

Q. P. Code: 25699

(03 Hours)

[Total Marks: 80

- N.B.:
- (1) Attempt any four questions.
 - (2) Assumption made should be clearly stated.
 - (3) Use of Design Data Book is permitted.

1. A. Write short note on the followings: 10
 - i. Foil type gas lubricated bearings
 - ii. Externally pressurized gas lubricated bearings
- B. Derive an equation for estimating the frictional power loss in a hydrostatic step bearing. 10
2. A. Write short note on the followings: 10
 - i. Surface roughness correction factor in EHL
 - ii. Gaseous lubricants
- B. A deep groove ball bearing supports 11 kN radial load and 3.2 kN axial load. The shaft rotates at 500 RPM. The expected life is 16,000 hours with 92% of probability of survival and 140 °C operating temperature. Select suitable bearing for the above application. 10
3. A. Write short note on the followings: 10
 - i. Hysteresis friction mechanism
 - ii. Hypothesis of Archard
- B. Explain different lubrication regimes in EHL contact. 10
4. A. Write short note on the followings: 10
 - i. Delamination theory of wear
 - ii. Ratchet friction mechanism
- B. A shaft is rotating at 1,000 RPM and is supported by two journal bearings at two ends of shaft. Bearings are lubricated with SAE40 oil with an inlet temperature of 25 °C. A 5 kN load is applied 0.5 m from the left bearing where the total shaft length is 2.5 m, the bearing width is 25 mm, diameter is 50 mm, and the radial clearance is 0.0315 mm. Determine (a) oil temperature rise, (b) minimum film thickness, (c) maximum pressure, (d) side leakage, and (e) bearing power loss. 10
5. A. Write short note on the followings: 10
 - i. Biotribology
 - ii. Friction junction growth theory
- B. Explain in short any four types of viscometers. 10
6. A. Write short note on the followings: 10
 - i. Semisolid lubricants
 - ii. Thermal correction factor in EHL
- B. A bearing is subjected to 3 kN radial load under minor shocks at 600 RPM. Select an appropriate type of rolling contact bearing if the expected life is 8,000 hours. 10