# BRAINWARE UNIVERSITY

## Term End Examination 2024-2025
## Programme – Dip.RA-2022
## Course Name – Mobile Robotics
## Course Code - ECPE601B
## ( Semester VI )

**Full Marks : 60** **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

### Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Identify the pioneer of UAV development.
a) Nikola Tesla b) Abraham Karem
c) Wright Brothers d) Leonardo da Vinci

(ii) Summarize a common UAV application in the construction industry.
a) Site surveying b) Cooking
c) Fashion design d) Space travel

(iii) Predict an emerging future trend in UAVs.
a) Autonomous AI-driven flight b) Decreased battery life
c) Increased manual control d) Reduced payload capacity

(iv) Identify the primary propulsion type in most commercial UAVs.
a) Electric motors b) Jet engines
c) Internal combustion d) Hybrid propulsion

(v) List the main function of telemetry in UAVs.
a) Communication with satellites b) Data transmission to ground station
c) Autonomous flight control d) Payload activation

(vi) Identify the main types of control systems used in underwater robotics.
a) PID and adaptive control b) Manual and automated
c) Open and closed-loop d) Digital and analog

(vii) Identify key advancements in AUV technology.
a) Enhanced autonomy b) Longer endurance
c) AI-driven models d) Smaller AUVs

(viii) Identify the primary function of underwater robots.
a) Exploration b) Navigation
c) Data Collection d) All of the above

(ix) Identify the key environmental factors affecting underwater robotics.

a) Temperature, Pressure, Salinity, Light
b) Wind, Temperature, Altitude
c) Humidity, Pressure, Wind
d) Altitude, Gravity, Friction

(x) Define the purpose of an IMU in underwater robots.

a) Provide orientation and motion data
b) Measure depth
c) Control buoyancy
d) Enhance speed

(xi) Identify a common propulsion system for AUVs.

a) Thrusters
b) Wings
c) Rotors
d) Propellers

(xii) Identify the main challenge in UAS recovery.

a) Safe landing
b) Flight stability
c) Reducing sensor accuracy
d) Limiting maneuverability

(xiii) Identify the primary applications of UAVs in civil use.

a) Surveillance
b) Agriculture
c) Underwater Mapping
d) Disaster Management

(xiv) Identify the primary use of UAVs:

a) Agriculture
b) Surveillance
c) Deep-sea exploration
d) None of the above

(xv) Interpret why UAVs require telemetry systems.

a) To improve aerodynamics
b) To transmit data
c) To reduce weight
d) To enhance payload capacity

## Group-B

(Short Answer Type Questions) 3 x 5=15

2. Define an Unmanned Aerial Vehicle (UAV). (3)
3. Write is the role of scale in UAV design and operation? (3)
4. Explain the principle of lift generation in UAVs. (3)
5. Write the primary governmental and civil uses of UAVs. (3)
6. Classify the historical significance of UAVs in military applications? (3)

**OR**

Examine the challenges in integrating electro-optic payload systems in small satellites. (3)

## Group-C

(Long Answer Type Questions) 5 x 6=30

7. Name three examples of electro-optic payload systems. (5)
8. Write the primary function of radar imaging payloads. (5)
9. Assess the impact of payload weight on satellite launch costs and performance. (5)
10. List the classification methods for underwater robots. (5)
11. Differentiate between aerial and underwater robotics. (5)
12. Compare the imaging capabilities of electro-optic payloads and radar payloads in different weather conditions. (5)

**OR**

Critically evaluate the importance of payload integration in mission success. (5)

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