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18AE45

## Fourth Semester B.E. Degree Examination, July/August 2022 Aircraft Material Science

Time: 3 hrs.

Max. Marks: 100

**Note: Answer any FIVE full questions, choosing ONE full question from each module.**

### Module-1

- 1 a. Name different types of testing methods of aircraft materials and explain briefly. (10 Marks)
- b. State the selection criteria based on properties for material used in aircraft. (10 Marks)

**OR**

- 2 a. Explain the application and trends in usage of materials in aero engines. (10 Marks)
- b. Discuss the importance and application of Titanium alloys in aircraft structure. (10 Marks)

### Module-2

- 3 a. Discuss briefly about the surface treatment given to super alloys. (10 Marks)
- b. Describe briefly about Nickel based super alloys and its microstructures. (10 Marks)

**OR**

- 4 a. Write the properties and applications of Carbon – Carbon composites. (10 Marks)
- b. Write short notes on :  
 i) Intermetallic Matrix Composites based on polymer  
 ii) Ablative Composites based on polymer. (10 Marks)

### Module-3

- 5 a. Briefly explain the characteristics of typical applications of plastic materials. (12 Marks)
- b. Define adhesive and sealant. State their applications in aircraft. (08 Marks)

**OR**

- 6 a. Write the types of non Scatterable glass available and explain briefly. (10 Marks)
- b. Briefly explain the typical properties and polymer materials. (10 Marks)

### Module-4

- 7 a. Define Ablation process. What are the different ablative materials and their applications in aerospace? (10 Marks)
- b. Describe the classification and properties of wood. (10 Marks)

**OR**

- 8 a. Describe briefly about aircraft painting process. (10 Marks)
- b. What is purpose of painting an aircraft? State the different types of aircraft paints. (10 Marks)

### Module-5

- 9 a. List out the materials used for Rockets and Missiles and explain its properties. (10 Marks)
- b. What are the different methods employed in removal of corrosion from common aircraft metals. (10 Marks)

**OR**

- 10 a. Write a short note on insulating materials used for cryogenic engines of aircraft. (10 Marks)
- b. Explain the following: i) Uniaxial testing ii) Strip-biaxial. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42-8 = 50, will be treated as malpractice.