(Following Paper ID and Roll No. to be filled in your Answer Books)

PAPER ID :   **Roll No**.

B.TECH.

Theory Examination (Semester-VI) 2015-16

TRIBOLOGY

Time : 3 Hours   *Max. Marks : 100*

Note: Attempt all questions as directed & assume missing **data suitably**, if any.

SECTION – A

1. Attempt all questions   **(10*2 = 20)**

    a) What are the simplifying assumptions in hydrodynamics.
    b) What are the advantages of gas lubricated bearing over oil lubricated bearings.
    c) What is the effect of temperature on the viscosity of lubricant used in bearing.
    d) Give difference between squeeze film and wedge film lubrication in journal bearings.
    e) What factors must be considered to avoid side leakage in journal bearings
    f) Explain the effect of compressibility of oil in design of journal bearing.
    g) What are the various additives used in lubricating oils and for what purpose they are used.
    h) What do you mean by porous bearing.
    i) What is the effect of wear on properties of material.
    j) Give the significance of Sommerfield no. in design of journal bearing.

SECTION – B

2. Attempt any FIVE Questions   **(5*10 = 50)**
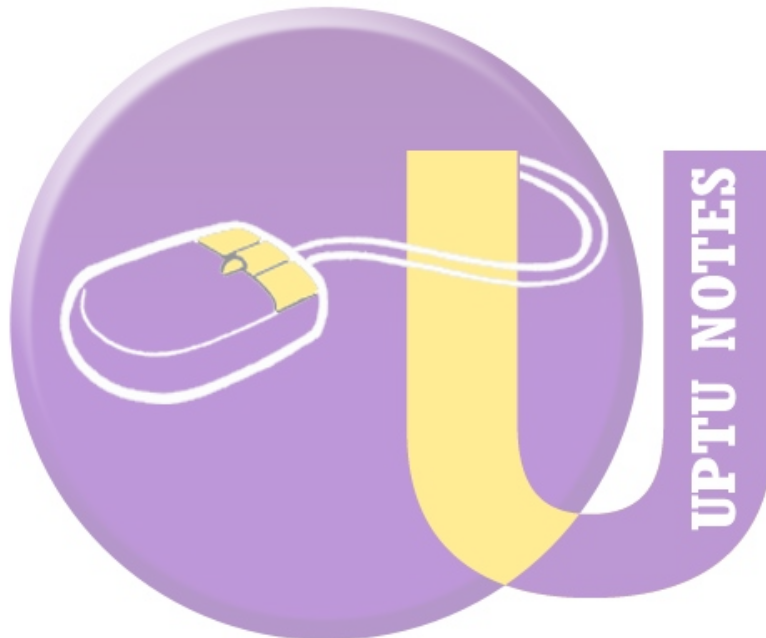
a) With the help of a neat sketch explain the construction and working of falling sphere viscometer.
b) Compare advantages and disadvantages of hydrodynamic and hydrostatic lubricated bearings.
c) A machine tool bearing has a length of 50 mm and its journal diameter is also 50 mm.The r/c ratio is 1000 and the operating viscosity of the lubricant (SAE 30) is 50 mPa-s. If the journal speed is 950 rpm and eccentricity ratio is 0.5 . Calculate the load carrying capacity
d) Derive an expression for Reynold's equation for hydrodynamic bearings.
e) What other parameters apart from viscosity are significant when dealing withlubricants. Explain their role on the effectiveness of lubricant.
f) A rectangular slider bearing with pivoted shoe has the following specifications
    Length of shoe = 60 mm   Width of shoe = 55 mm
    Slider speed = 5m/s   Load = 25KN
    Absolute Viscosity = 0.012 Pa-s
  Determine: (i) Minimum film thickness (ii) Power loss due to viscous friction. Neglect side leakage
g) Derive an expression for pressure distribution in hydrostatic bearing.
h) What are the important properties of bearing materials ? Discuss in detail.

Attempt any two questions.   (2*15 = 30)

3. Give the requisite properties of lubricants used in bearings. What are the various stages for selection of lubricant. Also define boundry lubrication and mixed film lubrication.

4. Explain in detail the circular step thrust bearing and write the pressure distribution equation.

5. Lateral stability of long shaft 15 cm in diameter is obtained by means of 25 cm stationary bearing having an internal diameter 15.025 cm. If the space between bearing and shaft is filled with a lubricant having a viscosity of 49Nsec/m^2. What power will be required to overcome the viscous resistance when shaft is rotating at constant rate of 180rpm?