

**B.Tech. – VIEP – MECHANICAL ENGINEERING
(BTMEVI)****Term-End Examination****December, 2015****BIMEE-006 : TRIBOLOGY***Time : 3 hours**Maximum Marks : 70*

Note : Attempt any *five* questions. All questions carry equal marks. Draw neat sketches, if required. Assume any missing data.

1. (a) Explain the laws of rolling friction. What are the similarities between rolling and sliding friction ? Distinguish between the two.
- (b) Differentiate between rubbing and sliding motion. Give practical examples of each. 7+7
2. (a) Discuss briefly any seven desirable properties of a good bearing material. List few materials used in bearings.
- (b) Explain in detail the mechanism of lubrication. Mention various types of lubrication methods. 7+7
3. (a) Briefly explain the Hydrodynamic theory of lubrication. State the basic assumptions made in this theory.

- (b) What are the additives used in lubricating oils ? Give their classification. What are their basic functions ?

7+7

4. A lightly loaded full journal bearing has the following specifications :

Bearing diameter = 80 mm

Bearing length = 60 mm

Diametral clearance = 0.12 mm

Journal speed = 2000 r.p.m.

Viscosity of lubricating oil = 4 cP

Radial load = 1000 N

Determine the following :

$$4 \times 3 \frac{1}{2} = 14$$

- (a) Frictional force
- (b) Torque
- (c) Power loss
- (d) Coefficient of friction
5. Explain the following :

$$4 \times 3 \frac{1}{2} = 14$$

- (a) Scuffing
- (b) Pitting
- (c) Effect of temperature on wear
- (d) Effect of temperature and pressure on viscosity

6. (a) How are rolling bearings lubricated by grease ? Discuss the factors on which the time interval of lubrication of a roller bearing depends.
- (b) Discuss the different modes of bearing failure. 7+7
7. Explain any *two* of the following : 7+7
- (a) Abrasive Wear
 - (b) Erosive Wear
 - (c) Corrosive Wear
 - (d) Adhesive Wear
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