मोतीलाल नेहरू राष्ट्रीय प्रौद्योगिकी संस्थान इलाहाबाद
प्रयागराज (इलाहाबाद)–211004 (भारत)

Motilal Nehru National Institute of Technology Allahabad
Prayagraj-211004 [India]

Mid Semester Examination (2022-23)

Programme Name: B.Tech (Section: G - N) **Semester: II**

Course Code: (CSN12601) **Course Name: Introduction to AI & ML**

Branch: Common to All Branches **Student Reg. No.:** 2 0 2 2 2 0 6 8

Duration: 1 Hours 30 Minutes **Max. Marks: 20**

Instructions: Attempt all questions and make suitable assumption whenever required.

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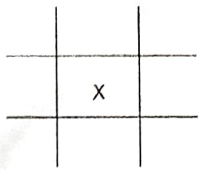
Q. No.

1. (a) Explain intelligent agents in detail. What are the different types of intelligent agents? **(3M)**

   (b) Differentiate between Breadth First Search and Depth First Search algorithms with suitable example. **(2M)**

2. (a) What is a state space? Consider a Tic-Tac-Toe problem in which the start state and the goal states are given as follows

   Start state =



   Goal state = Consecutive 3 X's or 0's (row or column or diagonal) Draw all the possible states **(For any one branch from level 2)** using state-space tree to reach from start state to goal state. **(3M)**

   (b) Explain Hill climbing with suitable sketch. **(2M)**

3. (a) Write the output for the following code snippet for the function call func(4). **(2M)**

```
def func (x):
    if(x > 0):
        print(x)
        print(x-1)
        func(x-1)
```

   (b) Write an algorithm and draw a flowchart to add all odd numbers from 1 to 100 and print the sum of all odd numbers. **(3M)**

4. Write a python program to create a list by taking input from user as list_1=[1,2,3,4,5,6,7,8,9,10]

   Update the list **(using for/while loop only)** such that

   a) list_1=[5,4,3,2,1,6,7,8,9,10] (Here half list is reversed)

   b) list_1=[1,10,2,9,3,8,4,7,5,6] (Here, first element is followed by last element and so on). **(5M)**

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Computer Science and Engineering Department

End Semester (Even) Examination (2022-23)

Programme Name: B.Tech (Section: G - N)	**Semester: II**
Course Code: (CSN12601)	**Course Name: Introduction to AI & ML**
Branch: Common to All Branches	**Student Reg. No.:**
Duration: 2 Hours 30 Minutes	**Max. Marks: 40**

Instructions:
Attempt all questions and make suitable assumption whenever required.
Draw neat diagrams whenever required.

Q. No		Question Description	CO
1	(a)	Why do we need datatypes in the Python programming language? Enlist and explain all the available Python datatypes with appropriate examples for each. **(3M)**	CO1
	(b)	Write a Python program to sort a list of randomly generated 10 numbers between the range (10,50) using 1. *for* loop, 2. *while* loop. **(5M)**	CO1
2	(a)	Write the Python statements using *Numpy*, *Pandas*, and *Matplotlib.pyplot* library functions for the following tasks: i. Read dataset from the csv file "MNNIT_food_waste.csv" into a DataFrame my_data. ii. Print the statistical information of my_data. iii. Print the last 20 rows of my_data. iv. Rename the columns, namely A, B, C, and D from my_data to UG1, UG2, PG1, PG2. v. Calculate and print the mean and variance for the columns named as UG1 and PG1. vi. Convert the DataFrame my_data to the numpy array my_data1. vii. Delete all the rows whose value is NaN for Column PG2. viii. Calculate the maximum value Max_UG2 for the column UG2 and divide	CO2

all the row values for the column UG2 by Max_UG2.

ix. Plot a graph between the columns PG1 and PG2.

x. Save the numpy array my_data1 to the external file "Normalized_my_data1.csv". **(5M)**

(b) What is the Turing test? What is the need of performing the Turing test? Explain with a suitable example. **(3M)** **CO3**

3 (a) What is the 8-Queen problem? Draw the state space tree for two different solutions to the 8-Queen problem. **(3M)** **CO3**

(b) Define linear regression and explain different types of linear regression with suitable examples for each. Write the hypothetical equations $h_\theta(X)$ for each type of regression. If linear regression is not well suited to the problem, how will you model your hypothesis? **(5M)** **CO4**

4 (a) What is PEAS? Identify the PEAS description and properties of the task environment for online books shopping application. **(3M)** **CO3**

(b) Explain the Naïve-Bayes classification algorithm by deriving the maximum probability of the given sample belonging to output class C with a suitable example. **(5M)** **CO4**

5 (a) Define machine learning. Enlist different types of machine learning. Differentiate among different types of machine learning with suitable applications for each. **(3M)** **CO5**

(b) Consider the following sample points (4,4), (2,4), (5,2), (2,6), (8,3), and (4,9) with the initial centroids c1(1,5), and c2(4,1). Find the cluster number for each point after 2 iterations. What are the new values of the cluster centroids c1 and c2 after each iteration? Suppose another 3 sample points (1,2), (2,5), and (3,2) need to be clustered in the same clusters. What are the cluster numbers for the sample point (2,5) and (3,2) respectively? What are the updated values of the centroids after clustering all 9 points? **(5M)** **CO5**