Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- V EXAMINATION-SUMMER 2023

Subject Code: 3150101 Date: 26/06/2023

Subject Name: Flight Mechanics

Time: 02:30 PM TO 05:00 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 do you mean by Altitutde? List out different types of altitude.	**03**
	(b)	Derive hydrostatic equation.	**04**
	(c)	Make a Relation between geopotential and geometric altitudes.	**07**
Q.2	**(a)**	Define Steady flight and draw force diagram for an airplane in flight.	**03**
	(b)	Draw and explain thrust required curve level flight.	**04**
	(c)	Derive $C_{D,0}=C^2L$ / п*e*AR.	**07**
		OR	
	(c)	Draw and explain thrust available curves for piston engine – propeller combination.	**07**
Q.3	**(a)**	Define Power and write an equation.	**03**
	(b)	Write a short note on effect of altitude on power required.	**04**
	(c)	Draw and explain comparison of lift-induced, zero-lift and net power required curve.	**07**
		OR	
Q.3	**(a)**	What is absolute and service ceilings?	**03**
	(b)	Draw and shortly explain airplane in power off gliding flight.	**04**
	(c)	Derive an equation of rate of climb.	**07**
Q.4	**(a)**	Draw pull-up maneuvers.	**03**
	(b)	Explain Landing Performance.	**04**
	(c)	Draw and explain V-n diagram for a typical jet trainer aircraft.	**07**
		OR	
Q.4	**(a)**	Draw pull-down maneuvers.	**03**
	(b)	Define stability and control.	**04**
	(c)	Explain Longitudinal static stability in detail.	**07**
Q.5	**(a)**	Define Neutral Point	**03**
	(b)	Discuss Stick fixed vs. Stick free Stability.	**04**
	(c)	Write a note on Directional Static Stability	**07**

OR

Q.5	**(a)**	Distinguish between ‘mass’ balance and ‘aerodynamic’ balance	**03**
	(b)	Why does an aeroplane spin?	**04**
	(c)	Why do we require Horizontal Stabilizer? Explain in terms of longitudinal stability.	**07**