U.S.N.										

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

Autonomous Institute Affiliated to VTU

August 2024 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Aerospace Engineering **Duration: 3 hrs.**
Course Code: 23AS3PCMAE **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.	CO1	PO1	**6**
	b)	Bring out the list of major Aerospace materials used in the industry.	CO1	PO1	**6**
	c)	List the corrosion resistant materials and methods to minimize corrosion in Aerospace industry.	CO1	PO1	**8**
		OR			
2	a)	Based on historical timeline discuss the development of aircraft materials.	CO1	PO1	**6**
	b)	What are intermetallics? List and state properties any four intermetallics.	CO1	PO1	**8**
	c)	Discuss any four methods of achieving stealth in military aircrafts.	CO1	PO1	**6**
		UNIT - II			
3	a)	Categorize aluminium alloys into age hardenable and non-age hardenable alloys.	CO2	PO1	**4**
	b)	State the classification and usage of titanium and its alloys.	CO2	PO1	**8**
	c)	Discuss the following heat treatment process and its effects. i) Solid solution treatment ii) Age hardening iii) Precipitation hardening.	CO2	PO1	**8**
		OR			
4	a)	Give out IADS classification of Aluminium alloys along with their composition.	CO2	PO1	**5**
	b)	State and discuss the major alloys formed out of copper and their applications in aircraft industry.	CO2	PO1	**6**
	c)	State the advantages of Titanium. And hence discuss the composition and applications of Alpha Titanium alloys.	CO2	PO2	**9**

			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	*CO2*	*PO1*	**10**
		b)	How are maraging steels obtained? Discuss in detail their composition and properties.	*CO2*	*PO2*	**5**
		c)	Discuss the composition and application of Nickel and Cobalt based superalloys.	*CO3*	*PO2*	**5**
			UNIT - IV			
	6	a)	With illustration explain any two techniques involved in the processing of metal matrix composites.	*CO3*	*PO1*	**10**
		b)	List typical ceramics and state their applications.	*CO3*	*PO2*	**5**
		c)	Define Composites. State the specific advantages of composites over metals and alloys.	*CO3*	*PO2*	**5**
			UNIT - V			
	7	a)	What is the Bauschinger effect observed in engineering materials? Explain with illustration.	*CO3*	*PO1*	**6**
		b)	With neat sketches discuss the following flaw detection methods. i) Dye penetrant test ii) Ultrasonic testing	CO3	*PO3*	**8**
		c)	Explain linear and non-linear behavior of metals with a stress-strain curve.	CO3	*PO2*	**6**

****