APPLIED TRIBOLOGY

(Machine Design)

Time: 3hrs

Max.Marks:60

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 20 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 8 marks and may have a, b, c as sub questions.

PART - A**5 × 4 Marks = 20**

- 1.a) Explain the effect of temperature on viscosity. [4]
- b) Give the practical considerations in bearing design. [4]
- c) Give the film thickness equations for elasto hydrodynamic lubrication. [4]
- d) Differentiate between apparent and real area of contact. [4]
- e) Comment about frictional heating. [4]

PART - B**5 × 8 Marks = 40**

2. Derive generalized Reynolds equation for shear stress. [8]
- OR**
- 3.a) Explain the physical properties of mineral oils. [4+4]
 - b) Explain the mechanism of pressure development in viscous conditions. [4+4]
4. Explain the concept of effective temperature and heat balance in bearings. [8]
- OR**
5. What is hydrodynamic stability? Explain the factors influencing the same. [8]
- 6.a) Differentiate between Grubin solution and accurate solution.
 - b) How do you calculate the load capacity of thrust ball bearing? [4+4]
- OR**
7. What is the influence of geometry on stress and deformations in elasto hydrodynamic bearings? [8]
8. Derive the average Reynolds equation for partially lubricated surface. [8]
- OR**
9. Discuss in detail the effect of surface roughness on journal bearing. [8]
- 10.a) Explain various friction theories.
 - b) Explain quantitative laws of wear. [4+4]
- OR**
- 11.a) What are surface contaminants? What is their influence?
 - b) Explain the characteristics of various wear resistant materials. [4+4]