National Forensics Sciences University, Goa Campus
TA-1 Examination

Program Name – MSc Cyber Security **Sem – I** **Date- 20-09-2023**
Subject Name- Artificial Intelligence **Subject Code- CTMSCS SI P4**
Time- 45 minutes **Max. Marks- 25**
Instructions - 1) Answer all questions. 2) Assume suitable data.

Q. I. Multiple Choice Questions (1 mark each) [10 Marks]

1. Which of the following is used to measure the spread of data?
   a) Variance b) Mean c) Median d) Mode

2. A _____ matrix is always square and equal to its own transpose.
   a) Lower triangular b) Symmetric c) Upper triangular d) None of the above

3. If A and B are two events such that P (B) = 0.4 and P (A U B) = 0.6 If A and B are independent, then P (A) is ____
   a) 1/3 b) 1/2 c) 2/3 d) 2/5

4. The mmagnitude of vector $v = (3, 4)$ is _____
   a) 4 b) 1 c) 5 d) 25

5. Which one of the following holds true in probability, where Ω is sample space and A is any event?
   a) P (Ω) = 1 b) $0 \leq P(A) \leq 1$ c) Both a and b d) None of the above

6. Given 2 events A and B, the conditional probability P (A | B) is given as _____
   a) $\frac{P(A \cap B)}{P(B)}$ b) $\frac{P(A \cup B)}{P(B)}$ c) $P(A \cup B)$ d) None of the above

7. Vector c is linearly independent of vectors a and b if and only if it is
   a) Impossible to find scalar values of α and β such that $c = \alpha a + \beta b$ b) Three vectors can never be linearly independent
   b) Possible to find scalar values of α and β such that $c = \alpha a + \beta b$ d) None of the above

8. Which of the following keyword is used for function in Python language _____
   a) function b) def c) fun d) define

9. Mode of the series 0, 0, 0, 2, 2, 3, 3, 8, 10 is:
   a) 0 b) 3 c) 2 d) None of the above

10. If A and B are two independent events then _____
    a) $P(A \cap B) = P(A)P(B)$ b) $P(A \cap B) = P(A \cup B)$ c) P (A) = P (B) d) None of the above

Q.II. Answer any 3 of the following questions (5 marks each) [3x5=15 Marks]

1. Discuss in detail any three measures of central tendency with respect to data distribution.

2. Solve the system of linear equation $x - 2y = 1$ and $3x + 2y = 11$.

3. Let X be the number of heads obtained in an experiment of tossing a fair coin 3 times. Answer the following with respect to this experiment.
   a) What is the sample space? **(1mk)** b) What are the values for the random variable X? **(2mks)**
   c) Give the probability of random variable X taking on values in its range (Probability distribution table) **(2mks)**

4. The values of x and their corresponding values of y are shown in the table below. Find the least square regression line $y = w_0 + w_1 x$. and estimate the value of y when x = 10.

x	0	1	2	3	4
y	2	3	5	4	6

National Forensics Sciences University, Goa Campus
TA-I Examination

Branch – Digital Forensics and Information Security **Semester – II** **Date - 28-02-2023**
Subject Name - Artificial Intelligence **Subject Code - CTMSDFIS SII** P4
Time- 45 minutes **Max. Marks- 25**
Instructions - 1) Answer all questions. 2) Assume suitable data.

Q.1	Multiple Choice Questions (1 mark each)	10 marks
	1. In probability, _____ is the set of all possible outcomes of an experiment a) Event b) Sample space c) Random variable d) None of the above	1 mark
	2. If A and B are two events such that P (B) = 0.4 and P (A U B) = 0.6 If A and B are independent, then P (A) is ____ a) 1/3 b) 1/2 c) 2/3 d) 2/5	1 mark
	3. If P(C) = 5/13, P (D) = 7/13 and P (C ∩ D) = 3/13, then P (C | D) equals _____ a) 2/7 b) 3/5 c) 3/7 d) 1/7	1 mark
	4. Mode of the series 0, 0, 0, 2, 2, 3, 3, 8, 10 is _____ a) 0 b) 3 c) 2 d) None of the above	1 mark
	5. Which of the following is used to measure the spread of data? a) Variance b) Mean c) Median d) Mode	1 mark
	6. Which of the following keyword is used for user-defined function in Python language? a) function b) def c) fun d) define	1 mark
	7. What will be the output of the following line of code in Python ? len(["hello",2, 4, 6]) a) Error b) 6 c) 4 d) 3	1 mark
	8. Which of the following is an iterative approach for linear modelling? a) Ordinary least squares b) Normal equation c) Gradient descent d) None	1 mark
	9. Which of the following statement/s is/are true ? I. Mean and Median don't have to be numbers from the data set II. Mode is always a number from the data set a) Only I b) Only II c) Both I and II d) None of the above	1 mark
	10. Given A, B, C and D are four matrices, then $(ABCD)^T$ = _____ a) ABCD b) DCBA c) $A^TB^TC^TD^T$ d) $D^TC^TB^TA^T$	1 mark

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Q.2	Answer any 3 questions (3x5 marks each)	15 Marks
	i. Explain in detail how gradient descent can be applied to linear modelling	5 marks
	ii. Derive an equation for linear regression for the following data points and predict the output for value $x_n = 6$ and $x_n = 10$ x_n: 1, 2, 3, 4 t_n: 3, 7, 9, 10	5 marks
	iii. Derive an expression for w_0 and w_1 in linear modelling of $t_n = w_0 + w_1 x_n$ using Ordinary Least Squares method where x_n and t_n represents an input variable and the corresponding output respectively.	5 marks
	iv. Consider an experiment of tossing a fair coin 3 times. Let X be the number of heads obtained in 3 tosses. Answer the following with respect to this experiment. a) What is the sample space ?..... (1mark) b) What are the possible values for the random variable X ?..... (2 marks) c) Give the probability distribution table ..... (2 marks)	5 marks