C.U.SHAH UNIVERSITY
Summer-2015

M.TECH Sem - I (Mechanical Engineering-CAD/CAM)
Subject: Tribology in Design and Surface Engineering (5TE01TDS1)
Date: May -2015   Time: 3 Hrs   Max. Marks: 70

Instructions:
      (1) Answer each section in separate Answer sheet.
      (2) All questions are compulsory.
      (3) Indicate clearly, the options you attempt along with its respective question number.
      (4) Assume suitable data if necessary.

Section – I

Q.1 [A] Explain the following in respect to surface characteristics: [7]
             (i) Waviness (ii)Surface roughness (iii) Sampling length (iv)CLA & RMS
             (v) Bearing area curve (vi)Contact area (vii)Real area of contact

Q.2 [A] Discuss factors affecting the wear rate between the rubbing surfaces   [7]
       [B] What is the tribology? Suggest the various tribological solutions for overcoming [7]
             friction and wear.
OR
Q.2 [A] List the wear particle analysis ferrography in detail.   [7]
       [B] Explain the diagnostic maintenance of tribological components and considerations [7]
             in IC engines and automobile parts.

Q.3 [A] Discuss in detail the surface energy and flash temperature.   [7]
       [B] Discuss the different bearing materials.   [7]
OR
Q.3 [A] List and explain the factors affecting selection of bearing materials.   [7]
       [B] Explain fiber optic transducer with neat sketch.   [7]

Section – II

Q.4 [A] Define the following terms: [7]
             1) Tribo surfaces 2) Tribo system 3) Tribology 4) Antifriction Bearing
             5) Seat of pressure 6) Converging Fluid Film 7) Diverging Fluid Film

Q.5 [A]   1. What do you mean by lubricants? State the properties of a liquid lubricants [4]
               2. Define: Viscosity index, Efflux viscometer, profilometry   [3]
       [B] Explain the optimum design of hydrostatic step bearing.   [7]
OR
Q.5 [A] Explain the concept of Elasto hydrodynamic lubrication between two contacting   [7]
             bodies.
       [B] Derive the equation of load carrying capacity of hydrostatic step bearing.

Q.6 [A] State the assumptions made in forming Reynolds's equation for hydrodynamic   [7]
             journal bearings. Derive the Petroff's equation for hydrodynamic journal bearings.
       [B] Draw a neat sketch of hydrostatic bearing and state its advantages and   [7]
             disadvantages. Compare hydrostatic bearing and hydrodynamic bearings.
OR

Q.6 [A] Explain the effect of C/d ratio and L/d ratio on the performance of hydrodynamic journal bearing. [7]

[B] Explain the different configurations of hydrodynamic journal bearings with neat sketches (at least four). [7]

*****BEST OF LUCK*****