Enrolment No./Seat No_____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2024**

**Subject Code:3160114 Date:22-05-2024**

**Subject Name:Introduction to UAV**

**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's the main difference between a plane and a drone? | **03** |
| | **(b)** | Outline two historical milestones in the operational development of UAVs and their impact on warfare. | **04** |
| | **(c)** | Briefly describe the main components and their functions in each type of UAV: Fixed-Wing, Rotorcraft, and Flapping Wing. | **07** |
| **Q.2** | **(a)** | List two common types of sensors used in UAV payloads. | **03** |
| | **(b)** | List three key parts of a fixed-wing UAV and their functions . | **04** |
| | **(c)** | Compare and contrast the flight characteristics and range capabilities of fixed-wing and rotorcraft UAVs. | **07** |
| | | **OR** | |
| | **(c)** | Choose two payload types (e.g., hyper-spectral sensor, delivery payload) and discuss their specific applications in different sectors. | **07** |
| **Q.3** | **(a)** | What are payloads in the context of UAVs? | **03** |
| | **(b)** | Differentiate between a camera and a LiDAR sensor in terms of their functionality in a UAV payload. | **04** |
| | **(c)** | Describe the potential challenges associated with integrating a heavy payload onto a UAV and suggest strategies to mitigate them. | **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)** | Compare and contrast the launch methods used for fixed-wing UAVs and vertical takeoff and landing UAVs in terms of their advantages and limitations. | **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)** | Discuss the types of telemetry data typically transmitted from UAVs and how it aids in mission planning and execution. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Name classification category based on size for UAVs. | **03** |
| | **(b)** | Explain the significance of classification by range and endurance in categorizing UAVs. | **04** |
| | **(c)** | Discuss how understanding these classifications aids in selecting the most suitable UAV for diverse operational requirements. | **07** |
| **Q.5** | **(a)** | Briefly explain what distinguishes very small UAVs from small UAVs. | **03** |
| | **(b)** | Briefly explain the purpose of catapult launch system tests. | **04** |
| | **(c)** | Discuss how in-flight testing helps identify and address issues related to aerodynamics, stability, and payload integration. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Name types of test conducted during control station 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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