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

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E.   Semester: III
Branch: Aerospace Engineering   Duration: 3 hrs.
Course Code: 19AE3DCIAE   Max Marks: 100
Course: Introduction to 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.

			UNIT - I	
	1	a)	Define International Standard Atmosphere and explain the difference between geometric altitude and geo-potential altitude.	**6**
		b)	Explain the primary, secondary and auxiliary control surfaces on an aircraft.	**8**
		c)	Discuss the comprehensive space programs going on in India, to transport humans and permanently place them at a space station or another planet.	**6**
			OR	
	2	a)	Enumerate the spacecraft classification and also give its detailed explanation with a suitable example for each type.	**10**
		b)	Calculate the standard atmosphere values of T, P and ρ at an altitude of 18 km	**10**
			UNIT - II	
	3	a)	Briefly explain the nomenclature of a typical cambered airfoil. Draw a neat sketch and label its parts.	**6**
		b)	Define the terms range and endurance.	**4**
		c)	Explain the factors affecting the lift and the drag of an aircraft.	**10**
			OR	
	4	a)	Derive the equation for landing ground roll distance (S_L).	**10**
		b)	With a neat sketch, explain the concept of dynamic stability.	**4**
		c)	Explain Kepler's laws of planetary motion.	**6**
			UNIT - III	
	5	a)	Explain the use of metallic and non-metallic materials in aircraft application.	**10**
		b)	For a typical rocket engine, explain the merits and demerits of solid propellants over liquid propellants.	**4**

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.

		c)	Define total, static and dynamic pressures and explain the methods to measure them.	**6**
			OR	
6		a)	Explain the working principle of solid and liquid propellant rockets with suitable sketches.	**10**
		b)	With the help of T-s and P-v diagram, explain the working principle of Brayton cycle.	**10**
			UNIT - IV	
7		a)	Explain fuel system with a neat sketch and describe about the fuel system components in an aircraft used in a defense sector.	**8**
		b)	What is meant by the bleed air in an aircraft? Explain its significance and sources.	**6**
		c)	With a neat diagram explain about the gyroscopic instruments used in an aircraft.	**6**
			OR	
8		a)	Define anti-icing and de-icing. What are the methods of anti-icing and de-icing system?	**10**
		b)	Write a brief note about the Life Support Systems on an aircraft.	**5**
		c)	Explain the hydraulic system components used in an aircraft.	**5**
			UNIT - V	
9		a)	Explain the challenges faced in aerospace engineering.	**8**
		b)	Discuss how the advances in materials and manufacturing processes helping the aerospace industry.	**5**
		c)	Mention the top aerospace companies in India and their role.	**7**
			OR	
10		a)	Define crashworthiness. Explain the detail about crashworthy systems.	**10**
		b)	Explain the emerging technology trends in aviation industry.	**10**

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