# CBCS SCHEME

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**15ME742**

### Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020
## Tribology

Time: 3 hrs.                                                                     Max. Marks: 80

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.*
*2. Use of Design Data handbook is permitted.*

## Module-1

1  a. What is Tribology? Explain in detail Historical background of Tribology.  (08 Marks)
   b. Explain the industrial importance of Tribology.  (08 Marks)

**OR**

2  a. List out different types of viscometers. Explain any one with neat sketch.  (08 Marks)
   b. What are the functions of lubricants? Explain.  (08 Marks)

## Module-2

3  a. Define Friction. What are different types of Friction? Explain.  (08 Marks)
   b. What are the different methods of measuring frictional force? Explain any one.  (08 Marks)

**OR**

4  a. List out wear mechanisms. Explain any one wear mechanism?  (08 Marks)
   b. List out various wear testing methods clearly, mentioning their standards.  (08 Marks)

## Module-3

5  Derive Reynolds 2D equation with assumptions.  (16 Marks)

**OR**

6  a. Derive an equation for load carrying capacity for a Idealized Journal bearing.  (10 Marks)
   b. An Idealized full Journal bearing has the following specifications:
      Diameter of the Journal = 50 mm,          Length of the bearing = 62.5 mm
      Speed of the Journal = 1200 rpm,          Radial clearance = 0.025 mm
      Viscosity of lubricant = 11 CP,           Attitude, $\epsilon$ = 0.8
      Calculate (i) Load carrying capacity (ii) Co-efficient of friction (iii) Power loss of the bearing  (06 Marks)

## Module-4

7  a. Derive an expression for load carrying capacity of a plane slider bearing with a fixed shoe.  (10 Marks)
   b. A slider bearing has a pivoted shoe by the following data:
      Length of the shoe in the direction of motion = 50 mm
      Width of the shoe = 64 mm
      Slider velocity = 5.5 m/s
      Load on the bearing = 8025 N
      Viscosity of the lubricant = 31 CP
      Determine minimum oil film thickness, power loss and coefficient of friction of bearing?
      The inclination of the surface corresponds to minimum co-efficient of friction?  (06 Marks)

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**OR**

**8** a. Derive an expression for hydrostatic step bearing pressure distribution. **(08 Marks)**

b. A hydrostatic step bearing has the following specifications :

Diameter of the shaft = 152 mm

Diameter of the pocket = 102 mm

Vertical thrust on the bearing = 65000 N

External pressure = 0

Shaft speed = 900 rpm

Viscosity of lubricant = 24.15 CP

Oil film thickness = 0.127mm.

Find (i) Supply pressure (ii) Quantity of oil flow (iii) Power loss in the bearing (iv) Frictional force (v) Co-efficient of friction. **(08 Marks)**

## Module-5

**9** a. List the characteristics of bearing materials. Explain any two. **(08 Marks)**

b. Determine the common bearing alloys. Explain any two alloys. **(08 Marks)**

**OR**

**10** a. What is Surface Engineering? Write a brief history of Surface Engineering? **(08 Marks)**

b. List out Traditional Coating Techniques? Explain any two. **(08 Marks)**

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