

- (f) Why Synthetic oils are used in aerospace applications ?
- (g) Apart from reducing friction and wear, the secondary purpose(s) of lubricants are.
- (h) Where solid lubricant is used ?
- (i) ASTM stands for.
- (j) How the lubrication between two bodies done ?

1½×10=15

Roll No.

Total Pages : 04

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B. Tech. EXAMINATION, 2021

Semester VII (CBCS)

INDUSTRIAL TRIBOLOGY

ME709

Time : 2 Hours

Maximum Marks : 60

The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.

Note : Attempt *Four* questions in all, selecting *one* question from any of the Sections A, B, C and D. Q. No. **9** is compulsory.

Section A

1. (a) Write down difference between Micro and Nano-tribology with neat and clean figures. **7½**
- (b) What do you mean by surface interactions and characterization ? **7½**

2. (a) How surface measurement is conducted ?
Explain any *one* of the techniques. $7\frac{1}{2}$
- (b) What do you mean by surface topography ?
Explain with figures. $7\frac{1}{2}$

Section B

3. Classify different types of wear involved in a mechanical component with neat and clean figures. 15
4. What are the different types of friction ? Explain with neat and clean figures. 15

Section C

5. (a) What do you mean by viscosity ? What are the different types of it ? Explain all with an example. $7\frac{1}{2}$
- (b) What do you mean by grade of oil ? $7\frac{1}{2}$
6. (a) What are the different types of lubricants ? What properties is desirable for a four-wheeler ? $7\frac{1}{2}$
- (b) Explain in brief ferrography and particle counter with respect to Lubricants. $7\frac{1}{2}$

Section D

7. (a) Explain lubrication regimes and Reynolds equation. $7\frac{1}{2}$
- (b) Why lubricant starvation occur ? What are the steps will take to avoid it ? $7\frac{1}{2}$
8. (a) Explain Hertzian and Non-hertzian contacts w.r.t. lubrication. $7\frac{1}{2}$
- (b) Explain with a neat and clean figure mechanism of pressure development in fluid film bearing. $7\frac{1}{2}$

(Compulsory Question)

9. (a) As the temperature is increased, what will happen with the coefficient of friction ?
- (b) What are the desirable properties of boundary lubricant ?
- (c) Film thickness in elasto-hydrodynamic lubrication depends on which parameters.
- (d) Write a relation of Viscosity Index.
- (e) What are the main constituents of grease ?