Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3160114 Date:11-12-2023

Subject Name:Introduction to UAV

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)**	List three key parts of a fixed-wing UAV and their functions.	**03**
	(b)	Outline two historical milestones in the operational development of UAVs and their impact on warfare.	**04**
	(c)	Compare and contrast the flight characteristics and range capabilities of fixed-wing and rotorcraft UAVs.	**07**
Q.2	**(a)**	What are payloads in the context of UAVs?	**03**
	(b)	Differentiate between active and passive payloads, providing examples of each.	**04**
	(c)	Describe how the Hyper Spectral Sensor works.	**07**
		OR	
	(c)	Compare and contrast the capabilities and limitations of synthetic aperture radar (SAR) and conventional radar systems for UAV-based surveillance.	**07**
Q.3	**(a)**	Discuss Laser detection.	**03**
	(b)	Describe the primary function of a camera payload and its common applications in UAV operations.	**04**
	(c)	Discuss in detail the UAV Launch Methods for Fixed-Wing Vehicles.	**07**
		OR	
Q.3	**(a)**	Describe two common launch methods for fixed-wing UAVs.	**03**
	(b)	What is basic difference between Radar and Laser detection and range.	**04**
	(c)	Discuss the role of thermal cameras in UAV payloads and their applications in search and rescue operations.	**07**
Q.4	**(a)**	Discuss the advantages and limitations of waypoint navigation for UAVs.	**03**
	(b)	Discuss the role and functionalities of a ground control station (GCS) in UAV operations.	**04**
	(c)	Describe the principles of operation and applications of dead reckoning navigation systems in UAVs.	**07**
		OR	
Q.4	**(a)**	Differentiate between very small UAVs (VS-UAVs) and small UAVs (S-UAVs)	**03**
	(b)	Describe the UAV's ground control station.	**04**
	(c)	Explain in detail about Dijkstra’s Algorithm.	**07**
Q.5	**(a)**	What is the purpose of an ultrasonic detector?	**03**
	(b)	Describe the UAVs' manual control system.	**04**
	(c)	Describe the quadcopter control system in brief.	**07**
		OR	
Q.5	**(a)**	Explain the purpose of testing the complete UAV before in-flight testing.	**03**
	(b)	What are the key considerations when preparing for in-flight testing of UAVs?	**04**
	(c)	Explain the UAV testing procedure in detail.	**07**

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