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# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal-500043, Hyderabad

B.Tech V SEMESTER END EXAMINATIONS (REGULAR/ SUPPLEMENTARY) - FEBRUARY 2024

Regulation: UG20

ENGINEERING TRIBOLOGY

Time: 3 Hours

(MECHANICAL ENGINEERING)

Max Marks: 70

Answer ALL questions in Module I and II

Answer ONE out of two questions in Modules III, IV and V

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

## MODULE – I

- List the friction properties of metallic and non metallic materials. Describe in detail about friction in extreme conditions with applications. [BL: Understand| CO: 1|Marks: 7]
  - Briefly explain any two types of surface measuring techniques. Explain about sliding and rolling friction with applications. [BL: Understand| CO: 1|Marks: 7]

## MODULE – II

- Classify the different types of wear. Briefly explain any two. Discuss the four basic types of wear mechanisms. [BL: Understand| CO: 2|Marks: 7]
  - Discuss in detail about surface treatments and surface coating methods with applications. [BL: Understand| CO: 2|Marks: 7]

## MODULE – III

- Outline the guidelines to be followed during selecting the proper lubricant for particular applications. [BL: Understand| CO: 3|Marks: 7]
  - Differentiate between hydrodynamic and hydrostatic lubrication. Derive two dimensional Reynolds equations for hydrodynamic lubrication. [BL: Understand| CO: 3|Marks: 7]
- Name the requirements of lubricant. Describe briefly about fluid film lubrication with suitable example. [BL: Understand| CO: 4|Marks: 7]
  - Explain the significance of Sommerfield number in the analysis of hydrodynamic lubrication. [BL: Understand| CO: 4|Marks: 7]

## MODULE – IV

- What are the different types of corrosion? Explain the various factors influencing the rate of corrosion. [BL: Understand| CO: 5|Marks: 7]
  - Suggest the preventive measures to control corrosion. Differentiate between cathodic and anodic protection. [BL: Understand| CO: 5|Marks: 7].
- Summarize the following terms
    - Cathodic protection
    - Anodic protection
 [BL: Understand| CO: 5|Marks: 7]

- (b) List the consequences of corrosion. Explain in detail about metal cladding for corrosion prevention with applications. [BL: Understand| CO: 5|Marks: 7]

### MODULE – V

7. (a) Explain briefly about crystallinity of polymers. Distinguish between addition and condensation polymerization. [BL: Understand| CO: 6|Marks: 7]  
(b) Differentiate between thermoplastics and thermosetting plastics. List the properties and applications of the silica and zirconia ceramics. [BL: Understand| CO: 6|Marks: 7]
8. (a) Discuss the structure and applications of any four thermoplastics. List the important engineering ceramics and its applications. [BL: Understand| CO: 6|Marks: 7]  
(b) What are the processing methods of super alloys? Explain briefly about titanium alloy and outline its various applications. [BL: Understand| CO: 6|Marks: 7]

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