CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY

Department of Computer Science & Engineering

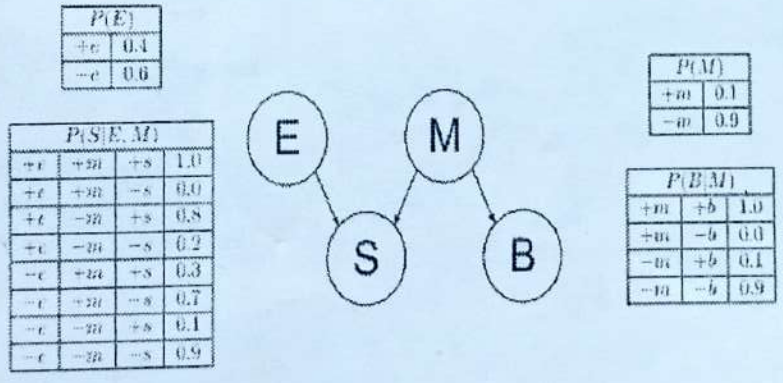
Class Test – 1 Session- July – Dec, 2023 Month-October

Sem- CSE 5th DS

Subject- Pattern Recognition and Machine Learning **Code- C128571(02)**

Time Allowed:2 hrs Max Marks: 40

Note: Q.1 in part Part A & B is compulsory, attempt any two questions from Q2 to Q4.

Q.N.	Questions	Marks	Levels of Bloom's Taxonomy	COs
	Part A			
Q1 (a)	Let's say your model is overfitting. Which of the following is NOT a suitable method for attempting to decrease overfitting? a) Increase the amount of training data. b) Improve the optimization algorithm being used for error minimization c) Decrease the model complexity. d) Reduce the noise in the training data.	[2]	Understand	CO1
(b)	Suppose we like to calculate P (H|E, F) and we have no conditional independence information. Which of the following sets of numbers are sufficient for the calculation- a) P(E, F), P(H), P(E|H), P(F|H) b) P(E, F), P(H), P(E, F|H) c) P(H), P(E|H), P(F|H) d) d) P(E, F), P(E|H), P(F|H)	[2]	Understand	CO2
Q2	State Bayes theorm? Consider a scenarios, where a smell of Sulphur (S) can be caused either by rotten eggs (E) or as a sign of the doom brought by the Mayan Apocalypse (M). The Mayan Apocalypse also causes the oceans to boil (B). The Bayesian network and corresponding conditional probability tables for this situation are shown below  $P(E)$: $+e$ 0.4; $-e$ 0.6 $P(M)$: $+m$ 0.1; $-m$ 0.9 $P(S\|E,M)$: $+e$ $+m$ $+s$ 1.0; $+e$ $+m$ $-s$ 0.0; $+e$ $-m$ $+s$ 0.8; $+e$ $-m$ $-s$ 0.2; $-e$ $+m$ $+s$ 0.3; $-e$ $+m$ $-s$ 0.7; $-e$ $-m$ $+s$ 0.1; $-e$ $-m$ $-s$ 0.9 $P(B\|M)$: $+m$ $+b$ 1.0; $+m$ $-b$ 0.0; $-m$ $+b$ 0.1; $-m$ $-b$ 0.9 Then find- (i) What is the probability that the oceans boil? (ii) What is the probability that the Mayan Apocalypse is occurring, given that there is a smell of Sulphur, the oceans are boiling, and there are rotten eggs? (iii) What is the probability that the Mayan Apocalypse is occurring, given that the oceans are boiling?	[2+6]	Apply	CO2

Q3	Explain following in brief- a) Dimensional Spaces b) Metric Space c) Normed Vector Space d) Pre-Hilbert and Hilbert	8]	Apply	CO2
Q4 (a)	Explain maximum entropy estimation. Derive an expression for Binary entropy?	[4]	Apply	CO2
(b)	A unfair coin is flipped 100 times. 61 head are observed. The coin either has a probability 1/3, 1/2 and 2/3 of flipping a head each time. Find which of the three is MLE?	[4]	Apply	CO2

Part B

Q1(a)	Parameter estimation problem is about: (a) Identifying input parameter (b) Identifying output parameter (c) Identifying model parameter (d) All of the above	[2]	Understand	CO1
(b)	If we train a Naive Bayes classifier using infinite training data that satisfies all of its modeling assumptions then in general, what can we say about the training error and test error: a) It may not achieve either zero training error or zero test error b) It will always achieve zero training error and zero test error c) It will always achieve zero training error but may not achieve zero test error d) It may not achieve zero training error but will always achieve zero test error	[2]	Understand	CO1
Q2	Consider the following data points, and implement single linkage hierarchical clustering algorithms?	[8]	Apply	CO2

	P1	P2	P3	P4	P5	P6
X	0.40	0.22	035	0.26	0.08	0.45
Y	0.53	0.38	0.32	0.19	0.41	0.30

Q3	Explain issue in decision tree? Suppose we wish to include the continuous-valued attribute Temperature in describing the training example days in the learning task of following table. Incorporate these continuous value to make decision tree.	[8]	Apply	CO2

F	F1	F2	F3	F4	F5	F6
Temperature	40	48	60	72	80	90
Play Tennis	No	No	Yes	Yes	Yes	No

Q4	Consider following data sample with two cluster. Implement fuzzy c means clustering. Iterate this algorithm for at least one iteration-	[8]	Apply	CO3

	(1, 3)	(2, 5)	(4, 8)	(7, 9)
Cluster 1	0.97	0.9	0.08	0.06
Cluster 2	003	0.05	0.92	0.94

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY

Department of Computer Science & Engineering

Class Test – I Session- July – Dec, 2023 Month-October

Sem- CSE 5thDS **Subject-Intelligent data Analysis**

Code- C128572(022)

Time Allowed:2 hrs Max Marks: 40

Note: - 1. Question 1 of each unit is compulsory.
2. Attempt any one from Q2-Q4

CO1. Understanding the basics of data mining, its challenges, data types, data visualization, and the importance of data pre-processing.

CO2. Applying various classification, association, clustering, and anomaly detection techniques to real-world data scenarios.

Q.N.	Questions	Marks	Levels of Bloom's Taxonomy	COs
	Unit I			
Q1	Explain why data pre-processing is important for data mining?	[4]	Apply	CO1
Q2	Explain the curse of dimensionality. Suggest measures to overcome it.	[8]	Apply	CO1
Q3	In a survey of 10 households, the number of children was found to be 4, 1, 5, 4, 3, 7, 2, 3, 4, 1 (a) State the mode. (b) Calculate. (i)the mean number of children per household (ii)the median number of children per household. (c) A researcher says: "The mode seems to be the best average to represent the data in this survey." Give ONE reason to support this statement.	[8]	Analyze	CO1
Q4	Explain data objects and attributes. Write down the matrix of different attributes and Transformations that represents attribute level.	[8]	Apply	CO1
	Unit II			
Q1	Explain the concept of classification with example	[4]	Apply	CO1, CO2
Q2	Explain the need of Model Evaluation. Explain K-fold cross validation.	[8]	Understand	CO2
Q3	Explain Naïve Bayesian classifier with example.	[8]	Apply	CO2
Q4	Explain the structure of Neural network with training process.	[8]	Understand	CO2

Chhattisgarh Swami Vivekanand Technical University
University Teaching Department
Class Test-1 (*July-December 2023*)
B. Tech(H)-5th Semester
Branch: AI/DS

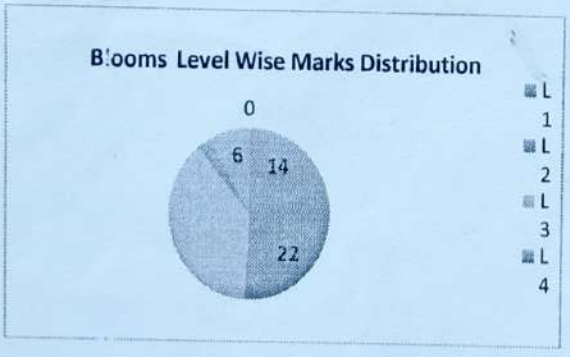
Subject Name: Cryptography and Network Security **Subject Code**: C127573(022)

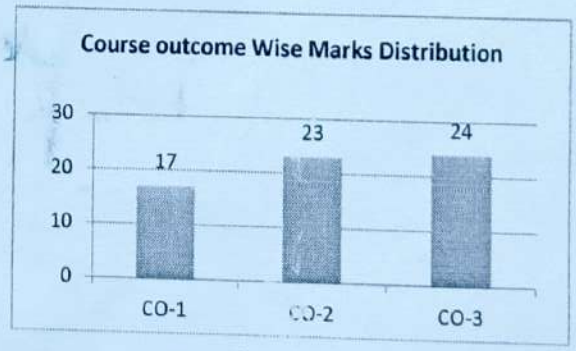
Max Marks: 40 **Min Marks:14** **Times: 2 hrs**

Note: Part A is compulsory, attempt any two questions from B, C, and D.

CO: 1 Compare various crystallographic techniques.
CO: 2 Examine different number theory and modular arithmetic techniques.
CO: 3 Examine Block Ciphers methods and Public Key Cryptography.

Q.No.		Questions	Marks	BL	CO
		UNIT 1			
1	a	Differentiate passive attack from active attack with example.	2	L1	1
	b	Convert the Given Text "CRYPTOGRAPHY" into cipher text using Rail fence Technique.	6	L2	1
	c	Convert "MEET ME" using Hill cipher with the key matrix Convert the cipher text back to plaintext - use the following matrix as keyword. [[17 17 5] [21 18 21] [2 2 19]]	6	L2	1
	d	Encrypt the following using play fair cipher using the keyword MONARCHY . " SWARAJ IS MY BIRTH RIGHT". Use X as blank space.	6	L2	1
		UNIT 2 X			
2	a	State the Fermat's Theorem	2	L2	2
	b	Discuss Euler's Theorem with example.	6	L3	2
	c	Discuss the properties that are satisfied by Groups, Rings and Fields.	6	L3	2
	d	Explain different methods of modular arithmetic.	6	L2	2
		UNIT 3			
3	a	Write down the purpose of S-Boxes in DES?	2	L1	3
	b	What is a meet-in-the-middle attack?	5	L2	3
	c	Explain DES with proper diagram and algorithm.	5	L2	3
	d	Explain triple DES in detail with example and diagram.	5	L2	3





Explain RSA with example 8 6
Differentiate symmetric and asymmetric 4 2
Diffie Hellman 8
Elgamal 8

Chhattisgarh Swami Vivekanand Technical University
University Teaching Department
Class Test-1 (*July-December 2023*)
B.Tech(H)-5th Semester
Branch: Data Science

Subject Name: Natural language Processing **Subject Code**:C128574(022)

Max Marks: 40 **Min Marks:14** **Times: 2 hrs**

Note: Part A is compulsory, attempt any two questions from B, C, and D.

CO: 1 Analyze the syntax, semantics, and pragmatics of a statement written in a natural language and Process the text data at syntactic and semantic level
CO: 2 Develop speech-based applications that use speech analysis (phonetics, speech recognition, and synthesis)
CO: 3 Extract information from text automatically using concepts and methods from natural language processing (NLP) including stemming, n-grams, POS tagging, and parsing

Q.No.		Questions	Marks	BL	CO
		UNIT 1			
1	a	Define Natural language Processing.	2	L1	1
	b	Illustrate with suitable example of the Different level of NLP.	6	L2	2
	c	List and Explain the challenges of NLP.	6	L4	1
	d	Explain the Various Applications of NLP.	6	L2	2
		UNIT 2			
2	a	Define Regular Expression.	2	L2	2
	b	Explain the process of Dealing with various spelling errors.	6	L3	2
	c	Describe the consonant and its place of Articulations.	6	L3	2
	d	Explain the identity of Speech Sound.	6	L2	2
		UNIT 3			
3	a	What is POS Tagging	2	L1	3
	b	Explain the syntactic and Statistical parsing.	5	L2	3
	c	Differentiate Top Down parsing and Bottom up Parsing Approach.	5	L2	3
	d	Write the Parsing Algorithms.	5	L2	3

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY

Department of Computer Science & Engineering

Class Test – I Session- July – Dec, 2023 Month-October- November

Sem- CSE 5th (AI) / (DS)

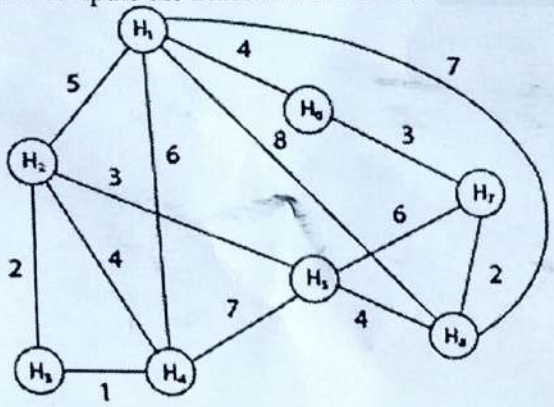
Subject- Computational complexity
Subject Code- C127532(022)

Time Allowed:2 hrs Max Marks: 40

Note: - Each question contains four parts. Part (a) of each question is compulsory. Attempt any two parts from (b), (c), and (d) of each question.

CO1: Evaluate the Time complexity of any algorithm and understand the polynomial time of NP-Hard, NP-Complete.
C02: Apply the algorithms and design techniques to solve problems related to divide and conquer and Greedy method.

Q.N.	Questions	Marks	Levels of Bloom's Taxonomy	COs
	Unit I			
Q1	Define Computational complexity with advantages.	[4]	Understand	CO1
Q2	Explain Concept of reduction with Polynomial time and its justification.	[8]	Understand	CO1
Q3	Difference between P versus NP problem and breif why it is hard.	[8]	Analyze	CO1
Q4	Explain non-trivial examples of polynomial time algorithm.	[8]	Apply	CO1
	Unit II			
Q1	Explain Divide and conquer with application.	[4]	Remember	CO1, CO2

Q2	**Design and Analysis of 0-1 Knapsack problem with algorithm.** Let us consider that the capacity of the knapsack is W = 8 and the items are as shown in the following table. **Item** A B C D **Profit** 2 4 7 10 **Weight** 1 3 5 7	[8]	Evaluate	CO2
Q3	**Define Travelling Sales Person Problem.** A newspaper agent daily drops the newspaper to the area assigned in such a manner that he has to cover all the houses in the respective area with minimum travel cost. Compute the minimum travel cost.  	[8]	Evaluate	CO2
Q4	Define LCS in complexity and Determine the LCS of (1,0,0,1,0,1,0,1) and (0,1,0,1,1,0,1,1,0).	[8]	Evaluate	CO2