St. Xavier's Institution (Panihati)

PRE-SELECTION TEST 2025-26

CLASS X - Robotics and Artificial Intelligence

Maximum Marks: 50 **Time Allowed: One Hour**

Instructions:

- Attempt all questions.
- Marks are indicated in brackets next to each question.

Section A

(Attempt all questions) **[1 × 10 = 10 marks]**

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

(Write only the correct option)

I. Which of the following is an example of probabilistic computing?
(a) Time tables (b) Maps (c) Report cards (d) Weather forecast

II. Cobots work:
(a) Independently (b) With other machines (c) With humans (d) Only in schools

III. The function of actuators is to:
(a) Process sensor data (b) Move physically (c) Store data (d) Power on the robot

IV. Which symbol is used for a single-line comment in Python?
(a) // (b) # (c) ! (d) /*

V. Camera is an example of a:
(a) Vision Sensor (b) Pressure Sensor (c) Motion Sensor (d) Solar Sensor

VI. The expression `a**b` in Python means:
(a) Multiplication (b) Division (c) Power (d) Modulus

VII. The controller in a robot is used to:
(a) Move wheels (b) Process feedback (c) Receive input (d) Sense environment

VIII. Which feature allows new age robots to learn from their experiences?
(a) Sensor fusion (b) Machine learning (c) Manual programming (d) Remote control

IX. Which one of the following is a limitation of cobots?
(a) Safety approval of cobots
(b) Supports reduced energy consumption
(c) Handle heavy loads
(d) Speed

X. Which Python structure allows data access but not modification (immutable)?
(a) List (b) Dictionary (c) Set (d) Tuple

Question 2: Answer the following in brief. **[2 × 5 = 10 marks]**

a) Mention any two characteristics of cobots. [2]

b) What technology do smart home robots use to integrate with other smart home devices? [2]

c) Write three differences between automated systems and autonomous systems. [2]

d) Write the output of the following code with explanation. [2]

```
text = "Python Programming"
print(text[7:])
```

e) Write a python program to find the largest and smallest elements in a list. [2]

Section B

(Attempt all questions) **[15 × 2 = 30 marks]**

Question 3

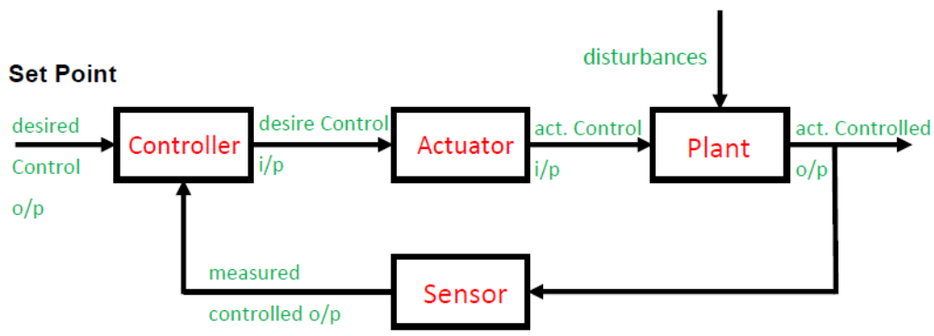
a) How do assistant robots help in patient care? Give two examples. [3]

b) Describe the role of sensors in a robot and differentiate between internal and external sensors (two differences). [3]

c) Write three differences between cobots and traditional industrial robots. [3]

d) State and describe the function of any three sensors. [2]

e) Describe how a typical control system operates using the block diagram given bellow (in 2–4 sentences). Include explanations of the following components: set point, controller, feedback, and actuator. [4]



Question 4

a) What is a gear? Write the principles of gears. If a 30-tooth driver gear rotates at 300 RPM, how many teeth does the driven gear have if it rotates at 200 RPM? [1+2+3]

b) List two main differences between subjective and objective decision making. [3]

c) Write a Python program that: [6]

- Accepts number of late days as input
- Calculates fine:
  - First 10 days: Rs 1/day
  - Next 10 days: Rs 2.5/day
  - Beyond 20 days: Rs 5/day
- Prints the total fine