U.S.N.										

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

Autonomous Institute Affiliated to VTU

August 2023 Semester End Make-Up Examinations

Programme: B.E. **Semester: III**
Branch: Aerospace Engineering **Duration: 3 hrs.**
Course Code: 22AS3PCMAE **Max Marks: 100**
Course: Materials for Aerospace Engineering **Date: 11.08.2023**

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

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

1	a)	List and discuss any four materials used in modern Aerospace industry.	6
	b)	What are intermetallics? Explain with one example each for Aluminide and Silicide with their characteristics stated and temperature limits specified.	7
	c)	Stealth is an important modern fighter aircraft defensive mechanism. Discuss various means to achieve the stealth.	7

OR

2	a)	Discuss any two corrosion processes applicable for Aerospace industry. Also list out the methods to prevent corrosion in aircrafts.	8
	b)	With classification, state the characteristics of polymers. List the applications of various polymers in Aerospace industry.	8
	c)	Why was the magnesium alloy brought into usage as Aerospace material? Discuss its advantages, disadvantages and uses.	4

UNIT - II

3	a)	Bring out the reasons for Aluminium being the most favorite material for Aerospace industry.	6
	b)	Based on the alloy content how are the aluminium alloys classified using IADS system? State the characteristics and importance of 1000 series of alloys.	6
	c)	Stating the differences between alpha and beta titanium alloys, bring out their specific applications in aerospace industry.	8

OR

4 a) State the major age-hardenable aluminium alloys and their characteristics. **8**

b) Draw a comparison between aluminium and titanium alloys in terms of their properties and aerospace applications. **6**

c) State and discuss the properties and applications of copper and its alloys. **6**

UNIT - III

5 a) With an illustration of iron-carbon diagram explain the following phases of steel. **8**

a. Austenite
b. Ferrite
c. Cementite

b) Differentiate between eutectic, hypo-eutectic and hyper-eutectic steels. Which out of these are majorly employed in aerospace industry? State the reasons. **6**

c) Stating the three different categories of superalloys, give their typical alloy composition and advantages. **6**

UNIT - IV

6 a) Listing the properties of ceramic materials, give examples for ceramics. **7**

b) What are carbon-carbon composites? State their advantages and limitations. **6**

c) Sketch and explain any one liquid state processing of metal matrix composites. **7**

UNIT - V

7 a) With a stress-strain diagram explain linear and non-linear behavior of metals. **6**

b) With illustration explain the phenomenon of Bauschinger effect. **6**

c) Explain with illustration one NDT technique each for detection of surface and sub-surface defect. **8**

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