U.S.N.										

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

Autonomous Institute Affiliated to VTU

April 2024 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Aerospace Engineering **Duration: 3 hrs.**
Course Code: 23AS3PCIAE **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.

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)	Define the following terms: i) Pressure altitude ii) Temperature altitude iii) Density altitude	CO 2	PO 1	**06**
	b)	Derive the hydrostatic equation with the help of its force diagram.	CO 2	PO 3	**06**
	c)	Calculate the standard atmosphere values of T, P and ρ at an altitude of 14 km.	CO 2	PO 1	**08**
		UNIT - II			
2	a)	Explain the Kepler's law of planetary motion.	CO 1	PO 1	**09**
	b)	Derive the equation for lift-off distance (S_{LO}).	CO 1	PO 1	**05**
	c)	Define the following: i) Endurance ii) Power	CO 2	PO 3	**06**
		OR			
3	a)	Write short notes on: i) Types of drag ii) Centre of pressure iii) Aerodynamic centre iv) Mach number	CO 2	PO 1	**8**
	b)	Define with equation speed of sound. Explain its significance in determining airspeed and ground speed.	CO 2	PO 1	**6**
	c)	Briefly explain the terms: i) Stalling ii) Take-off iii) Landing.	CO 2	PO 1	**6**

			UNIT - III			
	4	a)	What are the advantages of turbofan over turboprop engine?	*CO 2*	*PO 1*	**5**
		b)	With the help of neat sketch explain the working of scramjet engine.	*CO 2*	*PO 3*	**7**
		c)	With the help of T-S and P-V diagram, explain the working principle of Brayton cycle.	*CO 2*	*PO 3*	**8**
			OR			
	5	a)	Derive the thrust equation of a Jet Engine.	*CO 2*	*PO 3*	**7**
		b)	Consider a turbojet-powered airplane flying at a standard altitude of 30,000 ft at a velocity of 500 mi/h. The turbojet engine itself has inlet and exit areas of 7 and 4.5 ft^2, respectively. The velocity and pressure of the exhaust gas at the exit are 1600 ft/s and 640 lb/ft^2, respectively. Calculate the thrust of the turbojet.	*CO 2*	*PO 3*	**8**
		c)	What do you understand by dihedral angle? Explain in detail.	*CO 2*	*PO 1*	**5**
			UNIT - IV			
	6	a)	List the uses of i) Aluminum alloys ii) Titanium iii) Stainless Steel and iv) Composite Materials	*CO 3*	*PO 1*	**8**
		b)	Explain briefly the semi-monocoque construction of a fuselage and wing structure of an aircraft with simple sketches.	*CO 2*	*PO 1*	**8**
		c)	Differentiate truss type and monocoque type of fuselage construction.	*CO 2*	*PO 1*	**4**
			UNIT - V			
	7	a)	Explain the emerging technologies in aircraft manufacturing.	*CO 1*	*PO 1*	**7**
		b)	Mention and define the challenges being faced by the aerospace industry with growing technology.	*CO 3*	*PO 2*	**8**
		c)	Define crashworthiness. Explain in detail about crashworthy systems.	*CO 1*	*PO 1*	**5**

****