Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2023

Subject Code:3150101 Date:07-12-2023

Subject Name:Flight Mechanics

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Define – Altitude, Standard Atmosphere, Temperature altitude.	**03**
	(b)	Differentiate between Geometric altitude and Geo-Potential Altitude.	**04**
	(c)	Briefly explain how high lift devices work during take-off and landing.	**07**
Q.2	**(a)**	Define Stall. Shortly explain how stall takes place on wing.	**03**
	(b)	Differentiate between Thrust and Power.	**04**
	(c)	Briefly explain difference between power required and power available for Piston prop or turboprop aircrafts.	**07**
		OR	
	(c)	Briefly explain how thrust available affects service ceiling and maximum velocity.	**07**
Q.3	**(a)**	With vector diagram of a climbing flight explain why powerless or climb without thrust is not possible.	**03**
	(b)	Differentiate between Gliding Flight and Power Descend.	**04**
	(c)	Discuss factors affecting Range and Endurance of an fixed wing aircraft.	**07**
		OR	
Q.3	**(a)**	What do you understand by level turn? Only draw vector diagram.	**03**
	(b)	Differentiate between steady climb and accelerated climb.	**04**
	(c)	Briefly explain V-N Diagram with neat sketch.	**07**
Q.4	**(a)**	Shortly explain how air density affects take-off and landing performance.	**03**
	(b)	With neat sketch explain four forces acting upon an aircraft.	**04**
	(c)	Briefly differentiate between static and dynamic stability.	**07**
		OR	
Q.4	**(a)**	Define pitching moment. How does it affect performance of horizontal stabilizer.	**03**
	(b)	Differentiate between stick free and stick fixed stability.	**04**
	(c)	Explain role of location of Centre of gravity, Neutral point and Centre of pressure on aircraft stability.	**07**
Q.5	**(a)**	Define Positive stability, Negative Stability and Neutral Stability.	**03**
	(b)	What is elevator trimming?	**04**
	(c)	Discuss factors affecting directional stability of a fixed wing aircraft.	**07**
		OR	
Q.5	**(a)**	Define static margin. Explain how static margin affects pitching stability.	**03**
	(b)	Define and shortly explain Stick Force Gradient?	**04**
	(c)	Explain method to improve stability of aircraft.	**07**

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