ROBOTICS AND AI

Instructor: Saptarshi Jana

Class X

Assignment 1-4

Due Date: 20.06.25 **40 marks**

INSTRUCTIONS

- *Don't copy*
- *Don't use AI*

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)*

Assignment 2
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)*

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 toque 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)*

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)*