Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

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B.Tech.(ME) (2012 Onwards E-II) (Sem.–7)
INDUSTRIAL TRIBOLOGY
Subject Code : DE/ME-3.6
M.Code : 72022

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTION TO CANDIDATES :
1. **SECTION-A** is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. **SECTION-B** contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. **SECTION-C** contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Answer briefly :**

    a) Define Wear.

    b) Describe various types of lubricants.

    c) Illustrate hydrostatic lubrication.

    d) Briefly describe Archard's equation.

    e) List **any two** methods of testing lubricants.

    f) Differentiate between rubbing and sliding motion.

    g) Describe Sommerfield number.

    h) List **any two** methods of studying surfaces.

    i) List out the additives used in lubricants.

    j) Why surface-coatings are necessary in Industrial applications?

SECTION-B

2. Describe the following terms :

    a) Surface roughness

    b) Waviness

    c) Form errors

3. Discuss the laws of rolling friction. Suggest some laws of siding friction analogous to those of rolling friction.

4. Explain **any two** methods of testing the lubricants.

5. a) Can hybrid hydrostatic and hydrodynamic bearings be developed and used to advantage?

    b) Give examples of operating conditions under which the application of hydrostatic bearings would be necessary or highly desirable.

6. Describe various properties of liquid and grease lubricants.

SECTION-C

7. A hydrostatic thrust bearing of a turbine generator is designed for a load of 24 KN. The outside diameter is 0.2 m and diameter of recess is 0.1 m. The film thickness is to be 0.1 mm.

    a) Determine the recess pressure and volume flow required if the oil used is of 0.1 cP.

    b) Assuming $P_r/P_s = 0.5$, determine the stiffness of bearing. Generator speed = 750 rpm. Here P_r is the recess pressure and P_s is supply pressure.

8. a) What are the two conditions for the occurrence of hydrodynamic lubrication?

    b) Describe the term elasto hydrodynamic films and their effects.

    c) Describe the categories of boundary and extreme pressure lubrication.

9. Describe and Sketch various friction and wear measurement methods.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.