



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal-500043, Hyderabad

B.Tech V SEMESTER END EXAMINATIONS (REGULAR) - DECEMBER 2022

Regulation:UG20

ENGINEERING TRIBOLOGY

MECHANICAL ENGINEERING

Time: 3 Hours

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

1. (a) What do you mean by adhesive coefficient of friction? Outline different types of friction. List the factors affecting coefficient of friction. [BL: Understand| CO: 1|Marks: 7]
- (b) Discuss the laws of rolling friction. Suggest laws of sliding friction analogous to those of rolling friction. [BL: Understand| CO: 1|Marks: 7]

MODULE – II

2. (a) Write short notes on following
i) Fretting wear ii) Surface fatigue wear iii) Erosion wear. iv) Percussion wear. [BL: Understand| CO: 2|Marks: 7]
- (b) Apply Rabinowicz quantitative theory for abrasive wear. Give any four examples of occurrence of sliding wear in industry [BL: Apply| CO: 2|Marks: 7]

MODULE – III

3. (a) What are the basic functions of a lubricant? List the important factors to be considered in the selection of lubrication system for given application. [BL: Understand| CO: 3|Marks: 7]
- (b) Model the mechanism of hydrodynamic lubrication. Discuss the significant design parameters in elasto-hydrodynamic lubrication. [BL: Apply| CO: 3|Marks: 7]
4. (a) Mention the four desirable properties of lubricant. Explain mixed and hydrodynamic lubrication regimes with the help of stribeck curve. [BL: Understand| CO: 4|Marks: 7]
- (b) Write short notes on viscosity and viscosity index. Make use of different methods in computing viscosity of lubricant with neat sketches. [BL: Understand| CO: 4|Marks: 7]

MODULE – IV

5. (a) Illustrate the mechanism of electrochemical corrosion of iron. Explain the factors effecting rate of corrosion by nature of metal? [BL: Understand| CO: 5|Marks: 7]
- (b) Discuss the principle involved in electroplating. Develop the procedure with special reference to copper plating. [BL: Apply| CO: 5|Marks: 7]

6. (a) Summarize about the sacrificial anodic method. Distinguish anodic and cathodic coatings. [BL: Understand| CO: 5|Marks: 7]
- (b) Explain briefly about pitting corrosion and crevice corrosion. Mention its impact on the material of corrosion. [BL: Apply| CO: 5|Marks: 7]

MODULE – V

7. (a) Outline the effect of the following elements as alloying additions to steel:
i) Manganese ii) Silicon iii) Chromium iv) Titanium [BL: Understand| CO: 6|Marks: 7]
- (b) Identify the effects of ageing temperature and time on the properties of alloy. Why copper is a suitable material for automobile radiators? [BL: Apply| CO: 6|Marks: 7]
8. (a) Describe the molecular structures properties and application of the following polymers:
i) Polyvinyl chloride ii) Polystyrene iii) Polyethylene terephthalate iv) Polycarbonate [BL: Understand| CO: 6|Marks: 7]
- (b) Briefly explain five important properties of ceramics that make them useful engineering materials. Explain the main classification of ceramic materials. [BL: Understand| CO: 6|Marks: 7]

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