MASTER OF COMPUTER APPLICATIONS (MCA_NEW)

ASSIGNMENTS
OF MCA_NEW (2Yrs) PROGRAMME
SEMESTER-III

(January - 2025 & July - 2025)

MCS-224, MCS-225, MCS-226, MCS-227

MCSL-228, MCSL-229

SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
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Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to Programme Guide of MCA (2Yrs).
3. To become eligible for appearing the Term End Practical Examination for the lab courses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the Programme Guide of MCA (2yrs).
4. The viva voce is compulsory for the assignments. For any course, if a student submitted the assignment and not attended the viva-voce, then the assignment is treated as not successfully completed and would be marked as ZERO.

Course Code	**:**	**MCS-224**
Course Title	**:**	**Artificial Intelligence and Machine Learning**
Assignment Number	**:**	**MCA_NEW(III)/224/Assign/2025**
Maximum Marks	**:**	**100**
Weightage	**:**	**30%**
Last date of Submission	**:**	**30th April, 2025 (for January session)** **31st October, 2025 (for July session)**

This assignment has 16 questions of 5 Marks each, answer all questions. Rest 20 marks are for viva voce. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: Compare ANI, AGI and ASI, in context of AI. Also, discuss the major applications of AI.

Q2: What is Turing Test? What is the Criticism to the Turing Test?

Q3: Compare Artificial Intelligence (AI), Machine Learning (ML), and Deep Learning (DL).

Q4: What are Intelligent agents in AI? Briefly discuss the properties of Agents.

Q5: Find the minimum cost path for the 8-puzzle problem, where the start and goal state are given as follows:

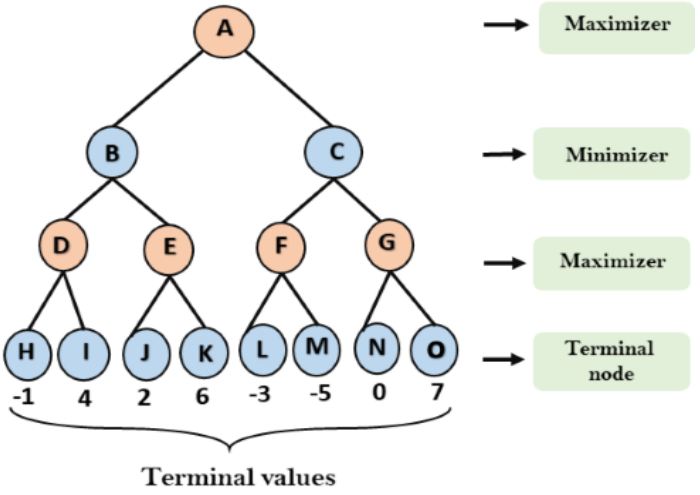
1	2	3
8		4
7	6	5

Start State

2	8	1
	4	3
7	6	5

Goal State

Q6: Consider the following Minimax game tree search in which root is maximizing node and children are visited from left to right. Find the value of the root node of the game tree?



Q7: Define a frame for the entity date which consists of day, month and year. each of which is a number with restrictions which are well-known. Also, a procedure named compute-day-of-week is already defined.

Q8: In a class, three students tossed one coins (one each) for 3 times. Write down all the possible outcomes which can be obtained in this experiment. What is the probability of getting 2 or more than 2 heads at a time? Also find the probability of getting three tails at a time.

Q9: Briefly discuss the various Ensemble Methods.

Q10: Explain K-Nearest Neighbour (K-NN) classification algorithm with the help of a suitable example

Q11: Using the following training dataset, apply Naïve Bayes classification algorithm to find the class of an unknown sample X = < Rainy, Cool, High, False >

S. No.	Outlook	Temperature	Humidity	Windy	Play Golf/Class
0	Rainy	Hot	High	False	No
1	Rainy	Hot	High	True	No
2	Overcast	Hot	High	False	Yes
3	Sunny	Mild	High	False	Yes
4	Sunny	Cool	Normal	False	Yes
5	Sunny	Cool	Normal	True	No
6	Overcast	Cool	Normal	True	Yes
7	Rainy	Mild	High	False	No
8	Rainy	Cool	Normal	False	Yes
9	Sunny	Mild	Normal	False	Yes
10	Rainy	Mild	Normal	True	Yes
11	Overcast	Mild	High	True	Yes
12	Overcast	Hot	Normal	False	Yes
13	Sunny	Mild	High	True	No

Q12: Explain working of SVM algorithm with the help of a suitable example.

Q13: Consider the following set of data points (Year of experience salary). Find the 2nd order polynomial $y=a_0 + a_1x_i + a_2 x_i^2$, and using polynomial regression determine the salary when year of experience is 10.

Years of Experience (X)	Salary (Y) in Dollar
1	50,000
2	55,000
3	65,000
4	80,000
5	110,000
6	150,000
7	200,000

Q14: Write Back Propagation algorithm, and showcase its execution on a neural network of your choice (make suitable assumptions if any)

Q15: Consider the two-dimensional patterns (2, 2), (3, 6), (4, 4), (5, 6), (6, 7), (7, 8), (8, 8) and (9, 10). Using the PCA Algorithm, calculate the primary component.

Q16: Compute the Linear Discriminant projection for the following two-dimensional dataset
X1 = (x1, x2) = {(4,2), (2,1), (2,4), (3,5), (4,5)} and X2 = (x1, x2) = {(9, 9), (6, 9), (9, 6), (8, 7), (10, 9)}