

1. What type of lubrication primarily relies on the viscosity of the lubricant to separate moving surfaces?

- a) Boundary lubrication
- b) Hydrodynamic lubrication
- c) Mixed lubrication
- d) Elastohydrodynamic lubrication

Answer: b) Hydrodynamic lubrication

Explanation: Hydrodynamic lubrication occurs when a fluid film forms between the surfaces in relative motion. Viscosity plays a crucial role in generating this fluid film, which prevents direct contact between the surfaces.

2. Which theory explains the formation of a fluid film between moving surfaces due to the pressure generated by the relative motion?

- a) Archard's theory
- b) Coulomb's theory
- c) Hydrodynamic theory
- d) Reynolds' theory

Answer: d) Reynolds' theory

Explanation: Reynolds' equation describes the formation and behavior of fluid films between surfaces in relative motion, considering factors such as viscosity, velocity, and pressure.

3. What design factor is crucial for ensuring stable operation of journal bearings?

- a) Surface roughness

- b) Lubricant viscosity
- c) Clearance ratio
- d) Temperature gradient

Answer: c) Clearance ratio

Explanation: The clearance ratio, which is the ratio of the radial clearance to the bearing radius, is essential for maintaining the stability of journal bearings by controlling the hydrodynamic film thickness.

4. Which type of lubrication is characterized by direct contact between the surfaces with minimal or no fluid film separation?

- a) Hydrodynamic lubrication
- b) Elastohydrodynamic lubrication
- c) Boundary lubrication
- d) Mixed lubrication

Answer: c) Boundary lubrication

Explanation: In boundary lubrication, the lubricant forms a thin layer on the surface, offering limited protection against direct metal-to-metal contact between the moving parts.

5. Which dimensionless number is commonly used to predict the onset of turbulence in fluid flow within bearings?

- a) Reynolds number
- b) Froude number
- c) Mach number
- d) Weber number

Answer: a) Reynolds number

Explanation: The Reynolds number is used to predict whether the flow of a fluid within a bearing will be laminar or turbulent, based on factors such as velocity, viscosity, and geometry.

6. Which type of rolling contact bearing is known for its ability to support both radial and axial loads simultaneously?

- a) Deep groove ball bearing
- b) Tapered roller bearing
- c) Thrust ball bearing
- d) Spherical roller bearing

Answer: b) Tapered roller bearing

Explanation: Tapered roller bearings are designed to support both radial and axial loads due to their tapered inner and outer raceways, which allow for axial displacement.

7. What factor primarily determines the friction and power loss in rolling element bearings?

- a) Bearing material
- b) Lubricant viscosity
- c) Rolling element diameter
- d) Applied load

Answer: d) Applied load

Explanation: Friction and power loss in rolling element bearings primarily depend on the applied load, as higher loads result in increased contact pressures and friction between the rolling elements and races.

8. Which load capacity represents the maximum load a bearing can withstand without permanent deformation?

- a) Static load capacity
- b) Dynamic load capacity
- c) Axial load capacity
- d) Radial load capacity

Answer: a) Static load capacity

Explanation: The static load capacity of a bearing indicates the maximum load it can withstand without experiencing permanent deformation or fatigue failure while stationary.

9. What is the purpose of lubrication and sealing in ball and roller bearings?

- a) To reduce friction
- b) To prevent contamination
- c) To dissipate heat
- d) All of the above

Answer: d) All of the above

Explanation: Lubrication and sealing in ball and roller bearings serve multiple purposes, including reducing friction, preventing contamination ingress, and dissipating heat generated during operation.

10. What is the primary consideration when selecting a lubricant for bearings operating under varying temperature conditions?

- a) Viscosity index

- b) Flash point
- c) Pour point
- d) Additive package

Answer: a) Viscosity index

Explanation: The viscosity index of a lubricant indicates its resistance to viscosity changes with temperature variations, making it a crucial consideration for bearings operating across a range of temperatures.

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