U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: III**

Branch: Aerospace Engineering **Duration: 3 hrs.**

Course Code: 23AS3PCMAE / 22AS3PCMAE **Max Marks: 100**

Course: Materials For Aerospace Engineering

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	List the factors to be considered in selecting aerospace material. Also list out the important aerospace materials.	*CO1*	*PO1*	**08**
	b)	What was the first major natural material used for aircraft building? What were its disadvantages?	*CO1*	*PO1*	**04**
	c)	Discuss the corrosion resistant materials and methods used in Aerospace industry.	*CO1*	*PO1*	**08**
		OR			
2	a)	Based on historical timeline discuss the development of aircraft materials.	*CO1*	*PO1*	**06**
	b)	What are thermoplastics and thermosets? Discuss their properties and usage.	*CO1*	*PO1*	**08**
	c)	What is stealth? Discuss methods to implement stealth in aircrafts.	*CO1*	*PO1*	**06**
		UNIT - II			
3	a)	Discuss the following heat treatment process and their resulting effects a. Solid solution treatment b. Age hardening	*CO2*	*PO1*	**06**
	b)	Mentioning the age-hardenable aluminium alloys, discuss their properties and applications.	*CO2*	*PO1*	**08**
	c)	State the classification and usage of commercially pure titanium.	*CO2*	*PO1*	**06**
		OR			
4	a)	State and discuss the major alloys formed out of copper and their applications in aircraft industry.	*CO2*	*PO1*	**08**

		b)	State the applications of wood and fabric in aircraft.	*CO2*	*PO1*	**04**
		c)	How are titanium alloys categorized? Discuss their alloying composition and applications.	*CO2*	*PO1*	**08**
			UNIT - III			
	5	a)	Discuss the following phases of steel formation and their characteristics. i) Austenite ii) Ferrite iii) Cementite iv) Pearlite v) 5. Martensite	*CO3*	*PO1*	**12**
		b)	How are maraging steels obtained? Discuss in detail their composition and properties.	*CO3*	*PO1*	**08**
			OR			
	6	a)	Explain classification and composition of superalloys.	*CO3*	*PO1*	**09**
		b)	Differentiate hypo-eutectic and hyper-eutectic steels.	*CO3*	*PO1*	**04**
		c)	Discuss the role of ferrous materials in aircraft construction. Highlight their advantages and limitations with examples of specific applications in the aerospace industry.	*CO3*	*PO1*	**07**
			UNIT - IV			
	7	a)	Explain the CVD technique used in processing carbon/carbon composite.	*CO4*	*PO1*	**08**
		b)	List the applications of polymer matrix composite in aircraft industry.	*CO4*	*PO1*	**04**
		c)	Sketch and explain the solid-state processing of metal matrix composite.	*CO4*	*PO1*	**08**
			OR			
	8	a)	List different techniques involved in the processing of advanced ceramics.	*CO4*	*PO1*	**10**
		b)	List the typical ceramics and state their applications.	*CO4*	*PO3*	**10**
			UNIT - V			
	9	a)	What is Bauschinger effect observed in engineering materials? Explain.	*CO4*	*PO1*	**06**
		b)	With an illustration discuss the following flaw detection methods. i) Dye penetrant test ii) 2. Ultrasonic testing	*CO4*	*PO1*	**10**
		c)	State the machine tool used, for the following tests done on engineering materials.	*CO4*	*PO1*	**04**

			i) Tensile test ii) Fatigue test iii) Hardness test iv) Impact test			
			OR			
	10	a)	Explain the following Flaw detection techniques with illustrations. i) Radiography ii) Eddy current method iii) Magnetic particle testing	*CO4*	*PO1*	**15**
		b)	What is yielding in metals? Explain.	*CO4*	*PO1*	**05**

****