



Reg. No. :

Name :

First Semester M.Tech. Degree Examination, February 2015

Branch : Mechanical Engineering

Stream : Machine Design

(2013 Scheme)

MDC 1004 : INDUSTRIAL TRIBOLOGY

Time : 3 Hours

Max. Marks : 60

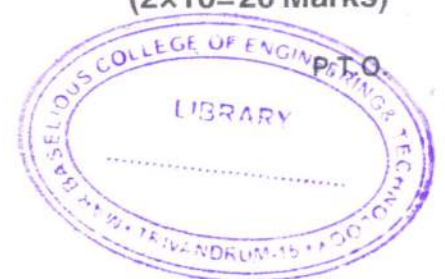
- Instructions :** 1) Answer **any two** questions from **each** Module.
2) **All** questions carry **10** marks **each**.
3) **Use** of Design Data Hand Book is **permitted**.

MODULE – 1

1. Discuss the Molecular theory of Friction and Wear and hence deduce expressions for coefficient of friction and wear.
2. Write in detail the mode of wear mechanism in Adhesive and Abrasive wear encountered in engineering surfaces under relative motion.
3. Explain running -in wear and deduce an expression for it. **(2×10=20 Marks)**

MODULE – 2

4. Derive an expression for rate of flow between parallel circular plates of length "l".
5. Discuss the significance of Sommerfield diagram in tribology.
6. Derive Reynolds equation from basic principles and describe the physical meaning of each term. **(2×10=20 Marks)**





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MODULE – 3

7. The following data is given for the hydrostatic step bearing of a vertical turbogenerator.

Thrust load = 450 kN

Shaft diameter = 400 mm

Recess diameter = 250 mm

Shaft speed = 750 rpm

Viscosity of lubricant = 30 cP.

Draw a neat sketch showing the effect of film thickness on energy losses.

Calculate the optimum film thickness for minimum power loss.

8. Discuss the role of restrictors in the design of hydrostatic bearing.

9. Select a single row deep groove ball bearing for a radial load 4 kN and a thrust load 5 kN operating at a speed of 1600 rpm for an average life of 5 years at 10 hours per day. Assume uniform and steady load. **(2×10=20 Marks)**
