PRN:		Course Code :	UST553

Third Year **B. Tech** End Semester Examination Winter 2024

Fundamentals of Aeronautical Engineering

Day and Date: Thu 28 NOV 2024 Max Marks: **100** 000139

Time : 10:30AM To 01.30PM Duration: **03** hrs

Instructions:All questions are compulsory.

			Marks	Bloom's Level	CO
Q.1		**Attempt the following**			
	a)	Describe the principles behind balloon flight. How does a hot air balloon achieve lift?	08	2	1
	b)	Discuss the significance of the Wright Brothers' first powered flight. What innovations did they introduce that were crucial for their success?	08	2	1
		OR			
	b)	Describe how the advancements in flight technology have impacted global society, particularly in terms of transportation, communication, and military strategy.	08	3	1
Q.2		**Attempt the following**			
	a)	Classy aircrafts.	08	2	2
	b)	Describe the all the six basic flight instruments that are necessary in aircraft navigation.	08	3	2
		OR			
	b)	Draw neatly an airplane and explain its components.	08	3	2
Q.3		**Attempt any two from the following**			
	a)	Describe the generation of lift in an airfoil and how it affects flight performance.	08	1	3
	b)	Discuss different types of airfoils and how angle of attack affects lift generation in each type of airfoil.	08	3	3
	c)	Decode the airfoils given below: a. NACA 0012 b. NACA 4414 c. NACA 24210 d. NACA 621-412	08	3	3
Q.4		**Attempt any two from the following**			
	a)	Explain the use of aluminum alloys, titanium, stainless steel, and composites in modern aircraft.	08	3	4

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	b)	Describe the typical structure of a wing and fuselage in a commercial aircraft.	08	3	4
	c)	Discuss the concept of the factor of safety in aircraft design and its importance in structural integrity.	08	2	4
Q.5		**Attempt any Two of the following**			
	a)	Compare the merits of turbofan engines and turbofan engines in terms of fuel efficiency and performance.	09	3	4
	b)	Explain the 4 strokes principle of a piston engine.	09	2	4
	c)	Explain the process of thrust generation in a jet engine and the role of each major component.	09	3	5
Q.6		**Attempt any Two of the following**			
	a)	Explain the basic principles behind rocket engine operation and how they differ from jet engines.	09	2	5
	b)	Analyze the historical development of piston and jet engines and their impact on modern aviation.	09	3	5
	c)	Discuss the different types of rockets (liquid-fuel, solid-fuel, hybrid) and their typical applications.	09	3	5

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