Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER • 2015

Subject Code: 150101 **Date: 02/05/2015**

Subject Name: Flight Mechanics

Time: 02.30pm-05.00pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Derive the condition for optimum thrust requirements under steady level flight.	**07**
	(b)	Derive the condition for optimum power required under steady level flight.	**07**
Q.2	**(a)**	Derive briquette's range equation for propeller driven aircraft.	**07**
	(b)	Derive an equation for endurance for jet aircraft.	**07**
		OR	
	(b)	Explain gliding flight. Derive its equation of motion and explain how the glide distance is independent of the weight of glider.	**07**
Q.3	**(a)**	Explain criteria for longitudinal stability for conventional wing tail combination and canard configuration.	**07**
	(b)	With neat diagram explain vector diagram for level turning flight.	**07**
		OR	
Q.3	**(a)**	What are lift enhancement devices used for aircraft? Explain with locations.	**07**
	(b)	Explain Cl-α curve after using lift augmentation systems.	**07**
Q.4	**(a)**	Explain vector diagram of steady descend powered flight and gliding flight.	**07**
	(b)	Derive the equation for rate of turn and turn radius of level horizontal turn.	**07**
		OR	
Q.4	**(a)**	Derive equation for ground roll distance.	**07**
	(b)	Differentiate between static and dynamic stability and explain its types.	**07**
Q.5	**(a)**	Explain contribution of wing in longitudinal static stability of an aircraft.	**07**
	(b)	What is the importance of sweep back wing on high subsonic speeds.	**07**
		OR	
Q.5	**(a)**	Define Centre of pressure, Centre of gravity, Aerodynamic centre, Neutral point, Static margin.	**07**
	(b)	Differentiate between stick free and stick fix stability briefly.	**07**

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