Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170108 Date:04-12-2023

Subject Name: Aircraft Control and Navigation

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)**	What is longitudinal dynamics?	**03**
	(b)	Define (i) Stability (ii) Navigation (iii) Dutch Roll	**04**
	(c)	Derive equation of motions for forces and moments of longitudinal dynamics.	**07**
Q.2	**(a)**	Write a note on mapping navigation system.	**03**
	(b)	Enlist celestial navigation system	**04**
	(c)	Explain pitch orientation control system with functional diagram.	**07**
		OR	
	(c)	Derive equation for turn compensation with suitable sketch and block diagram.	**07**
Q.3	**(a)**	List out the parameters which are affecting stability of an aircraft.	**03**
	(b)	Explain basic longitudinal autopilot with block diagram.	**04**
	(c)	Explain Transient response of an aircraft in brief.	**07**
		OR	
Q.3	**(a)**	Explain positioning in terms of navigation.	**03**
	(b)	Explain basic lateral autopilot with block diagram.	**04**
	(c)	Explain longitudinal autopilot with its advantages and disadvantages in brief.	**07**
Q.4	**(a)**	Write a short note on Deck reckoning.	**03**
	(b)	Explain Dutch roll Damping with block diagram.	**04**
	(c)	Define Inertial cross coupling. Explain the system for controlling an aircraft subject to Inertial cross coupling.	**07**
		OR	
Q.4	**(a)**	Write a note on glide slope coupler.	**03**
	(b)	Write a note on automatic flare coupler.	**04**
	(c)	Explain Euler angle system to establish relations between inertial and body reference.	**07**
Q.5	**(a)**	What is inertia cross coupling of aircraft?	**03**
	(b)	Explain short and long period mode of aircraft.	**04**
	(c)	Explain Yaw orientation control system with block diagram.	**07**
		OR	
Q.5	**(a)**	Explain ILS coupled Autopilot system in brief.	**03**
	(b)	Explain MLS coupled Autopilot system in brief.	**04**
	(c)	Explain acceleration control system with its block diagram.	**07**

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