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Question Paper Code: U6G03

B.E./B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Sixth Semester

CSE (Artificial Intelligence and Machine Learning)

21UAM603- DRONE TECHNOLOGY AND ITS APPLICATIONS

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Name two ways in which drones have created opportunities for entrepreneurship. CO1- U
2. Imagine you are tasked with presenting the history of drones in a business pitch. Briefly outline three key milestones that influenced modern drone technology. CO2-App
3. Why is Wi-Fi connection important for drone operations? CO1- U
4. Based on your understanding of flight modes, how would you choose the most efficient mode to maximize a drone's battery life during a specific task, such as aerial photography or package delivery? CO2-App
5. How does the drone's behavior change when switching from manual mode to GPS hold mode? CO1- U
6. A drone pilot needs real-time telemetry data on their smartphone. How would you set up and integrate a mobile application to provide live monitoring? CO2-App
7. Why is flight time an important factor in choosing a drone for industrial applications? CO1- U
8. Given a city with high-rise buildings and limited open space, how would you adapt drone delivery technology to ensure smooth operations? CO2-App
9. How do pre-flight safety checks contribute to safe drone operations? CO1- U
10. Given a case where a drone interferes with manned aircraft operations, how should aviation authorities respond? CO2-App

PART – B (5 x 16= 80 Marks)

11. (a) You are a drone consultant tasked with recommending a suitable drone type (fixed-wing, rotary-wing, or hybrid) for specific industry applications. Using examples from delivery services, mining, and disaster management, demonstrate how you would evaluate and select the most appropriate drone type based on operational range, payload capacity, and industry-specific requirements. Give out your recommendations with clear reasoning and real-world scenarios. CO2- App (16)

Or

- (b) Imagine you are starting a drone-based photography business. Give a detailed business plan that includes: CO2- App (16)
- The type of drones and technology required.
 - The target market and competitive advantages.
 - Challenges you may face and strategies to overcome them.

12. (a) You are tasked with assembling a drone for surveillance in a forested region, where obstacles like trees and wildlife are common. Choose the appropriate components (e.g., frame, motors, flight controller, sensors) for this mission. Explain how each component contributes to the drone's ability to carry out the mission, ensuring stability and reliability in such an environment. CO2- App (16)

Or

- (b) You are preparing to conduct a large-scale surveying mission using a drone. You need to download, install, and configure a surveying software program for the drone. Outline the steps involved in installing the program on both the computer and the drone, and discuss the potential challenges you may encounter during installation and how to troubleshoot them. CO2- App (16)

13. (a) Explain the basic concept of how a drone operates. Include descriptions of key components such as the flight controller, propellers, motors, and sensors, and explain their role in drone functionality. CO1- U (16)

Or

- (b) Explain the key security risks associated with using removable storage devices in mobile devices (e.g., data theft, malware, etc.). Also propose strategies and tools to ensure the security of data stored on removable devices. CO1- U (16)
14. (a) Explain how drones are used in the insurance sector for damage assessment and risk evaluation. Provide suitable examples. Also discuss the benefits and challenges of using drones for insurance claims processing. CO1- U (16)
- Or
- (b) How can drone technology be strategically applied to develop an integrated system that not only automates livestock tracking and health monitoring based on grazing patterns but also incorporates predictive weather anomaly monitoring to proactively prevent crop losses, thereby optimizing both livestock management and crop yield sustainability on a dairy farm? CO1- U (16)
15. (a) Identify the role of aviation regulations and standardization in the drone industry. How do international standards like those from the International Civil Aviation Organization (ICAO) and the Federal Aviation Administration (FAA) influence drone operation? Discuss the legal framework and compliance requirements for commercial drone operations. CO2- App (16)
- Or
- (b) As a drone operations manager for a commercial drone service, you are responsible for ensuring safe operations. Develop a comprehensive set of safety guidelines that operators must follow before, during, and after each flight. Justify your guidelines with respect to the specific operational environment (e.g., urban, rural, industrial). CO2- App (16)

