

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – I • EXAMINATION – WINTER 2012****Subject code: 710905N****Date: 16-01-2013****Subject Name: Tribology****Time: 02.30 pm – 05.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a) List and explain the factors affecting selection of lubricants. 07
 (b) Classify the lubricants and explain the important properties of the lubricants. 07
- Q.2 (a) Explain the different methods used to reduce the wear with neat sketches in detail. 07
 (b) List and explain the factors affecting wear rate. Also explain the coating for wear resistance. 07
- OR
- Q.3 (a) State and explain the different bearing materials and its properties in detail. 07
 (b) The following data refers to hydrodynamic journal bearing:- 07
 Journal diameter = 80 mm
 Length of bearing = 40 mm
 Radial clearance between the journal and bearing = 50 microns
 Minimum oil film thickness = 15 microns
 Speed of journal = 1800 r.p.m.
 Viscosity of lubricating oil = 30 mPa·s
 Assuming the narrow approximation (a) plot the pressure distribution in the plane perpendicular to the axis and passing through the midpoint of bearing length (b) find the location and magnitude of maximum pressure.
 (b) Draw and explain different configurations of journal bearing in detail. 07
- OR
- Q.3 (a) Explain the design of hydrodynamic journal bearing in detail with neat sketch. 07
 (b) State the limitations of hydrodynamic journal bearings and advantages of hydrostatic bearing. 07
- Q.4 (a) Derive Petroff's equation for hydro journal bearing .also state the assumptions made while deriving the equation. 07
 (b) List and explain the factors affecting selection of an antifriction bearing. Also draw the flowchart for this. 07
- OR
- Q.4 (a) Derive the load carrying capacity equation for hydrostatic thrust bearing with a circular step. 07
 Q.4 (b) Discuss the optimum design of hydrostatic step bearing for minimizing fluid flow rate. 07
- Q.5 (a) Discuss the lubrication problems arise at certain extreme environmental conditions such as pressure, temperature and vacuum and along with their solution. 07
 (b) Explain the different types of wear in detail. 07
- OR
- Q.5 (a) Explain the EHD (elasto hydrodynamic lubrication) in detail and state its practical examples. 07
 (b) List the wear particle analysis ferrography in detail. 07
