

- 1
 - a) Explain the industrial significance of tribology.
 - b) What are the physico-chemical characteristics of surface layers.
 - c) Give one use of each bearings of following type:
 - i) Tapered roller bearing
 - ii) Roller thrust bearings
 - iii) needle roller bearing
- 2
 - a) What are the assumptions of Hertz theory?
 - b) What are the advantages of roller bearing over sliding bearing?
 - c) Differentiate between conforming and non-conforming contacts with example.
- 3
 - a) Explain any one of the methods of measuring friction in detail.
 - b) What are the laws of friction with exceptions for each law?
- 4
 - a) Write short notes on: i) Friction of metals ii) Friction of ceramics.
 - b) Write down any two situations where i) Friction is desirable ii) Friction is undesirable.
 - c) What is stick slip phenomenon?
- 5
 - a) What are the different types of wear?
 - b) Give any 4 examples of occurrence of sliding wear in industry.
- 6
 - a) State the assumptions of Archard's law and derive an expression for it.
 - b) What are the different stages of wear? Explain with wear regime maps?
- 7
 - a) What is viscosity? Explain Newton's law of viscosity.
 - b) Differentiate between Newtonian and non-Newtonian fluid.
 - c) Explain the role of lubricant in rolling process.
- 8
 - a) Explain different types of additives for developing a good lubricant (Any four additives).
 - b) What is viscosity index?
- 9
 - a) What is the importance of adhesion in tribology?
 - b) What is meant by adhesion index?
 - c) Write short notes on adhesion produced by surface tension.
- 10
 - a) What is Stiction?
 - b) What are the different bearing materials used in industry?
 - c) Explain the constructional details of a roller bearing.
- 11
 - a) Write down the basic equation for fluid film lubrication and explain its significance
 - b) What are the different types of slider bearing?
 - c) Explain the working principle of journal bearing.

- 12 a) Write short notes on microstructural treatments.
b) Explain thermo chemical treatments.
- 13 a) What are different types of vapour deposition processes? Explain any two methods.
b) Explain transformation hardening.
- 14 a) What are the different properties and parameters of coating?
c) Write short notes on i) Surface melting ii) Fusion Processes.