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BIMEE-006

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B.Tech. MECHANICAL ENGINEERING (BTMEVI)

Term-End Examination

June, 2013

BIMEE-006 : TRIBOLOGY

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any seven** questions. All questions carry **equal** marks. Use of scientific calculator is **allowed**.*

1. (a) What is the role of surface films and interface debris in sliding friction ? 5+5

(b) How is rolling friction different from sliding friction ?

2. (a) Describe when and why roller bearings are preferred over ball bearings ? 5+5

(b) Explain how solid lubricants work ? Give suitable examples.

3. (a) What is a bio-based lubricant ? Explain in brief. 5+5

(b) Discuss wear in polymers and ceramics. Also explain ways to prevent it.

4. (a) Describe different types of wear. 5+5

(b) Explain the various criteria for selecting bearing fits.

5. (a) What is thick film lubrication ? Explain briefly. 5+5

(b) Discuss viscosity of an oil. Name the instrument used to determine the viscosity of lubricating oil. How does temperature influence oil viscosity ?

6. (a) Why it is desirable to have small carbon residue in a diesel lubricating oil ? 5+5

(b) Why should a lubricating oil not have an excessive tendency to oxidize ?

7. (a) What is the relation between the colour of a lubricating oil and its properties ? 3+7

(b) Indicate the difference between "Pressure feed" and splash type of lubrication with the help of a schematic diagram and briefly explain as to how the bearings of a connecting rod are lubricated. What is the need for providing crankcase ventilation ?

8. (a) Compare and contrast co-efficient of friction and angle of friction. 5+5

(b) Prove that the angle of friction is equal to the angle of the inclined plane, when a solid body of weight W placed on the inclined plane, is about to slide down.

9. (a) Discuss distribution of pressure of oil in a journal bearing width and length wise, with the help of pressure curves. 5+5

(b) What conditions should be fulfilled for obtaining film lubrication in a journal bearing ?

10. (a) What do you understand by pitting, erosion and stress corrosion ? 5+5

(b) What are the materials you would consider for the manufacturing of bearings ? What characteristics should these materials possess ?