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Code No: ME1920

GEC-R14

M. Tech II Semester Regular/Suppl. Examinations, July 2017

TRIBOLOGY
(Machine Design)

Time: 3 Hours

Max. Marks: 60

Note: Answer any **FIVE** questions. All Questions carry equal Marks.

5 × 12 = 60M

1. a) Explain contact surface topography and also explain wear mechanisms with neat sketch. (6M)
b) What are the different types of lubricants? Mention some of the examples of applications and type of lubricant used in it. (6M)
2. a) Explain the working of shock pulse method for condition monitoring. (6M)
b) A shaft rotating at constant speed is subjected to variable load. The bearings supporting the shaft are subjected to stationary equivalent radial load of 3 kN for 10 per cent of time, 2 kN for 20 per cent of time, 1 kN for 30 per cent of time and no load for remaining time of cycle. If the total life expected for the bearing is 20×10^6 revolutions at 95 per cent reliability, calculate dynamic load rating of the ball bearing. (6M)
3. A rectangular slider bearing with fixed shoe is operating under the following conditions: (12M)
Bearing width=80mm
Bearing length=150mm
Sliding speed=2.0m/s
Absolute viscosity of oil=0.02Pas
Minimum oil film thickness=0.02mm
Maximum oil film thickness=0.05mm
Find
i) The load carrying capacity.
ii) The pressure at a distance 50mm measured from the maximum film thickness point. Neglect side leakage.
4. a) Derive the generalized Reynolds's equation applied to viscous fluids. (8M)
b) Discuss the advantages, limitations and applications of air lubricated bearings. (4M)

5. Explain types of seals with neat sketches. How do you select mechanical seals. (12M)
6. Explain Raimondi and Boyd solution for hydrodynamic thrust bearings. (12M)
7. a) Explain the effect of friction on hydro dynamic bearings? (6M)
b) Explain why pre loading is necessary for rolling contact bearings? (6M)
8. a) Explain the phenomenon of decrease of viscosity of liquids with increase in temperature and increase of viscosity of gases with increase in temperature. Also explain the effect of temperature on viscosity index. (6M)
b) What is hydrodynamic journal bearing? Explain the significance of Sommerfield number in hydrodynamic bearings? (6M)
