

# St. Xavier's Institution (Panihati)

Instructor: Saptarshi Jana

## Class X : ROBOTICS AND AI Assignment 1-4

Due Date: 20.06.25

40 marks

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### INSTRUCTIONS

- *Don't copy*
  - *Don't use AI*
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### SECTION - Assignment 1 New Age Robotic Systems

**Question A1:** Who coined the term 'Robot'?

(1 mark)

*Note: Know about contributions of all of them. Then choose the right option*

- |                 |                           |
|-----------------|---------------------------|
| (a) Asimov      | (b) John McCarthy         |
| (c) Josef Capek | (d) Joseph F. Engelberger |

**Question A2:** What is the primary goal of the industrial robots?

(1 mark)

*Note: Choose the right option.*

- |                        |                            |
|------------------------|----------------------------|
| (a) To decrease costs  | (b) To increase production |
| (c) To increase safety | (d) All of these           |

**Question A3:** Smart class room is a teaching space which has:

- (i) Smart monitor with a touch control panel system
- (ii) Projector and screen
- (iii) PC/Laptop and internet connection
- (iv) Specialized software

(1 mark)

*Select the correct answer from bellow*

- |                             |                            |
|-----------------------------|----------------------------|
| (a) (i),(ii),(iii) and (iv) | (b) (i),(ii) and (iv) only |
| (c) (iii) and (iv) only     | (d) (i) and (ii) only      |

**Question A4:** World's first robot citizen is \_\_\_\_\_. (1 mark)

*Note: Choose the right option.*

- |            |             |
|------------|-------------|
| (a) Apollo | (b) Prepper |
| (c) Tiago  | (d) Sophia  |

**Question A5:** Name the Robot from its use: (1 mark)

*Note: Write the generic name or an example*

- (a) Assist humans in space.
- (b) The designs of the robots are inspired from the nature and biology.
- (c) A robot that helps us in household works.
- (d) A robot that helps to pick objects and to keep it at a particular place.

**Question A6:** Robots are becoming smarter day by day. Identify 3 unique new age smart robots (NARS) and write their benefits and applications. (3 mark)

**Question A7:** Make a table on the difference between a machine/robot/cobot. (2 marks)

## **SECTION - Assignment 2**

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### **From Robots to Cobots**

**Question B1:** In "Cobot", "Co" represents: (1 mark)

*Note: Choose the right option.*

- |                   |                  |
|-------------------|------------------|
| (a) Constructive  | (b) Coordinative |
| (c) Collaborative | (d) Controlled   |

**Question B2:** Which one of the following is a limitation of cobots? (1 mark)

*Note: Choose the right option.*

- (a) Safety approval of cobots
- (b) Supports reduced energy consumption
- (c) Handle heavy loads
- (d) High speed

**Question B3:** The collaborative robot arms are designed to mimic the range of motion of a \_\_\_\_\_ (1 marks)

*Note: Choose the right option.*

- |                 |               |
|-----------------|---------------|
| (a) machine arm | (b) networks  |
| (c) device      | (d) human arm |

**Question B4:** What are the distinguishing characteristics of a cobot? (2 mark)

**Question B5:** Write the importance and limitations of cobots. (5 mark)

### **SECTION - Assignment 3**

#### **Components of Robots as a System: Gears**

**Question C1:** What is the gear ratio of a gear train with a 20-tooth driving gear and a 40-tooth driven gear? (1 mark)

*Hint: Higher gear ratio used in speed reduction. choose the right answer from bellow.*

- |         |         |
|---------|---------|
| (a) 2:1 | (b) 1:2 |
| (c) 1:1 | (d) 3:1 |

**Question C2:** Gear ratio of a gear train is 3:1. How do you explain the speed transmission and torque amplification? The driven gear will have: (1 mark)

*Note: Choose the right option.*

- (a) greater speed and greater torque
- (b) lesser speed and greater torque
- (c) greater speed and lesser torque
- (d) none of these above

**Question C3:** If a 30-tooth driver gear rotates at 300 RPM, how many teeth does the driven gear have if it rotates at 200 RPM? (3 mark)

- |        |        |
|--------|--------|
| (a) 45 | (b) 30 |
| (c) 20 | (d) 15 |

**Question C4:** Write the principles of gears. (2 marks)

**Question C5:** What is a gear? Explain pitch circle, pressure angle. (3 marks)

### **SECTION - Assignment 4**

#### **Python: Recap**

**Question D1:** Python Programming: Create a list of 10 students in your class and sort them in alphabetical order. (3 marks)

**Question D2:** Write a program that takes a string as input and returns the count of vowels (a, e, i, o, u) in the string. (3 marks)

**Question D3:** Write a program that takes a string as input and checks if it's a palindrome (a word that reads the same backwards and forward). Ignore spaces and cases. (4 marks)