

**B.Tech. MECHANICAL ENGINEERING  
(BTMEVI)**

**Term-End Examination**

**December, 2012**

**BIMEE-006 : TRIBOLOGY**

*Time : 3 hours*

*Maximum Marks : 70*

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

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1. (a) A block of concrete weighs 20 kg ; it takes 5+5  
40 N to start the block sliding on a concrete  
floor and 10 N to maintain sliding.

Calculate :

- (i) the static coefficient of friction  
(ii) the kinetic coefficient of friction
- (b) Explain why contact area does not appear  
in the friction equation.

$$F = \mu N$$

2. (a) What is the effect of liquid lubrication on 5+5  
the friction of a shaft/bushing couple ?
- (b) Indicate the requirement to be fulfilled by  
the lubricating oil ?

3. (a) What is the role of speed in bearing selection ? 5+5
- (b) What is the difference between an oil, a grease, and a solid lubricant ?
4. (a) Name five materials commonly used to solve erosion problems, and name which type of erosion each material solves. 5+5
- (b) Enumerate the main conditions that influence the oil film thickness between two metal surfaces in relative motion ?
5. (a) What is clearance in respect of bearing ? 5+5  
What factors lead to wear of cylinder and piston rings ?
- (b) What is pour point of an oil ? Explain the significance of pour point.
6. (a) Discuss in brief the procedure and steps involved in bearing design. 5+5
- (b) What is flash point of a lubricating oil ?
7. (a) What are the additives for lubricating oil ? 5+5  
How are they classified ? What are their functions ?
- (b) What will happen if the lubricating oil is in excess quantity in the crank case ? Explain.

8. (a) Discuss in brief the working principle of plain slider bearing. 5+5
- (b) Explain in brief the mechanism of pressure development in bearings.
9. (a) What do you mean by "angle of repose" ? 5+5  
Prove that the angle of repose is equal to the angle of friction.
- (b) Discuss the concept of Boundary Layer in lubrication.
10. (a) Name atleast five engineering materials used for bearing. What are the criteria for selection of bearing material ? 5+5
- (b) Differentiate between corrosive wear and abrasive wear. Explain with the help of suitable examples.
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