MGM University
University Department of Information and Communication Technology
Mid Semester Examination – March 2024

Program : B. Tech in Information Technology

Course Name: Artificial Intelligence and Machine Learning (AIML)

Max Marks: 20

Sem: IV

Subject Code: BTIT2204

Duration:- 1 Hr

Instructions to the students:

1.All questions are compulsory   2.Assume suitable data, if required   3.Figures to the right indicate full marks

Q No		C.O	B.L	Marks
Q 1	*Solve any THREE of the following?*			6
a.	Explain characteristics of hill climbing algorithm.	1	Understand	
b.	What is the relevance of Bayes' Theorem with AI?	1	Understand	
c.	Explain in short various planning types in AI.	2	Understand	
d.	With example define procedural and declarative knowledge.	2	Remember	
Q 2	*Solve any two of the following*			3 * 2
a.	Discuss Knowledge representation concept in AI with suitable example?	1	analyze	
b.	Write a short note on the Truth maintenance system.	2	Understand	
c.	What is Problem Reduction in AI? Explain.	1	analyze	
Q 3	*Solve any one TWO of the following.*			8
a.	With a suitable diagram explain components of an expert system.	2	Remember	
b.	What is the Block World Problem? Explain.	2	analyze	
c.	Explain Monotonic reasoning with example.	1	analyze	

"By far, the greatest danger of Artificial Intelligence is that people conclude too early that they understand it." —Eliezer Yudkowsky (An American artificial intelligence researcher and writer on decision theory and ethics)

MGM UNIVERSITY
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MSE EXAMINATION – March 2024

COURSE: B.Tech in Information Technology   **Sem:** IV   **Class Test:** MSE

Subject Name: Convex Optimization   **Subject Code:** BTAM2204

Date: 07/03/2024   **Total Marks:** 20

Note: All questions are Compulsory.

Q1.	Solve any two of the following Questions (4 Marks each)	CO	Level
1.	Describe the operations that preserve convexity	CO1	2
2.	Using Chebyshev theorem solve the given problems for a distribution with a mean of 80 and std. deviation 10. a) At least what percentage of values will fall between 60-90. b) At least what percentage of values will fall between 70-100.	CO3	2
3	Solve the given quadratic equation by completing the square method c) $n^2 - 2n - 3 = 0$ d) $X^2 - 12X - 11 = 0$	CO3	2
Q2	Solve any two of the following Questions (6 Marks each)		
1	Define Mathematical optimization and briefly explain any three applications of mathematical optimization.	CO 2	3
2.	Differentiate between linear and non-linear programming.	CO2	3
3.	The sales of a company (in million dollars) for each year are shown in the table below. 	x (year)	2005	2006	2007	2008	2009
y (sales)	12	19	29	37	45 | a) Find the least square regression line $y = a x + b$.	CO3	3

Class: SY: AIML	Exam: MSE	Subject: MLA
Date: 06 /03/ 2024	Duration : 1 Hr	Max Marks: 20

	Solve any TWO questions from Q1 to Q3	Marks
1	Explain and Comparison of the different scales of measurement	5
2	Explain all the techniques of dealing with Missing Data in the dataset	5
3	Explain all methods of handling categorical data in the dataset	5
	Solve any TWO questions from Q4 to Q6	
4	Explain the matrices used for evaluating performances of linear model.	5
5	Explain why to use supervised-learning regression method also explain the term Correlation and Causation	5
6	Explain and Compare the Linear and Polynomial regression techniques.	5

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MSE Examination – March 2024

Class: SY IT/DS/AIML   Sem: IV

Subject Name: Digital Logic Design   Subject Code: BTIT2203

Date: 6 /03/2024   Time: 60 min   Total Marks: 20

Q. 1	Solve any TWO of the following Questions.	CO	Marks
A)	Explain how Hamming Code is used for error detection with example?	CO 1	4
B)	Minimize following logic function using k – map 1. $f(A,B,C,D) = \Sigma m(0, 1, 2, 3, 5, 7, 8, 9, 11, 14)$ 2. $f(A,B,C,D) = \pi M (1, 4, 6, 9, 10, 11, 14, 15) . d(3, 5, 7)$	CO 1	4
C)	Design full adder using suitable Demultiplexer.	CO 2	4
Q. 2	Solve any THREE of the following Questions.		
A)	Minimize following logic function using k – map $Y = \Sigma m (8, 9, 10, 11, 13, 15, 16, 18, 21, 24, 25, 26, 27, 30, 31)$	CO 1	4
B)	Simplify following logic function using Quine-McCluskey minimization technique. $Y = \Sigma m (0, 1, 3, 7, 8, 9, 11, 15)$	CO 1	4
C)	Define multiplexer. Implement following function using suitable multiplexer $Y = A'B'C + ABC + A'BC + AB'C + AB'C'$	CO 2	4
D)	Define demultiplexer. Design 1:16 demultiplexer using 1:8 demultiplexers.	CO 2	4

Class: B. Tech SY (IT/AIML/DS)   **Sem: IV**

Subject Name: Probability & Statistics   **Subject Code:** BTIT2201

Date: 04/ 03 /2024   **Time:** 11:00 a.m. to 12:00 Noon   **Total Marks:** 20

Sr. No.	Solve any FOUR of the following Questions. (Each question carries 5 Marks)	CO	Level
1	Define Normal Distribution and state its characteristics? Briefly explain the importance of Normal Distribution.	CO1	1
2	The AIML Department of UDICT has a lab with sixteen computers reserved for statistics majors. Let X denotes the number of these computers that are in use at a particular time of day. Suppose that the probability distribution of X is as given in the following table; the first row of the table lists the possible X values and the second row gives the probability of each such value. <table><tr><td>x</td><td>3</td><td>6</td><td>9</td><td>12</td><td>15</td><td>18</td><td>21</td><td>24</td></tr><tr><td>P(x)</td><td>0.08</td><td>0.12</td><td>0.10</td><td>0.20</td><td>0.10</td><td>0.20</td><td>0.10</td><td>0.10</td></tr></table> a) Calculate the probabilities of at most 6 computers, are in use. b) Calculate the probability that between 6 to 12 computers, are in use. **Hint:** Expected Value	CO1	2
3	What is Poisson Distribution? An average of 0.61 soldiers died by horse kicks per year in each Prussian army corps. You want to calculate the probability that exactly two soldiers died in the VII Army Corps in 1898, assuming that the number of horse kick deaths per year follows a Poisson distribution.	CO3	3
4	Differentiate between PDF and PMF.	CO3	2
5	Find probability density function for normal distribution where mean = 6, std. deviation = 7 and X=8	CO3	2
6	Write short notes (any two) a) Discrete Variable & Continuous Variable b) Random Variable c) Joint and marginal probability	CO3	3

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Academic Year 2023-24   Semester-IV

Class: SY IT Div-2/ AIML/DS   Class Assessment –MSE

Subject: Data Structures in JAVA   Date: 05/03/ 2024

Duration : 1 Hr   Max Marks: 20

Instructions to the Students:

1. Illustrate your answers with neat diagrams etc. where ever necessary
2. Attempt any 4 questions

		CO	BT Level	Marks
Q1	Sort the given set of numbers using Insertion Sort 40 30 20 10 50 40 10 5 Comment on the time complexity	1	2	5
Q2	Write Pseudo code for a menu driven operations for implementation of a stack.	2	3	5
Q3	Convert the given expression to Prefix and Postfix (a+b)*cde/f/g/(h-j)	2	3	5
Q4	Write Pseudo code to search an element in a list using Binary Search Method. Handrun on given data: 10 20 30 40 50 60 70 80 100 Compute number of comparisons required to search elements: 10,50, 200, 80	4	3	5
Q5	Describe why a circular queue is better than a linear queue by demonstrating the Insert() and Delete() operations.	2	3	5

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Department of Information and Communication Technology

Mid Semester Examination – March 2024

Course: B. Tech IT (I and III)   **Sem:** IV

Subject Name: Data Structure in JAVA   **Subject Code:** BTIT2202

Max Marks: 20   **Date:-**5/03/2024   **Duration:-** 1 Hr.

Instructions to the Students:
1. **All questions are compulsory**
2. Assume suitable data wherever necessary.

		(CO / Level)	Marks
Q. 1			**6**
	1. What is the correct way to declare an array in java? a. datatype[] arrayname= new datatype[size] b. datatype[] arrayname= new arrayname[size] c. datatype arrayname[size]; d. None of the above	CO1 / Level-1	
	2. Working principle of queue is a. LIFO b. FIFO c. RANDOM d. None of these	CO1 / Level-1	
	3. Time complexity is calculated based on a. Number of lines of code b. Time required to compile the code c. Execution time of code d. none of these.	CO1 / Level-1	
	4. In asymptotic notations Big-O denotes a. Worst case complexity b. Best case complexity c. Average case complexity d. None of these	CO1 / Level-1	
	5. Which statement/s is/are incorrect about the array ? i. Array size must be defined earlier ii. Array size cannot be changed once declared iii. Array can store different data types in java iv. Array can not be initialized a. i & ii b. ii c. i d. iii & iv	CO1 / Level-1	
	6. What is stack full condition ?. a. top == -1 b. top == (size-1) c. top == size d. top == 0	CO1 / Level-1	

Q.2	Solve Any Two of the following.		3 X 2
(A)	Convert given infix expression to postfix expression K + L - M * N + (O ^ P) * W / U / V	CO2 / Level-2	
(B)	Explain working principle of stack with example	CO1 / Level-1	
(C)	Define time and space complexity and prove $3n + 2 = O(n)$	CO2 / Level-2	
Q. 3	Solve Any One of the following.		8 X 1
(A)	Explain the structure of node in Singly linked list and Write an algorithm for inserting the node at the end of the singly linked list	CO3 / Level-3	
(B)	Explain simple queue with example and write an algorithm for operations on simple queue.	CO3 / Level-3	
	*** End ***		