St. Xavier's Institution (Panihati)

SELECTION TEST 2025-26

CLASS X - Robotics and Artificial Intelligence

Maximum Marks: 100 **Time Allowed: Two Hours**

Instructions:

- Attempt all questions from Section A & B and ANY FOUR questions from Section C.
- The intended marks for questions or parts of questions are given in brackets [ ].

Section A

(Attempt all questions) **[1 × 20 = 20 marks]**

Question 1: Choose the correct answer from the options given below.

(Write the correct answer)

I. Which of the following is an example of a warehouse robot?
(a) Kiva Systems robot (b) Humanoid robot (c) Drone (d) Self-driving car

II. Which of the following is a reason New Age Robotic Systems (NARS) are possible today?
(a) Faster processors (b) Lack of internet (c) No automation (d) Manual work only

III. An elevator is best classified as:
(a) Machine (b) Robot (c) Humanoid (d) AI agent

IV. Which statement best defines a "Cobot"?
(a) A collaborative robot (b) A combat robot (c) A cognitive bot (d) A cobweb bot

V. Gear ratio refers to:
(a) Ratio of teeth (b) Size of gear (c) Weight of gear (d) Speed of rotation

VI. Which is an example of a tactile sensor?
(a) Force-sensitive resistor (b) GPS (c) IMU (d) Proximity sensor

VII. A proximity sensor is classified as:
(a) External sensor (b) Internal sensor (c) Hybrid sensor (d) Manual sensor

VIII. Which is a linear actuator used in robotics?
(a) Hydraulic cylinder (b) DC motor (c) Stepper motor (d) Turbine

IX. The function of a controller in a robotic system is to:
(a) Process input and control output (b) Store data (c) Lift loads
(d) Generate electricity

X. Which of the following is a difference between manual and automatic control systems?
(a) Human intervention (b) Gear size (c) Number of sensors (d) Motor speed

XI. Feedback in a robotic control system represents:
(a) Output information returned to input (b) User comments (c) AI predictions
(d) Internet data

XII. Which is an example of a deterministic system?
(a) Calculator (b) Weather (c) Stock market (d) Human decision-making

XIII. "Objective decision-making" in machines means:
(a) Based on logic and data (b) Based on feelings (c) Based on luck (d) Based on bias

XIV. Which of the following is a source of datasets in AI?
(a) Kaggle (b) Paint (c) MS Word (d) Calculator

XV. Which type of AI learning uses labelled data?
(a) Supervised learning (b) Unsupervised learning (c) Reinforcement learning
(d) Deep reinforcement

XVI. Which of the following methods is used to add an element at the end of a list?
a) `insert()` b) `append()` c) `extend()` d) `add()`

XVII. What will be the output of the following code?

```
my_tuple = (1, 2, 3)
print(my_tuple[1])
```

a) 1 b) 2 c) 3 d) Error

XVIII. Which of the following is an immutable data type in Python?
a) List b) Dictionary c) Tuple d) Set

XIX. Which string function returns the number of occurrences of a specified value?
a) `count()` b) `find()` c) `len()` d) `index()`

XX. What will be the output of the following code?

```
"HELLO".islower()
```

a) True b) False c) 0 d) 1

Section B

(Attempt all questions) **[2 × 10 = 20 marks]**

Question 2: Answer the following in brief. Maximum 2-3 sentences.

I. State TWO uses of gears in robots.

II. Draw and label a simple block diagram of a robotic control system.

III. Give TWO differences between automated and autonomous systems.

IV. Differentiate between Data and Information (ONE point).

V. State any TWO graphical methods of data representation and their uses.

VI. Distinguish between supervised and unsupervised learning with TWO point each.

VII. Write a Python program to create a list of 5 integers and print the second and fourth elements.

VIII. What will be the output of the following code?

```
my_list = [10, 20, 30]
my_list.append(40)
my_list.insert(1, 15)
print(my_list)
```

IX. Write a Python program to check if a given string starts with `"AI"`.

X. Explain with example how `replace()` function works in strings.

Section C

(Answer ANY FOUR questions from this Section) **[15 × 4 = 60 marks]**

Question 3

a) Write a Python program to:

(i) Create a list `fruits` with elements `"apple"`, `"banana"`, `"cherry"`.

(ii) Add `"orange"` at the end.

(iii) Insert `"mango"` at position 1.

(iv) Sort the list alphabetically.

(v) Print the final list. [8]

b) Create a python function that takes a string as input parameter and returns the count of vowels (a, e, i, o, u) in the string. [7]

Question 4

a) Write three difference between a robot and a cobot with examples. [5]

b) Explain how machines classify objects compared to humans. [5]

c) Convert the list `[1, 2, 3, 5, 2, 9]` into a Python set and print it. Describe all the changes you observe in the output compared to the original list. [5]

Question 5

a) What is data exploration? Why data exploration is necessary? (FOUR points) [1+4]

b) Describe the classification of sensors into internal and external with examples. [5]

c) Explain how angular position of a robotic arm is measured and controlled using sensors, actuators, and a controller. [5]

Question 6

a) Explain training data and testing data with suitable examples. [5]

b) What is a gear? Explain pitch circle, pressure angle. [1+3]

c) Write THREE importance of acquiring relevant data from reliable data source. Write Three key features of Kaggle platform. [3+3]

Question 7

a) Name FIVE stages of an AI project framework. Describe the problem scoping in details. [2+5]

b) Explain the different types of data and their sources in AI. [4]

c) Explain with ONE example 'rule-based approach' and 'learning-based approach' in AI data modelling. [4]