Estd. 1861

BOYS' HIGH SCHOOL AND COLLEGE
PRELIMINARY EXAMINATION (2024-25)
CLASS – X
ROBOTICS

Time: 2:00 hrs

General Instructions:

- Answers to this Paper must he 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. Which of the following statement will import pandas?
   a) import pandas as pd
   b) import panda as py
   c) import pandaspy as pd
   d) all of the mentioned

B. What will be the output of the following Python code?

```
for i in range(2.0):
    print(i)
```

   a) 0.0 1.0 b) 0 1 c) error d) none of the mentioned.

C. Convert the decimal number 45 into base 5 and base 4.
   a)1150 and 2110 b) 1050 and 2101 c) 1030 and 2201 d) 1040 and 2101

D. What is the standard way to import matplotlib's pyplot library in python?
   a) import matplot as plt
   b) import matplotlib.pyplot as plt
   c) from matplotlib import pyplot as plt
   d) import matplotlib pyplot as plt

E. What will be the output of the following Python code?

```
print(6 + 5 - 4 * 3 / 2 % 1)
```

   a) 7.0 b) 7 c) 11.0 d) error

F. Which Matplotlib method is used to save a figure to a file?
   a) savefig() b) saveplot() c) exportfig() d) downloadfig()

G. What is the purpose of NumPy in Python?
   a) To do numerical calculations
   b) To do scientific computing
   c) Both A and B
   d) None of the mentioned above

H. Ways to achieve AI in real-life are_____.
   a) Machine Learning
   b) Deep Learning
   c) Both a & b
   d)None of the above

I. Which of the following is a component of Artificial Intelligence?
a) Learning b)Training c)Designing d) Puzzling

J. What will be the output of the following Python code?

```
i = 0
while i < 3:
    print(i)
    i += 1
else:
    print(0)
```

a) 0 1 2 3 0 b) 0 1 2 0 c) 0 1 2 d) error

K. What will be the output of the following Python code?

```
for i in range(0):
  print(i)
```

a) 0 b) error c) no output d) none of the mentioned

L. What will be the output of the following Python code?

```
for i in range(int(2.0)):
    print(i)
```

a) 0.0 1.0 b) 0 1 c) error d) none of the mentioned

M. What will be the output of the following Python code?

```
x = 'abcd'
for i in range(len(x)):
  print(i)
```

a) 1 2 3 4 b) a b c d c)0 1 2 3 d) error.

N. Which of the following is a short-range sensor.

a) Ultrasonic Sensor
b) Radar
c) GPS
d) Camera Systems

O. What is Cyber Security?

a) Cyber Security provides security against malware
b) Cyber Security provides security against cyber-terrorists
c) Cyber Security protects a system from cyber-attacks
d) All of the mentioned

P. What does cyber security protect?

a) Cyber security protects criminals
b) Cyber security protects internet-connected systems
c) Cyber security protects hackers
d) None of the mentioned

Q. Which of the following is the main goal of machine learning?

a) Enable computers to learn data
b)To automate manual tasks
c)To make computers intelligent
d)To generate self-aware machines

R. What is the first step in the AI project lifecycle?

a) Building the model
b) Data acquisition
c) Scoping (Requirements analysis)
d) Deployment

S. ..... algorithms enable the computers to learn from data, and even improve themselves, without being explicitly programmed

a) Machine Learining
b) Deep Learining
c) Artificial Learining
d) None of the above

T. Machine learning is a subset of ...

a)Data Learining
b)Deep Learining
c) Artificial Learining
d) None of the above

Question 2: Short Answer Questions **[10X2 Marks]**

A. Give 4 differences between manual and automatic control systems.
B. What is RR Mechanism.
C. What is Control systems in robotics. Explain with examples.
D. State main components of a robot..
E. List three ethical issues related to cybersecurity.
F. What is the purpose of the pass statement in python.
G. how to read csv file and json file in pandas dataframe.

H. Import statement for numpy, pandas, matplotlib scipy.
I. What do you understand by cybersecurity..
J. Explain machine learning process workflow(steps of machine learning process).

Section B [60 marks]
(Attempt **ANY FOUR** out of **SIX** Questions)

3A. Draw the block diagram of a typical robotic mechanical system. [3]
3B. Explain the various steps of Artificial learning. [3]
3C. Write a function is_armstrong that takes a number and checks whether it is an Armstrong number. [9]

4A. Explain the different types of joints. [3]
4B. Discuss Reinforcement learning. Key components of RL with examples ? [3]
4C. Write a function fibonacci that takes a number n and prints the first n numbers in the Fibonacci sequence. The Fibonacci sequence starts with 0, 1, 1, 2, 3, 5, 8, ... [9]

5A. Explain the process of building a simple wheeled mobile robot and its key component. [3]
5B. Explain Data Exploration. [3]
5C. Create two matrices of same order in NumPy by user input and multiply them and show their output. [9]

6A. What are mobile robots, and what are some common examples currently in use? [3]
6B. Compare Artificial Intelligence and Machine Learning. [3]
6C. Based on a survey of 100 people, create a pie chart showing their preferred programming languages.The responses were as follows.Python: 45%,Java: 25%,JavaScript: 15%,C++: 10%,Ruby: 5%. [9]

7A. Explain the use of tinkercard in designing robotic components.its advantages for visualising.[3]
7B. What is Problem Scoping? What are the 4ws of Problem Scoping? [3]
7C. Write a program in NumPy to create a matrix and to check whether a matrix is symmetric or not.(A symmetric matrix is equal to its transpose.) [9]

8A. What do you understand by actuators. explain its types and their application. [3]
8B. What is Training and testing Data. [3]
8C Create a simple (line,bar, histogram,scatter) plot with x = [0,1,2,3,4,5,6,7,8,9] and y = x^2. Adding Title and Labels. Customizing the Line Style, markers,color. [9]

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