Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

Roll No .....

MMMD-204

M.E./M.Tech. II Semester

Examination, December 2017

Industrial Tribology

Time : Three Hours

Maximum Marks : 70

Note : i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Draw neat diagrams wherever required.

1. a) Discuss some important tribological properties of bearing materials and lubricants.
   b) Define friction and wear. Explain laws of wear.

2. a) List three general advantages and disadvantages to be expected in applying water lubricated bearings rather than oil-film or rolling element bearings. Give five applications in which you conclude that water bearings would be advantageous.
   b) Explain instabilities and stick-slip motion.

3. a) Derive the Reynold's equation in 3D flow, giving the various assumptions used for deriving the same.
   b) State two types of bearings or bearing systems that you would consider for conveyor carrying 10 lb castings in 20 min passage at a speed of 2m/min through a 350°C heat-treating oven. List five selection factors to be considered. Which factor appears to be most critical?

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4. a) Discuss important applications of Journal Bearings.
   b) Discuss heat generation in bearings.

5. Design the journal bearing for a centrifugal pump. The diameter of bearing is 0.1m, the load on it is 50kN and its speed is 1000 rev/min. Assume any required data.

6. a) Discuss the Hertz theory of Elasto-hydrodynamic Lubrication.
   b) State brief about air lubricated bearings. State its important applications.

7. a) Discuss the Tribological aspects of metal rolling and extrusion process.
   b) Discuss evaluation of friction and wear through experiments under influencing parameters.

8. Write short note on following: (any two)
   a) pV value of materials
   b) Tribological aspects of wheel on rail contact
   c) Limitations of hydrodynamic bearing
   d) Tribo characteristics of different materials

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