



Estd. 1861

# BOYS' HIGH SCHOOL AND COLLEGE FIRST TERM EXAMINATION (2024-25)

## CLASS - X ROBOTICS

Time: 2:00 hrs

### General Instructions:

- Answers to this Paper must be written on the paper provided separately.
- The time given at the head of this Paper is the time allowed for writing the answers.
- This Paper is divided into two Sections.
- Attempt **all** questions from Section A and any **four** questions from Section B.
- The intended marks for questions or parts of questions are given in brackets [].

### Section A [40 marks] (Attempt ALL Questions)

#### Question 1: Multiple Choice Questions

[20X1 Marks]

- A. What will be the output of the following Python code?  
`print("abcdef".find("cd") == "cd" in "abcdef")`
- a) True  
b) False  
c) Error  
d) None of the mentioned
- B. What will be the output of the following Python code?  
`print("abcdef".find("cd"))`
- a) True  
b) 2  
c) 3  
d) None of the mentioned
- C. What will be the output of the following Python code?  
`print('abcdef12'.replace('cd', '12'))`
- a) ab12ef12  
b) abcdef12  
c) ab12efcd  
d) none of the mentioned
- D. What will be the output of the following Python code?  
`print('abcefd'.replace('cd', '12'))`
- a) ab1ef2  
b) abcefd  
c) ab1efd  
d) ab12ed2
- E. Suppose list1 is [3, 5, 25, 1, 3], what is min(list1)?
- a) 3  
b) 5  
c) 25  
d) 1
- F. Suppose list1 is [4, 2, 2, 4, 5, 2, 1, 0], Which of the following is correct syntax for slicing operation?
- a) print(list1[2:])  
b) print(list1[:2])  
c) print(list1[:-2])  
d) all of the mentioned
- G. Who coined the word "Robotics"?
- a) Karel Capek  
b) Issac Asimov  
c) Isaac Newton  
d) Elon Musk
- H. Washing machine is a Robot. True or false?
- a) True  
b) False
- I. What is the key difference between supervised and unsupervised learning?
- a) Supervised learning requires labeled data, while unsupervised learning does not.  
b) Supervised learning predicts labels, while unsupervised learning discovers patterns.  
c) Supervised learning is used for classification, while unsupervised learning is used for regression.  
d) Supervised learning is always more accurate than unsupervised learning.
- J. Who is known as the -Father of AI"?
- a) Fisher Ada  
b) Alan Turing  
c) John McCarthy  
d) Allen Newell
- K. If a robot is able to change its own trajectory as per the external conditions, then the robot is considered as the\_\_
- a) Mobile  
b) Non-Servo  
c) Open Loop  
d) Intelligent
- L. The application/applications of Artificial Intelligence is/are
- a) Expert Systems  
b) Gaming  
c) Vision Systems  
d) All of the above
- M. An AI agent perceives and acts upon the environment using\_\_.
- a) Sensors  
b) Perceiver  
c) Actuators  
d) Both a and c
- N. What is module of a gear.
- a) pitch diameter/ number of teeth



- b) number of teeth/pitch diameter
- c) it is same as pitch of diameter
- d) All of the above

- O. The ratio of the number of teeth on the gear to the number of teeth on the pinion is called \_\_\_\_\_
- a) velocity ratio
  - b) module
  - c) gear ratio
  - d) pitch point
- P. The smaller and generally the driving gear of a pair of mated gears is called \_\_\_\_\_
- a) pitch
  - b) module
  - c) rack
  - d) pinion
- Q. Smallest change which a sensor can detect is \_\_\_\_\_
- a) Resolution
  - b) Accuracy
  - c) Precision
  - d) Scale
- R. Which kind of data does reinforcement learning use?
- a) Labeled data
  - b) Unlabelled data
  - c) None
  - d) Both
- S. How many types of feedback does reinforcement provide?
- a) 1
  - b) 2
  - c) 3
  - d) 4
- T. Which statement best describes semi-supervised learning?
- a) Semi-supervised learning uses a combination of labeled and unlabeled data to improve learning accuracy.
  - b) Semi-supervised learning requires only labeled data to train models effectively.
  - c) Semi-supervised learning is exclusively used in supervised learning tasks.
  - d) Semi-supervised learning does not use any labeled data

**Question 2: Short Answer Questions [10\*2 Marks]**

- A. Give 4 differences between Robots and Machines.
- B. What is Cobot. Explain any 2 Key characteristics of Cobot .
- C. What is gear ratio. Explain with examples.
- D. What are Underwater Robots? Give some applications of Underwater Robots.
- E. Explain any 4 functions of different type of sensors.
- F. Explain the supervised learning.
- G. What is autonomous systems.
- H. What is automated systems.
- I. Limitations of Human Intelligence.
- J. How autonomous drones are being used in India? Explain with examples.

**Section B [60 marks]**

(Attempt ANY FOUR out of SIX Questions)

- 3A. What is NARs. Illustrate with 2 examples. [3]
- 3B. Explain the various steps of machine learning. [3]
- 3C. Write a Python program to count the number of vowels in a given string. [9]
- Expected Output:** For s = "hello world":  
Number of vowels in "hello world" is 3
- 4A. How do machines and robots differ from each other? Illustrate with 2 examples. [3]
- 4B. Explain Reinforcement learning. Key components of RL with examples ? [3]
- 4C. Write a Python program to remove all non-alphanumeric characters from a string. [9]
- Expected Output:** For s = "hello@world!123":  
Cleaned string: "helloworld123"
- 5A. What are the different classifications of sensors based on their characteristics? [3]
- 5B. Human vs machine decision making (Subjective vs Objective)? Describe differences. [3]
- 5C. WAPP to remove duplicates from a list while maintaining the original order. [9]
- Expected Output:** For numbers = [1, 3, 3, 5, 5, 5, 7, 8, 8]:  
List after removing duplicates: [1, 3, 5, 7, 8]
- 6A. What are assistant robots, and what are some common examples currently in use? [3]
- 6B. What is Artificial intelligence? Explain any three Advantages and Disadvantages of AI. [3]
- 6C. Create a tuple t with elements (10, 20, 30, 40, 50). Print the first and last element. [9]
- Expected Output:** First element: 10 Last element: 50
- 7A. What are Gears? Explain its types. [3]
- 7B. Deterministic vs probabilistic systems? Explain [3]
- 7C. Sort the list l = [3, 1, 4, 1, 5, 9, 2, 6] in ascending order and print the sorted list. [9]
- Expected Output:** Sorted list in ascending order: [1, 1, 2, 3, 4, 5, 6, 9]
- 8A. What are sensors ? explain its importance and types. [3]
- 8B. What is intelligence? Explain its types. [3]
- 8C Convert the list l = [1, 2, 3] into a tuple t and convert the tuple t = (4, 5, 6) into a list. [9]
- Print both l and t after conversion.

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