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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2017

Program: B. Tech Mechanical

Semester – V

**Subject (Course): Tribology
: 100**

Max. Marks

Course Code : ADEG353

Duration : 3 Hrs

No. of page/s:1

SECTION A (4 x5=20)

- Q1. Explain the general theories of friction in metal.
- Q2. Explain the Elasto-plastic theory of friction.
- Q3. Explain the phenomenon of three body abrasive wear.
- Q4. Explain the elastohydrodynamic lubrication.

SECTION B (4x10=40)

- Q5. Discuss the corrosive wear in the metal
- Q6. Discuss the steps of the selection of the material for wear resistance.
- Q7. Differentiate carburizing and carbonitriding of surface improvement techniques.
- Q8. Differentiate between hydrodynamic and hydrostatic lubrication.

OR

Explain the physical properties of lubricant.

SECTION C (2x20=40)

- Q9 a. Derive the Navier- Stokes equations of motion for the laminar and viscous flow.
- b. Derive the relationship between shear stress and pressure gradient.
- Q10. Apply hydrodynamic lubrication to a tapered slider bearing and calculate the maximum load which such a bearing can take.

OR

- a. A shaft of 100mm diameter rotates at 60 rpm in a 200 long bearing. Taking that the two surfaces are uniformly separated by a distance of 0.5 mm and taking linear velocity



distribution in the lubricating oil having dynamic viscosity 0.04poise, find the power absorbed in bearing.

- b. Explain Hertz theory of elastic contact.