



DELHI PUBLIC SCHOOL NEWTOWN
SESSION 2025-26
MONDAY TEST

Class: IX
Subject: ROBOTICS & AI

Total Marks: 40
Date: 28/07/25

Instruction:

- Attempt all questions.
- The intended marks for questions are given in brackets [].
- Write a variable description table or comments for all programs.
- This paper consists of three printed pages.

Question 1

[10]

Choose the correct answer

- i.** What is a major technological distinction between aerial robots and land robots?
- a. Aerial robots rely solely on hydraulic control systems, while land robots do not
 - b. Aerial robots must account for aerodynamic stability, unlike ground robots
 - c. Land robots always use wheels, while aerial robots cannot be autonomous
 - d. Land robots use propellers for movement, while aerial robots use treads
- ii.** What critical limitation often affects underwater robots compared to aerial robots?
- a. They can't be powered by rechargeable batteries
 - b. Underwater communication and navigation are significantly more complex
 - c. They always require human divers to deploy them
 - d. They cannot use any sensors due to water interference
- iii.** How is AI contributing to advancements in the healthcare sector?
- a. By replacing doctors with robots in all medical fields
 - b. By providing real-time diagnosis support through image analysis and predictive modeling
 - c. By limiting patient data to paper records only
 - d. By ensuring every surgery is performed remotely
- iv.** Why is AI critical in space missions where communication delays exist (like on Mars)?
- a. It replaces the need for any human input during the mission
 - b. It enables spacecraft to independently make decisions without waiting for Earth commands
 - c. It sends messages back to Earth via social media platforms
 - d. It only turns on when a signal is received from Earth
- v. Assertion (A):** The expression `"3" + 2` in Python will result in `5`.
Reason (R): In Python, `+` can be used to add strings and numbers directly.
- a. Both A and R are true, and R is the correct explanation of A
 - b. Both A and R are true, but R is not the correct explanation of A
 - c. A is true, but R is false
 - d. A is false, but R is true

vi. Which of the following identifiers are **valid** in Python:

- a. 1st_rank b. Hundred_dollar\$ c. Total Marks d. Serial_number1

vii. **Assertion (A):** AI-based solutions in agriculture can help detect pest infestations at an early stage using image analysis.

Reason (R): AI automatically sprays pesticides whenever crops are harvested.

- a. Both A and R are true, and R is the correct explanation of A
- b. Both A and R are true, but R is not the correct explanation of A
- c. A is true, but R is false
- d. A is false, but R is true

viii. **Assertion (A):** Legged robots are more suitable than wheeled robots for uneven terrains and natural disaster zones.

Reason (R): Wheeled robots have fewer parts and can easily climb stairs and debris-filled paths.

- a. Both A and R are true, and R is the correct explanation of A
- b. Both A and R are true, but R is not the correct explanation of A
- c. A is true, but R is false
- d. A is false, but R is true

ix. **Assertion (A):** AI is used in banking to automatically approve all loan applications submitted online.

Reason (R): AI models in banking evaluate customer risk profiles using past data and predictive algorithms.

- a. Both A and R are true, and R is the correct explanation of A
- b. Both A and R are true, but R is not the correct explanation of A
- c. A is true, but R is false
- d. A is false, but R is true

x. **Assertion (A):** The result of the expression $10 / 5$ in Python is of type float.

Reason (R): In Python, the division operator $/$ always returns a float, even if the result is a whole number.

- a. Both A and R are true, and R is the correct explanation of A
- b. Both A and R are true, but R is not the correct explanation of A
- c. A is true, but R is false
- d. A is false, but R is true

Question 2

i. Write the **corresponding Python** statements:

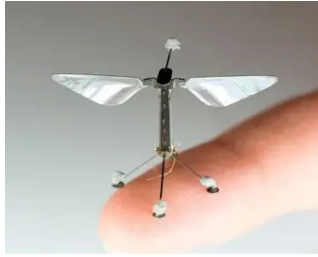
- a. Assign **50** to a variable speed and **100** to a variable distance [2]
- b. Assign the result of dividing distance by speed to a variable time [2]
- c. Display the type of the variable [1]

ii. Give **any three** applications of aerial robots. [3]

iii. Name **any two** categories of drones. [2]

Question 3

- i. Identify the bio-inspired robot given below and write any **two** advantages of using it. [3]



- ii. Explain **three** key benefits of using AI in agriculture. [3]
iii. Given the code below, what is the final value of 'a'. Calculate using operator precedence. [4]
(a) $a = 2 + 9((3 * 12) - 8) / 10$
(b) $a = 4 ** 2 - 18 / 3 + 1$

Question 4

- i. In a marine research project, scientists use a robot that operates below the surface of the ocean to collect data about coral reefs, monitor underwater ecosystems, and detect pollution levels. This robot is equipped with cameras, sonar sensors, and can withstand high water pressure.

Based on the case study, answer the following:

- a. Identify the **type** of robot discussed in the case. [1]
b. Mention **any two** key characteristics or features of this type of robot. [2]
ii. A city installs AI-based traffic cameras that automatically detect traffic violations, identify number plates, and send challans to violators. Over the next few months, the number of accidents and traffic jams reduces significantly.

Based on the situation, answer the following:

- a. Identify **two** benefits of using AI in this traffic system. [2]
b. Suggest **one** other domain (outside traffic management) where a similar AI-based system could be applied and why. [1]
iii. Write a program in Python to take the length and breadth of a rectangle as input from the user and calculate the perimeter of a rectangle. (Perimeter of rectangle = $2(l+b)$) [4]