PRN:		Course Code :	II2802

Final Year B. **Tech** End Semester Examination Summer 2024

Lighter Than Air Systems

Day and Date: Tuesday, 11 JUN 2024 Max Marks: **100**

Time : 10-30am to 1-30PM) Duration: **03** hrs

Instructions: All questions are compulsory.

		Marks	Bloom's Level	CO
Q.1	**Attempt the following**			
a)	How may the buoyant system be stabilized using a ballonet? Using a clear diagram, describe the control system's operation and performance.	08	1	1
b)	Sort and explain the aerostat and airship mooring and ground handling systems, respectively.	08	2	1
	OR			
b)	Interpret the technologies of any three of the following LTA systems a. Heavy Light Blimps b. High Altitude Airships c. Hybrid Airships d. Unconventional Blimps	08	2	1
Q.2	**Attempt the following**			
a)	What is Lighter than air system, Explain the classification, compare the limitations and advantages with HTAs and list out the USPs of LTAs.	08	2	1
b)	Write about at least four historical developments in the lighter-than-air system that led to significant advancements in LTA systems.	08	2	2
	OR			
b)	Using a clear sketch, explain why Dynastats and Rotastats are hybrid buoyant systems.	08	3	2
Q.3	**Attempt any Two from the following**			
a)	How may the buoyant system be stabilized using a ballonet? Using a clear diagram, describe the control system's operation and performance.	08	1	2
b)	Explain the limitations, analysis parameters, and design phases of the stratospheric airship module, along with its potential future applications.	08	2	3

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	c)	Draw neat sketch and Compare the Dalton's law of Partial pressure with Amagat's Law of partial pressure.	08	2	3
Q.4		**Attempt any Two from the following**			
	a)	Describe the techniques used to estimate aerodynamic parameters for the forces and moments involved in overall aerodynamics. Connect the techniques for estimating the same using blimps.	08	1	3
	b)	List the advantages of aerostats and airships in a clear, concise drawing.	08	2	4
	c)	Explain any two of the following with sketch. a. Aerodynamics and Aerostatics b. Forces acting on a flying body c. Components of conventional airplane	08	3	4
Q.5		**Attempt any Two of the following**			
	a)	Create a diagram of the atmosphere's layers and describe how its characteristics change in accordance with ISA guidelines.	09	3	4
	b)	Explain the components and working principles of an LTA system by drawing a schematic of the system.	09	2	4
	c)	Explain the following a. Angle of Attack b. Angle of Incident c. Chord line d. Symmetrical Airfoil e. Unsymmetrical Airfoil f. Camber Line	09	3	5
Q.6		**Attempt any Two of the following**			
	a)	Provide a clear sketch for each type of LTA vehicle and explain which design is best suited for sophisticated systems. Examine the benefits and drawbacks of each kind.	09	2	5
	b)	Sort the different kinds of flying machines using a tree diagram.Justify the need for the return of the LTA system by comparing the benefits and drawbacks of HTA and LTA systems.	09	2	5
	c)	Take a look at an LTA system, which is a low-orbit satellite system. Describe the various configurations and go into detail about its applicability using a diagram.	09	3	5

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