

RA2211003030139

SRM Institute of Science and Technology
Department of Computer Science and Engineering
 Delhi – Meerut Road, Sikri Kalan, Ghaziabad, Uttar Pradesh – 201204



Academic Year: 2024-25 (ODD)

Test : Internal Examination I
 Course Code & Title : 21CSC301T & Formal Language and Automata
 Year & Sem : 3rd Year & 5th Sem

Date & Session: 20/08/2024 & FN
 Duration: 1 Hour
 Max. Marks: 30

Answer all questions

Part - A

(10Q x 1M = 10 Marks)

Q. No	Question	Marks	BL	CO	PO
1	In a Non-Deterministic Finite Automata (NFA), which of the following is true? a) It can have more than one transition for a single input from a state. b) It cannot have epsilon transitions. c) It can have at most one start state. d) It is always less powerful than a DFA.	1	L1	1	1
2	The main difference between DFA and NFA is _____. a) DFAs have a finite number of states; NFAs do not. b) DFAs do not have transitions on epsilon; NFAs may have. c) DFAs are always faster than NFAs. d) NFAs are more powerful than DFAs.	1	L1	1	2
3	_____ is a correct regular expression for the language consisting of strings over {a, b} that start with 'a'? a) ab* b) a(a b)* c) (a b)a d) (ab)*	1	L3	1	2
4	The regular expression for the set of all strings over {0, 1} containing at least one '1' is. a) 01 b) (0 1) c) 01(0 1) d) 1*0	1	L3	1	1
5	When converting an NFA with 'n' states to an equivalent DFA, the maximum number of states the resulting DFA can have been: a) n b) n^2 c) 2^n d) n!	1	L2	1	1
6	What is the main difference between a two-way finite automaton and a one-way finite automaton? a) Two-way automaton can move its head in both directions on the input tape. b) Two-way automaton has more states. c) Two-way automaton can read multiple input symbols at once. d) Two-way automaton can accept more languages.	1	L2	1	2
7	How does a Mealy machine differ from a Moore machine? a) Mealy machine's output depends on the current state only. b) Mealy machine's output depends on the current state and the input. c) Mealy machine has fewer states than a Moore machine. d) Mealy machine has more states than a Moore machine.	1	L1	1	2
8	_____ is a common application of Moore and Mealy machines? a) Arithmetic operations b) String matching c) Control systems d) Sorting algorithms	1	L1	1	1
9	Can every Mealy machine be converted to an equivalent Moore machine? a) Yes, always b) No, never c) Yes, but the Moore machine might have more states	1	L4	1	2

- d) Yes, but the Moore machine might have **fewer states**
10. What is the main difference in the state transition graphs of an NFA and a DFA?
 a) DFA has one start state; NFA has multiple start states.
 b) DFA has deterministic transitions; NFA can have multiple transitions for a single input symbol.
 c) DFA can have ϵ -moves; NFA cannot.
 d) There is no difference.

1 L2 1 1

Part B
Answer any three questions

3Q x 4M = 12 Marks

11. Describe the algorithm to convert an NFA with ϵ -moves to an equivalent NFA without ϵ -moves. 4 L2 1 2
 12. Provide an example of a regular expression and construct a finite automaton that recognizes the same language. 4 L3 1 1
 13. Determine the formal definition of equivalence between an NFA and a DFA with example. 4 L4 1 1
 14. Provide an example of a language that can be recognized by a two-way finite automaton but not by a one-way finite automaton. 4 L4 1 2

Part C
Answer all questions

1Q x 8M = 8 Marks

15. (A) Can every NFA be converted to an equivalent DFA? If yes, describe the process briefly. 8 L1,3 1 1
 Provide an example of a language that can be recognized by an NFA but not by a DFA.

(OR)

- (B) Define Moore and Mealy machines and explain the key differences between them. 8 L2 1 2
 Describe the process of converting a Mealy machine to an equivalent Moore machine.

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Academic Year: 2024-25 (ODD)



Test : Internal Examination I
Course Code & Title : 21CSC302J & Computer Networks
Year & Sem : III & V

Date & Session : 20.08.2024 & AN
Duration: 1 Hour
Max. Marks: 30

Answer all questions

Part - A

Q. No	Question	(10Q x 1M = 10 Marks)
1	_____ is used to connect devices within a single building or campus. A) LAN B) MAN C) PAN D) WAN	Marks BL CO PO 1 L1 1 1
2	MESH topology enhances network reliability by _____ as compared to a BUS topology. A) Providing multiple paths for data to travel B) Reducing the number of cables required C) Using a single central hub D) Allowing only one device to communicate at a time	1 L2 1 1
3	For a new data center with high data throughput requirements, propose how you would optimize the network for minimal delay and high bandwidth. A) Use fiber optic cables to maximize bandwidth and minimize latency. B) Use coaxial cables to ensure lower costs and higher reliability. C) Use twisted pair cables for cost-effectiveness and adequate bandwidth. D) Use radio waves for flexibility and low latency.	1 L3 1 5
4	The TCP/IP model has _____ layers. A) 5 B) 4 C) 7 D) 6	1 L1 1 1
5	Why packet switching is preferred over circuit switching for internet data transmission? A) It establishes a dedicated communication path. B) It allows data to be sent in small packets, improving efficiency. C) It guarantees the delivery of each packet. D) It requires less network equipment.	1 L2 1 1
6	Develop a wireless communication strategy for an indoor event where line-of-sight is limited. Which unguided media would be most effective and why? A) Radio Waves: due to their ability to penetrate walls and obstacles. B) Microwaves: due to their high bandwidth and long-range capabilities. C) Infrared: due to its short range and limited line-of-sight requirements. D) Satellite Signals: due to their long-range and high-bandwidth capabilities.	1 L3 1 5
7	Delay in networking refers to _____. A) The rate at which data is transferred over a network B) The time taken for data to travel from source to destination C) The physical distance between network devices D) The time taken to process data at a network device	1 L1 1 1
8	_____ is a common application of radio waves in communication. A) Television broadcasting B) Fiber optic communication	1 L2 1 1

- C) Wired LAN connections
D) High-frequency microwave links
- 9 For a multinational corporation, to connect its offices across different continents, which network type would be most appropriate?
A) LAN
B) MAN
C) PAN
D) WAN
- 10 One advantage of using twisted pair cables over coaxial cables.
A) Twisted pair cables are less expensive and more flexible.
B) Twisted pair cables offer higher bandwidth and less interference.
C) Twisted pair cables have better shielding from external noise.
D) Twisted pair cables support longer distances without signal degradation.

1 L3 1 5

1 L1 1 1

Part B

Answer any three questions

3Q x 4M=12 Marks

- 11 Define latency, bandwidth, and delay in the context of network performance. 4 L1 1 1
- 12 How packet switching improves the efficiency of network resource usage compared to circuit switching? 4 L2 1 1
- 13 Given a scenario where a business needs to connect multiple offices in a city, choose an appropriate network type and justify your choice based on the network's requirements. 4 L3 1 5
- 14 How do the layers in the TCP/IP model correspond to those in the OSI model? 4 L2 1 1

Part C

Answer all questions

1Q x 8M= 8 Marks

15. (A) Illustrate a detailed explanation of data movement from one layer to another in the OSI model during an email transmission. 8 L3 1 1
- (OR)
- (B) How the choice of network topology (Bus, Star, Ring, Mesh) affects network performance, scalability, and fault tolerance? Discuss. 8 L2 1 1

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Q1. What is the unit digit in the product of the expressions:
 $853 \times 1346 \times 452 \times 226$

- (a) 8 (b) 6 (c) 5 (d) 3

Q2. What is the unit digit in the place of $(24)^{63} + (33)^{61} - (27)^{58}$

- (a) 8 (b) 6 (c) 5 (d) 4

Q3. What is the largest 4 digit number exactly divisible by 88?

- (a) 9944 (b) 9900 (c) 9988 (d) 9999

Q4. If a number 968A96B is to be divisible by 72, the respective values of A and B can be
(a) 7 and 8 (b) 7 and 0 (c) 5 and 8 (d) 0 and 8

Q5. Find the greatest number which will divide 2112 and 2792 leaving the remainder 4 in each case.

Q6. Three bells toll at interval of 9, 12 and 15 minutes respectively. All three begins to toll at 8am. At what time will they first toll together again?

(a) 11am (b) 8:30am (c) 10am (d) 10:30am

Q7. Find the following for the number 84?

1. Number of odd factors 2. Number of even Factors

- (a) 4, 8 (b) 5, 5 (c) 8, 12 (d) 7, 9

Q8. Find the highest power of 30 in $40!$?

- (a) 12 (b) 10 (c) 8 (d) 9

Q9. A number when divided by 54 leaves a remainder of 31. Find the remainder when the same number is divided by 27?

- (a) 4 (b) 23 (c) 15 (d) 4 or 23

Q10. The digit in the unit place of the number 7295×3158 is?

- (a) 7 (b) 2 (c) 6 (d) 4

Q11. The sum of two numbers is 216 and their H.C.F. is 27. The numbers are:

- (a) 54, 162 (b) 108, 118 (c) 27, 189 (d) 42, 163

Q12. If $\log(x+y) = \log\left(\frac{3x-3y}{2}\right)$, then $\log x - \log y =$

- (a) $\log 2$ (b) $\log 3$ (c) $\log 6$ (d) $\log 4$

Q13. $x^{\log_y \log_z} \cdot y^{\log_z \log_x} \cdot z^{\log_x \log_y} =$

- (a) 2 (b) 3 (c) 0 (d) 1

Q14. If $\log_2 = .3010$ and $\log_3 = .4771$, the value of $\log_5 12$ is

- (a) 2.870 (b) 2.967 (c) 3.876 (d) 3.912

Q15. If $\log_2 x + \log_4 x + \log_{16} x = 21/4$, then $x =$

- (a) 8 (b) 2 (c) 16 (d) 4

16. If $\log_e 2 \cdot \log_b 625 = \log_{10} 16$. Then $b =$

- (a) 4 (b) 5 (c) e (d) 1

17. $(17)^{3.5} \times (17)^2 = (17)^8$

- (a) 2.29 (b) 2.75 (c) 4.25 (d) 4.5

18. If $5^x = 3125$, then the value of 5^{x+2} is

- (a) 2.25 (b) 2.75 (c) 4.25 (d) 4.5

19. $(256)^{16} \times (256)^{m}$ is

- (a) 4 (b) 16 (c) 64 (d) 256.25

20. If m and n are whole numbers such that $m^n = 123$, the value of $(m-n)^{mn}$ is

- (a) 1 (b) 10 (c) 121 (d) 1000

21. Find the number of Proper divisors of 1040.

- (a) 14 (b) 16 (c) 19 (d) 18

22. The unit digit in the product 122^{123} is

- (a) 2 (b) 4 (c) 6 (d) 8

23. What is the highest power of 12 that divides 54!?

- (a) 25 (b) 26 (c) 30 (d) 4

24. Given N is a positive integer less than 31, how many values can n take if $(n+1)$ is a factor of $n!$?

- (a) 18 (b) 16 (c) 12 (d) 20

25. The largest 3 digit number exactly divisible by 25 is:

- (a) 201 (b) 999 (c) 100 (d) 975

Q26. $1397 \times 1397 = ?$

- (a) 1951609 (b) 1981709 (c) 18362619 (d) 2031719

Q27. The largest 4 digit number exactly divisible by 28 is:

- (a) 9944 (b) 9768 (c) 9988 (d) 8888

Q28. The difference of two numbers is 1365. On dividing the larger number by the smaller, we get 6 as quotient and the 15 as remainder. What is the smaller number?

- (a) 240 (b) 270 (c) 295 (d) 360

Q29. The sum of first 45 natural numbers is:

- (a) 1035 (b) 1280 (c) 2070 (d) 2140

Q30. How many numbers are there from 500 to 650 (Including both) which are divisible neither by 3 nor by 7.

- (a) 87 (b) 99 (c) 121 (d) 21

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 Delhi - Meerut Road, Sikri Kalan, Ghaziabad, Uttar Pradesh - 201204
Academic Year: 2024-25 (ODD)



Test : Internal Examination I
 Course Code & Title : 21MAB302T Discrete Mathematics
 Year & Sem : 3rd / 5th Semester

Date & Session : 21/08/24 & AN
 Duration : 1 Hour
 Max. Marks : 30

Answer all questions

Q. No.	Question	(10Q x 1M = 10 Marks)			
		Marks	BL	CO	PO
1	$A \cap (A \cup B)$ is equal to (a) \emptyset (b) A (c) B (d) $A \cup B$	1	1	1	1
2	Power set of empty set has exactly-----subset (a) 2 (b) 1 (c) 0 (d) 3	1	1	1	1
3	A collection of well-defined objects is called (a) CoSets (b) Relation (c) Set (d) Function	1	1	1	1
4	Which of the following relation is not a reflexive relation (a) $\{(1,1), (3,2), (2,2), (3,3), (2,3)\}$ (b) $\{(1,1), (1,2), (1,3), (3,3), (2,3)\}$ (c) $\{(1,1)(1,3), (2,2), (3,3), (2,3), (3,1)\}$ (d) $\{(1,1), (1,2), (2,2), (3,3), (2,3)\}$	1	2	1	1
5	A simplified form of digraph representing the partial order relation is (a) Hasse diagram (b) Graph relation (c) Poset (d) Relation	1	1	1	1
6	The Warshall's Algorithm is used for (a) Commutatively (b) Associatively (c) Reflexivity (d) Transitivity	1	1	1	1
7	If $A=\{2,4,6,8\}$ and $B=\{g, r, s, t\}$ and $f=\{(2,g), (4,s), (6,s), (8,t)\}$ then f is (a) Both 1-1 and onto (b) Neither 1-1 nor onto (c) 1-1 but not onto (d) onto but not 1-1	1	2	1	1
8	If f and g are onto then the function gof is (a) One-one (b) Many-one (c) Onto (d) Into	1	1	1	1
9	A function is called bijective if it is (a) Both 1-1 and onto (b) Neither 1-1 nor onto (c) Not a function (d) onto but not 1-1	1	1	1	1
10	The floor value of the -5.6 is (a) -4 (b) -5 (c) -6 (d) -7	1	1	1	1

Part B
Answer any three questions

3Q x 4M = 12 Marks

11	Prove analytically and graphically that $(A - B) \cap (B - A) = \emptyset$	4	3	1	2
12	If R is the relation on the set of positive integers such that $(a,b) \in R$ if and only if $a^2 + b$ is even, prove that R is an equivalence relation	4	3	1	1
13	Draw the Hasse diagram for the divisibility relation i.e. $\{(a,b) : a \text{ divides } b\}$ on $\{2,3,4,6,12,36,48\}$.	4	4	1	2
14	Determine whether the function is one-one and/or onto $f: R \rightarrow R$ given by $f(x)=3x^2-x$.	4	3	1	2

Part C
Answer all questions

1Q x 8M = 8 Marks

15.	(A) Find the transitive closure of the given relation $R=\{(1,2),(2,4),(4,1),(4,3)\}$ on set $A=\{1,2,3,4\}$ by using Warshall algorithm (OR) (B) Prove that the inverse of the composition of two functions is equal to the composition of the inverse of the functions in the reverse order.	8	3	1	2
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Academic Year: 2024-25 (ODD)

Test

: Internal Examination I

Course Code & Title : 21ECO103T & Modern Wireless Communication System

Year & Sem. : 3rd & 5th

Date & Session : 22/08/2024 & FN

Duration: 1 Hour

Max. Marks: 30

Answer all questions

Part A

Q. No	Question	(10Q x 1M = 10 Marks)			
		Marks	BL	CO	PO
1	GSM Standard is first introduced in which of this generation? (a) 1G (b) 2G (c) 3G (d) 4G	1	1	1	1
2	Which one of the following mode is called a two-way simultaneous communication between two stations? (a) Simplex (SX) (b) Half Duplex (HDX) (c) Full Duplex (FDX) (d) Full/Full Duplex (F/FDX)	1	1	1	2
3	The type of service provided by the 2G is (a) Voice (b) Voice and Email (c) Voice, Email, and Video calling (d) Voice, Email, Video calling, and High-speed Internet	1	1	1	3
4	GPRS stands for: (a) General Packet Radio Service (b) Global Positioning Radio Service (c) Geological Packet Radio Service (d) Geological Positioning Radio Service	1	1	1	2
5	UMTS was introduced during ----- system. (a) 2.5G (b) 3G (c) 4G (d) 5G	1	1	1	2
6	The maximum rate at which information can be transmitted over a given communication path, or channel, under given conditions is referred to as (a) Data rate (b) Signal to Noise Ratio (c) Channel Capacity (d) Frequency Bandwidth	1	1	1	2
7	Which of the following is an example of unguided transmission media? (a) Atmosphere (b) Coaxial cable (c) Optical fiber (d) Twisted pair	1	1	1	3
8	A process of converting analog signal into discrete form is called (a) Modulation (b) Demultiplexing (c) Sampling (d) Quantization	1	1	1	4
9	Which of the following is not a TDMA standard of a 2.5 G network? (a) GPRS (b) GSM (c) HSCSD (d) EDGE	1	1	1	2
10	The Shannon expression for channel capacity is (a) $B \log_2(1 - \frac{S}{N})$ (b) $B \log_2(1 + \frac{S}{N})$ (c) $B \log_{10}(1 + \frac{S}{N})$ (d) $B \log_{10}(1 - \frac{S}{N})$ Where, B= Bandwidth (Hz); S= Signal Power (W); N= Noise Power (W)	1	1	1	3

Part B

Answer any three questions

3Q x 4M = 12 Marks

11	Briefly discuss the Time domain and Frequency domain concepts.	4	2	1	2
12	Write a short note on satellite microwave communication.	4	2	1	3
13	Distinguish between analog and digital transmission.	4	2	1	2

- 14 An ideal power-limited communication channel with additive white Gaussian noise is having 2 kHz bandwidth & signal-to-noise ratio of 127. What will be the capacity for this channel? 4 3 1 4

Part C
Answer all questions

1Q x 8M = 8 Marks

15. (A) Distinguish between 1G, 2G, 3G, 4G, and 5G in detail. 8 2 1 2
- (B) A telephone line normally has a frequency range of 3.5 MHz to 7.5 MHz assigned for data communication. The SNR is usually 31 dB. What will be the capacity for this channel? (OR) 8 3 1 2

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Department of Computer Science and Engineering

Delhi-Meerut Road, Sikri Kalan, Ghaziabad, Uttar Pradesh - 201204



Academic Year: 2024-25 (ODD)

Test

Course Code & Title: 21CSC305P/Machine Learning
Year & Sem : III Year/V Sem

: Internal Examination-I

: III Year/V Sem

Date & Session : 22/08/2024 (AN)

Duration: 1 Hour

Max. Marks: 30

Answer all Questions

Part - A

(10Q x 1M = 10 Marks)

Q.N.	Question	Marks	BL	CO	PO
1.	Which of the following is a type of supervised learning? a. K-means b. PCA c. Decision Trees d. Independent Component Analysis	1	L1	1	2
2.	What is the range of values that a probability can take? a. Any real number b. 0 to 1 c. -1 to 1 d. 0 to 100	1	L1	1	2
3.	For a dataset {3, 7, 9, 15, 20}, what is the median? a. 7 b. 9 c. 10 d. 12	1	L2	1	2
4.	The first quartile (Q1) represents which of the following percentiles? a. 25th b. 50th c. 75th d. 100th	1	L2	1	2
5.	Which of the following is a possible range of values for covariance? a. 0 to 1 b. -1 to 1 c. -∞ to ∞ d. 0 to ∞	1	L1	1	2
6.	A discrete random variable is a. Having finite number b. Having infinite number c. Dependent variable d. Independent variable	1	L2	1	2
7.	Calculate the probability that the number 3 will occur twice when 2 dice are rolled at the same time. a. 1/6 b. 1/36 c. 2/36 d. 3/36	1	L2	1	2
8.	The sum of the probabilities of all possible outcomes in a sample space is: a. 0 b. 1 c. 0.5 d. Depends on number of outcomes.	1	L2	1	2
9. is used to determine how each data point in a particular population fluctuates. a. Variance b. Probability Density c. Quantile d. Mean	1	L2	1	2

10. defines the probability function representing the density of a continuous random variable lying between specific range of values.
- Variance
 - Baye's Rule
 - Probability Density
 - Marginal Probability
- | | | | |
|---|----|---|---|
| 1 | L1 | 1 | 2 |
|---|----|---|---|

Part - B
Answer any Three Questions

3Q x 4M = 12 Marks

11. Discuss the union and conditional probability rule along with an example.
 12. Differentiate between supervised and unsupervised machine learning.
 13. With an example briefly describe the Baye's rule.
 14. Define variance and probability densities.
- | | | | |
|---|----|---|---|
| 4 | L2 | 1 | 2 |
| 4 | L2 | 1 | 2 |
| 4 | L1 | 1 | 2 |
| 4 | L1 | 1 | 2 |

Part - C
Answer all Questions

1Q x 8M = 8 Marks

15. (a) Explain the key characteristics of discrete and continuous random variable along with an example of each.
- | | | | |
|---|----|---|---|
| 8 | L2 | 1 | 2 |
|---|----|---|---|

(OR)

- (b) Describe the steps of building a machine learning model for solving any real-world problem.
- | | | | |
|---|----|---|---|
| 8 | L2 | 1 | 2 |
|---|----|---|---|

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Academic Year: 2024-25 (ODD)

Test : Internal Examination I
Course Code & Title : Database Security and Privacy & 21CSE361T
Year & Sem : III & V

Date & Session : 23-08-2024, FN
Duration: 1 Hour
Max. Marks: 30

Part - A

Answer all questions

(10Q x 1M = 10 Marks)

Q. No	Question	Marks	BL	CO	PO
1	An information system is primarily designed to: a) Improve physical security measures b) Facilitate the collection, processing, and dissemination of information c) Develop software applications d) Manage network infrastructure	1	L1	1	1
2	What is the purpose of enabling firewall settings in an operating system? a) To improve system performance b) To block unauthorized network access c) To enhance user interface aesthetics d) To increase storage capacity	1	L2	1	2
3	The primary goal of implementing encryption in database security is _____ a) To protect data from unauthorized access and breaches b) To optimize data retrieval times c) To reduce database size d) To simplify data storage	1	L1	1	1
4	A security environment means: a) The physical location of an organization b) The overall state of security measures and policies c) The hardware used in a network d) The design of office space	1	L1	1	1
5	Which of the following represents a fundamental concept of operating system security? a) User interface design b) Resource management c) Access control d) System compatibility	1	L2	1	2
6	A key principle that does not belong to the information security: a) Confidentiality b) Integrity c) Availability d) Usability	1	L1	1	1
7	The core responsibility of a DBMS in relation to data handling is: a) Designing multimedia content b) Managing data storage and retrieval c) Developing programming languages d) Securing network connections	1	L1	1	1
8	_____ represents a biometric authentication method. a) Password b) Fingerprint scan c) Security question d) PIN	1	L1	1	1

- 9 How is the value of an information asset usually determined?
 a) By its age
 b) By its replacement cost
 c) By its importance to business operations
 d) By its physical size
- 10 _____ is a vulnerability related to inadequate security measures for system authentication?
 a) Weak password policies
 b) Strong multi-factor authentication
 c) Encrypted login credentials
 d) Frequent password updates

1 L2 1 2

1 L1 1 1

Part B
Answer any three questions

3Q x 4M = 12 Marks

- 11 Describe the Confidentiality and Integrity aspect of the CIA triad in ensuring the data accuracy within an information system? 4 L2 1 1
- 12 In what ways do security policies contribute to enhancing the security of an operating system? 4 L2 1 2
- 13 Explain the significance of assets in database security and privacy. Additionally, provide a brief description of the four types of assets. 4 L2 1 1
- 14 Detail the key techniques used to secure email communications against unauthorized access. 4 L2 1 2

Part C
Answer all questions

1Q x 8M = 8 Marks

15. (A) Why is the identification phase crucial to the overall security of a database in the database security methodology? Also, diagrammatically map its implementation with the phases of the software development lifecycle?
 (OR)
- (B) Elaborate on the common vulnerabilities in database security, how attackers might exploit them, and the measures that can be implemented to mitigate these vulnerabilities.

8 L2 1 2

8 L3 1 2

Registration Number:

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Academic Year: 2024-25 (ODD)

Test	: Internal Examination II	Date & Session: 23/09/2024 & AN
Course Code & Title	: 21CSC301T & Formal Language and Automata	Duration: 1 Hour 30 Minutes
Year & Sem	: 3 rd & 5 th	Max. Marks: 50

Answer all questions

Part - A

(10 x 1 = 10 Marks)

Q. No	Question	Marks	BL	CO	PO
1	Which of the following languages can be generated by a context-free grammar? A) The set of all strings over {a, b} that contain an equal number of a's and b's. B) The set of all strings over {a, b} where the number of a's is a multiple of 3. C) The set of all strings of the form $a^n b^n c^n$ where $n \geq 0$. D) The set of all palindromes over {a, b}.	1	1	2	2,3
2	Determine the true statement regarding the Chomsky Normal Form (CNF) of a context-free grammar (CFG). A) All production rules must have exactly two non-terminal symbols on the right-hand side. B) All production rules must have exactly one terminal symbol on the right-hand side. C) All production rules must be of the form $A \rightarrow BC$ or $A \rightarrow a$, where A, B, and C are non-terminals and a is a terminal. D) Every CFG can be converted into CNF without increasing the number of non-terminals.	1	3	2	2,3
3	Select the main advantage of converting a CFG into Chomsky Normal Form (CNF)? A) It simplifies the parsing process. B) It reduces the number of production rules. C) It ensures that all strings generated are of the same length. D) It eliminates the need for non-terminal symbols.	1	4	2	2,3
4	In the context of CFGs, what is a derivation? A) A process of converting a CFG into Chomsky Normal Form. B) A sequence of production rule applications that generates a string from the start symbol. C) A method of counting the number of non-terminal symbols in a CFG. D) A technique to determine the ambiguity of a CFG.	1	1	2	2,3
5	What class of grammars is a superset of Context-Free Grammars? A) Regular grammars B) Unrestricted grammars C) Deterministic Context-Free Grammars D) Regular expressions	1	1	2	2,3
6	Select the role of stack in a Pushdown Automaton (PDA). A) It keeps track of the input symbols. B) It helps in recognizing languages that require nested structures, such as balanced parentheses. C) It is used to store intermediate results of arithmetic calculations. D) It maintains the state of the finite control.	1	4	3	2,3
7	Determine the type of PDA that can recognize all Context-Free Languages (CFLs)? A) Deterministic PDA (DPDA) B) Non-deterministic PDA (NPDA) C) Finite Automaton (FA) D) Non-deterministic finite automata (NFA)	1	3	3	2,3

8	Analyze the language $\{ a^n b^n c^n \mid n \geq 0 \}$, select true statement in relation to Pushdown Automata (PDA)? A) recognized by a DPDA. B) recognized by a NPDA. C) represented by a regular expression. D) cannot be recognized by any PDA	1	4	3	2,3
9	If a Pushdown Automaton (PDA) accepts a language by empty stack, what does this mean? A) The PDA accepts the language by ending in an accepting state. B) The PDA accepts the language by having an empty stack when it finishes reading the input. C) The PDA accepts the language by ensuring that the stack is always full. D) The PDA accepts the language by having a specific symbol on the stack.	1	1	3	2,3
10	Which of the following languages is not recognized by any Deterministic Pushdown Automaton (DPDA)? A) $\{ a^n b^n \mid n \geq 0 \}$ B) $\{ a^n b^n c^n \mid n \geq 0 \}$ C) $\{ a^n b^n \mid n \text{ is a positive integer} \}$ D) $\{ a^i b^j \mid i \neq j \}$	1	2	3	2,3

Part B
Answer any two questions

4M x 2Q=8 Marks

11	Construct a CFG for defining palindrome over $\Sigma = \{a, b\}$, $L = \{wcw^R\}$. Show derivation of abbcbbba.	4	3	2	2,3
12	Remove useless symbols from the following grammar- T \rightarrow aaB / abA / aaT A \rightarrow aA B \rightarrow ab / b C \rightarrow cd	4	4	2	2,3
13	Eliminate null productions from the following grammar- S \rightarrow XYX X \rightarrow 0X / ϵ Y \rightarrow 1Y / ϵ	4	3	2	2,3

Part C

Answer any two questions

4M x 2Q=8 Marks

14	Generate a PDA that accepts $L = \{ a^n b^{2n}, n \geq 1 \}$, show instantaneous description for aabbbb.	4	4	3	2,3
15	Construct a NPDA that accepts $L = \{ ww^R, w \in (0+1)^* \}$, show instantaneous description for 011110.	4	3	3	2,3
16	Describe pushdown automata along with its types.	4	1	3	2,3

Part D
Answer all questions

12M x 2Q=24 Marks

17	(A) Convert the following CFG to Chomsky normal form- S \rightarrow ASB b A \rightarrow aAS a ϵ B \rightarrow SbS A bb (OR)	12	2	2	2,3
	(B) Convert the following CFG to Greibach normal form- S \rightarrow XA BB B \rightarrow b SB X \rightarrow b A \rightarrow a	12	2	2	2,3
18	(A) Generate a PDA for the following grammar: S \rightarrow AB A \rightarrow CD B \rightarrow b C \rightarrow a D \rightarrow a (OR)	12	4	3	2,3

(B) Show that $L = \{ a^n b^n c^n \mid n \geq 0 \}$ is not context free using pumping lemma.

	12	1	3	2,3
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Registration Number: RA2211003030139

**SRM Institute of Science and Technology
Department of Computer Science & Engineering
Delhi - Meerut Road, Sikri Kalan, Ghaziabad, Uttar Pradesh - 201204**

Academic Year: 2024-25 (ODD)



Test: Internal Examination II
Course Code & Title: 21CSC302J Computer Networks
Year & Sem: 3rd / V

Date & Session : 24-09-2024(AN)
Duration: 1 Hour 30 Minutes
Max. Marks: 50

Part - A

Answer all questions

Question

(10 x 1 = 10 Marks)

Q. No

- | | Question | Marks | BL | CO | PO |
|---|--|-------|----|----|----|
| 1 | Given the IP address 172.16.50.35/20, what is the subnet address for this network?
a) 172.16.48.0
b) 172.16.50.0
c) 172.16.32.0
d) 172.16.0.0 | 1 | L2 | 2 | 1 |
| 2 | If you have a network with an IP address of 10.0.0.0 and a subnet mask of 255.255.255.192, how many subnets can you create?
a) 2
b) 4
c) 8
d) 16 | 1 | L2 | 2 | 1 |
| 3 | Write the name of protocol which is used to dynamically assign IP addresses in IPv4 networks?
a) ARP
b) DHCP
c) ICMP
d) DNS | 1 | L3 | 2 | 4 |
| 4 | What does CIDR stand for in the context of IPv4 addressing?
a) Classless Inter-Domain Routing
b) Classful Inter-Domain Routing
c) Classless Integrated Data Routing
d) Classful Integrated Data Routing | 1 | L1 | 2 | 1 |
| 5 | In IPv4, which field in the IP header specifies the length of the data portion of the packet?
a) Version
b) Header Length
c) Total Length
d) Identification | 1 | L2 | 2 | 5 |
| 6 | Select the primary advantage of using static routing in a network.
a) It automatically adapts to changes in network topology
b) It reduces the complexity of network configuration and routing
c) It supports multiple redundant paths for load balancing
d) It provides real-time updates on network topology changes | 1 | L2 | 3 | 1 |
| 7 | The command which is used to configure a static route on a Cisco router?
a) ip route [destination_network] [subnet_mask] [next_hop_address]
b) static route [destination_network] [subnet_mask] [next_hop_address]
c) route add [destination_network] [subnet_mask] [next_hop_address]
d) configure route [destination_network] [subnet_mask] [next_hop_address] | 1 | L3 | 3 | 1 |
| 8 | _____ OSPF packet is used to maintain neighbor relationships.
a) Hello
b) Database Description(DD)
c) Link-State Request (LSR)
d) Link-State Update (LSU) | 1 | L1 | 3 | 4 |
| 9 | Mention the attribute which is used to influence the routing decision for outbound traffic?
a) AS Path
b) Local Preference | 1 | L2 | 3 | 1 |

- c) Next Hop
d) Port Address
- 10 The main function of PJM (Protocol Independent Multicast) is -----
a) To manage multicast group memberships
b) To provide a routing protocol for multicast traffic
c) To convert multicast addresses to unicast addresses
d) To secure multicast traffic
- 1 L2 3 1

Part B
Answer any two questions

4M x 2Q=8 Marks

- 11 Explain the concept of Classless Inter-Domain Routing (CIDR) and how it differs from Classful addressing.
- 12 How do Internet Service Providers (ISPs) manage and assign IP addresses to their customers? Discuss the differences between public and private IP addresses, and how NAT is used to allow multiple devices on a local network to share a single public IP address.
- 13 Discuss the advantages of Subnetting in terms of network management, security, and performance.
- 4 L2 2 1
4 L3 2 4
4 L2 2 5

Part C
Answer any two questions

4M x 2Q=8 Marks

- 14 In what scenarios is static routing typically used? Provide examples where static routing would be the preferred method for routing network traffic.
- 15 How do RIP v1 and RIP v2 handle the dissemination of routing information? Discuss the methods used by each version to exchange routing updates between routers.
- 16 Describe the structure and format of IPv6 addresses. How does IPv6 addressing differ from IPv4 addressing in terms of length and notation? Provide examples of IPv6 addresses and explain the significance of each part.
- 4 L3 3 1
4 L2 3 1
4 L3 3 4

Part D
Answer all questions

12M x 2Q=24 Marks

- 17 (A) A large number of consecutive IP addresses are available starting at 198.16.0.0. Suppose that four organizations, A, B, C, and D, request 4000, 2000, 4000, and 8000 addresses, respectively, and in that order. For each of these, give the first IP address assigned, the last IP address assigned, and the mask in the w.x.y.z/s notation.
(OR)
(B) You have been assigned the network address 192.168.50.0/24 for your organization. You need to create subnets to accommodate the five departments named as Finance with 50 hosts, HR with 30 hosts, IT with 70 hosts, Marketing with 20 hosts and Sales with 14 hosts. Calculate the subnet mask for each department's subnet and Determine the subnet address, the first usable IP address, the last usable IP address, and the broadcast address for each department.
- 18 (A) Compare and contrast Distance Vector Routing and Link State Routing protocols. Discuss how each protocol determines the best path to a destination and the mechanisms they use to update routing information.
(OR)
(B) In a large enterprise network, multiple routing protocols are often deployed across different regions or departments. Discuss the strategies for selecting the appropriate routing protocol for different segments of the network.
- 12 L4 2 1
12 L3 2 4
12 L4 3 5
12 L2 3 1

RA221103030139

1. What was the day of the week on 28th May, 2006?
A) Sunday B) Friday C) Wednesday D) Tuesday
2. If 15 March 2021 is Monday. What will be 12 July 2023?
A) Wednesday B) Monday C) Sunday D) Saturday
3. If 12 March 2018 is Sunday. What will be 12 March 2022?
A) Monday B) Tuesday C) Wednesday D) Friday
4. The calendar for the year 1992 will be the same for year?
A) 2014 B) 2016 C) 1996 D) 2020
5. If the minutes hand and seconds' hand of a clock are 25 minutes apart. What will be the angle formed between them?
A) 110 degree B) 120 degree C) 135 degree D) 150 degree
6. How many times the hands of a clock are in a straight line in a day?
A) 11 times B) 33 times C) 22 times D) 44 times
7. My watch gains 5 min. every hour. how many degrees the second hand moves in every minute?
A) 210 degree B) 120 degree C) 390 degree D) 220 degree
8. Arvind Swami was born on 2 Oct 1869. The day of the week was
A) Sunday B) Saturday C) Thursday D) Monday
9. Number of times 29th day of the month occurs in 400 consecutive years is
A) 4497 B) 4500 C) 5522 D) 4440
10. What will be the angle between hour and minute hand when the time is 5:20 am?
A) 33 degrees B) 40 degrees C) 35 degrees D) 43 degrees
11. A bag contains 2 red, 3 green and 2 blue balls. Two balls are drawn at random. What is the probability that none of the balls drawn is blue?
A) 10/21 B) 11/21 C) 2/7 D) 5/7
12. A problem is given to three students whose chances of solving it are $1/2$, $1/3$ and $1/4$ respectively. What is the probability that the problem will be solved?
A) $1/4$ B) $1/2$ C) $3/4$ D) $7/12$
13. How many necklace of 12 beads each can be made from 18 beads of different colours?
A) $18!$ B) $18! \times 19!$ C) $18!(6 \times 24)$ D) $18! \times 30$
14. There are 6 bowlers and 9 batsmen in a cricket club. In how many ways can a team of 11 be selected so that the team contains at least 4 bowlers?
A) 1170 B) 1200 C) 720 D) 360
15. A team of 8 students goes on an excursion, in two cars, of which one can seat 5 and the other only 4. In how many ways can they travel?
A) 126 B) 120 C) 146 D) 156
16. In a single throw of two dice, find the probability that neither a doublet nor a total of 8 will appear.
A) $7/15$ B) $5/18$ C) $13/18$ D) $3/16$
17. A basket contains 10 apples and 20 oranges out of which 3 apples and 5 oranges are defective. If we choose two fruits at random, what is the probability that either both are oranges or both are non defective?
A) $136/345$ B) $17/87$ C) $316/435$ D) $158/435$
18. A bag contains 50 tickets numbered 1, 2, 3, 4, ..., 50 of which five are drawn at random and arranged in Ascending order of magnitude. Find the probability that third drawn ticket is equal to 30.
A) $551/15134$ B) $1/2$ C) $552/15379$ D) $1/9$

19. What is the probability of getting a sum 9 from two throws of a dice?
A) $1/2$ B) $3/4$ C) $1/9$ D) $2/9$

20. Sum of three Natural numbers a, b and c is 10. How many ordered triplets (a, b, c) exist?
A) 45 B) 54 C) 48 D) 36

21. Out of 7 consonants and 4 vowels, how many words of 3 consonants and 2 vowels can be formed?
A) 25200 B) 52000 C) 120 D) 24400

22. Two dice are thrown together. What is the probability that the number obtained on one of the dice is multiple of number obtained on the other dice?
A) $11/18$ B) $12/25$ C) $7/18$ D) Can't Determine

23. Find the probability that a leap year has 52 Sundays.
A) 1 B) $5/7$ C) $2/7$ D) $52/366$

24. Three bags contain 3 red, 7 black; 8 red, 2 black, and 4 red & 6 black balls respectively. 1 of the bags is selected at random and a ball is drawn from it. If the ball drawn is red, find the probability that it is drawn from the third bag.
A) $15/30$ B) $2/75$ C) $4/15$ D) $1/2$

25. How many arrangements can be made out of the letters of the word COMMITTEE, taken all at a time, such that the four vowels do not come together?
A) 216 B) 45360 C) 1260 D) 43200

26. A college has 10 basketball players. A 5-member team and a captain will be selected out of these 10 players. How many different selections can be made?
A) 1260 B) 1400 C) 1250 D) 1600

27. If the letters of the word SACHIN are arranged in all possible ways and these words are written out as in dictionary, then the word 'SACHIN' appears at serial number.
A) 601 B) 600 C) 603 D) 602

28. How many integers, greater than 999 but not greater than 4000, can be formed with the digits 0, 1, 2, 3 and 4, if repetition of digits is allowed?
A) 376 B) 375 C) 500 D) 673

29. The Indian Cricket team consists of 16 players. It includes 2 wicket keepers and 5 bowlers. In how many ways can a cricket eleven be selected if we have to select 1 wicket keeper and at least 4 bowlers?
A) 1024 B) 1900 C) 2000 D) 1092

30. When four fair dice are rolled simultaneously, in how many outcomes will at least one of the dice show 3?
A) 620 B) 671 C) 625 D) 567

Registration Number:

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SRM Institute of Science and Technology
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**Academic Year: 2024-25 (ODD)****Test: Internal Examination II****Course Code & Title: 21MAB302T & Discrete Mathematics****Year & Sem: III & V****Date & Session : 25.09.2024 & AN****Duration: 1 Hour 30 Minutes****Max. Marks: 50****Part - A****Answer all questions****(10 x 1 = 10 Marks)**

Q. No	Question	Marks	BL	CO	PO
1	The number of arrangements of all six letters in the word PEPPER is (a) 60 (b) 70 (c) 80 (d) 90	1	2	2	1
2	The least common multiple of two numbers is 168 and highest common factor of them is 12. If the difference between the numbers is 60, what is the sum of the numbers? (a) 94 (b) 108 (c) 135 (d) 158	1	2	2	1
3	Assuming that repetitions are not permitted, how many four-digit numbers are less than 4000, can be formed from the six digits 1, 2, 3, 5, 7, 8? (a) 125 (b) 124 (c) 180 (d) 63	1	2	2	1
4	If a, b are integers such that $a > b$ then $\text{lcm}(a, b)$ lies in (a) $a > \text{lcm}(a, b) > b$ (b) $a > b > \text{lcm}(a, b)$ (c) $b > \text{lcm}(a, b) < b$ (d) $\text{lcm}(a, b) \geq a > b$	1	2	2	1
5	In a course, a professor give five grades {A, B, C, D, E}. What is the minimum number of students required so that four of them are guaranteed to get the same grade? (a) 16 (b) 15 (c) 4 (d) 2	1	2	2	1
6	$(p \rightarrow \sim p) \rightarrow \sim p$ is equivalent to (a) T (b) F (c) p (d) $\sim p$	1	1	3	1
7	The statement among the following that is a tautology (a) $p \wedge (p \vee q)$ (b) $q \rightarrow (p \wedge (p \rightarrow q))$ (c) $p \vee (p \wedge q)$ (d) $(p \wedge (p \rightarrow q)) \rightarrow q$	1	1	3	1
8	The negation of the statement $\sim p \wedge (p \vee q)$ is (a) $\sim p \wedge q$ (b) $p \vee \sim q$ (c) $\sim p \vee q$ (d) $p \wedge \sim q$	1	1	3	1
9	The rule if a formula S can be derived from another formula R and a set of premises, then the statement $R \rightarrow S$ can be derived from the set of premises is called (a) Rule CP (b) Rule T (c) Rule P (d) Inconsistent	1	1	3	1
10	Dual of $\sim p \rightarrow (p \rightarrow q)$ is (a) $p \vee (\sim p \wedge q)$ (b) $\sim (p) \wedge (\sim p \wedge q)$ (c) $p \rightarrow \sim (p \rightarrow q)$ (d) $(\sim p \wedge q) \wedge \sim p$	1	1	3	1

Part B**Answer any two questions****(4M x 2Q= 8 Marks)**

- 11 If we select 5 points in the interior of an equilateral triangle of side length 1, show that two are within a distance of $\frac{1}{2}$ of each other.

4 3 2 2

- 12 Find greatest common divisor and least common multiple of 120 and 500 by prime factorization. 4 2 2 1
- 13 The Indian Cricket team consist of 16 players. It includes two wicketkeepers and five bowlers. In how many ways you can select a Cricket team of 11 players if you have to select 1 wicketkeeper and atleast four bowlers? 4 2 2 2

Part C

Answer any two questions

(4M x 2Q= 8 Marks)

- 14 Construct the truth table for the compound proposition and prove that $\sim(p \leftrightarrow q) \equiv (p \wedge \sim q) \vee (\sim p \wedge q)$ 4 2 3 1
- 15 Prove by mathematical induction that $6^{n+2} + 7^{2n+1}$ is divisible by 43 for each positive integer n. 4 3 3 2
- 16 Verify whether the compound proposition $((p \vee q) \wedge (\sim p \vee r)) \rightarrow (q \vee r)$ is a tautology, contradiction or contingency. 4 2 3 1

Part D

Answer all questions

(12M x 2Q= 24 Marks)

- 17 (A) Determine $\gcd(a, b)$ by using Euclidean algorithm. Find s and t such that $\gcd(a, b) = s.a + t.b$ where $a=1819$ and $b=3587$. 12 3 2 2
 (OR)
 (B) (i) How many solutions does the equation $x_1 + x_2 + x_3 = 13$ have, where x_1, x_2, x_3 are non-negative integers less than 6? Use the principle of inclusion-exclusion.
 (ii) An examination paper consists of 12 questions is divided into two parts: A and B. Part A contains 7 questions and part B contains 5 questions. A candidate is required to answer 8 questions electing atleast 3 questions from each part. In how many ways can the candidate select the questions? 12 3 2 2
- 18 (A) Without using truth table prove that:
 (i) $(p \wedge q) \vee (\sim p \wedge q) \vee (p \wedge \sim q) \equiv p \vee q$
 (ii) $(p \leftrightarrow q) \equiv (p \wedge q) \vee (\sim p \wedge \sim q)$ 12 2 3 1
 (OR)
 (B) (i) Prove by using indirect method: $p \rightarrow q, q \rightarrow r, \sim(p \wedge r), p \vee r \Rightarrow r$. 12 3 3 2
 (ii) Construct an argument using rules of inference to show that the hypothesis "Radha works hard", "If Radha works hard, then she is a dull girl" and "If Radha is a dull girl, then she will not get the job" imply the conclusion "Radha will not get the job".

Registration Number: RA2211003030139

SRM Institute of Science and Technology
Department of Computer Science and Engineering
 Delhi – Meerut Road, Sikri Kalan, Ghaziabad, Uttar Pradesh – 201204



Academic Year: 2024-25 (ODD)

Test : Internal Examination II
Course Code & Title: 21ECO103T, Modern Wireless
Communication System
Year & Semester : III Year / V Semester

Date & Session: 27/09/24; AN
Duration: 1 Hour 30 Minutes
Max. Marks: 50

Part - A

Answer all questions

(10 x 1 = 10 Marks)

Q. No	Question	Marks	BL	CO	PO
1	Which of the following networks interconnects user with computer nodes within a geographical area? (a) LAN (b) WAN (c) MAN (d) PAN	1	1	2	1
2	Spectral efficiency is denoted in (a) Bits/Second (b) Hertz/Sec (c) Bits/Second/Hertz (d) Bits/Hertz	1	1	2	2
3	Store & Forward are terms used to describe ----- switching. (a) Circuit (b) Packet (c) Message (d) Datagram	1	1	2	1
4	The technique that makes possible the task of listening and talking in communication system is called (a) Simplex (b) Duplexing (c) Modulating (d) Multiple access technique	1	2	2	2
5	In TDM, slots are further divided into (a) Seconds (b) Packets (c) Frames (d) Bits	1	1	2	2
6	What is the interface between BSC & SGSN in a GPRS network structure? (a) Ga (b) Gb (c) Gc (d) Gd	1	2	3	2
7	GMSK modulation is used in (a) AMPS (b) GSM (c) LTE (d) GPRS	1	2	3	2
8	The CDMA IS 95 is the ----- generation digital cellular network system. (a) 3 rd (b) 2.5 (c) 2 nd (d) 1 st	1	2	3	2
9	The ----- technology is used for data transmission in GSM networks. (a) TDMA (b) FDMA (c) CDMA (d) GPRS Check	1	2	3	3
10	Which of the following does not come under subsystem of GSM architecture? (a) BSS (b) NSS (c) OSS (d) Channel	1	2	3	2

Part B

Answer any two questions

(4M x 2Q = 8 Marks)

11	Distinguish the concept of circuit switching & packet switching techniques.	4	2	2	2
12	Define duplexing & outline the differences between half duplex & full duplex communication.	4	2	2	3
13	Write a short note on Voice Coding.	4	2	2	4

Part C

Answer any two questions

(4M x 2Q = 8 Marks)

- | | | | | | |
|----|--|---|---|---|---|
| 14 | Write a short notes on the roaming services in GPRS network. | 4 | 2 | 3 | 2 |
| 15 | Give the CDMA one network structure & explain it's working. | 4 | 3 | 3 | 2 |
| 16 | Write a short note on High-Speed Circuit Switched Data (HSCSD) in personal communication services. | 4 | 3 | 3 | 3 |

Part D

Answer all questions

12M x 2Q = 24 Marks

- | | | | | | |
|------|--|----|----------|---|---|
| 17 | (A) Discuss TDMA & FDMA multiple access schemes, | 12 | 2 | 2 | 1 |
| (OR) | | | | | |
| | (B) With an aid of sketch, explain the ATM architecture in detail. | 12 | 2 | 3 | 4 |
| 18 | (A) Explain the GPRS network architecture in detail with neat diagram. | 12 | 3 | 3 | 4 |
| (OR) | | | | | |
| | (B) Explain the GSM architecture in (PCS) personal communication services with neat diagram. | 12 | 3 | 2 | 1 |

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SRM Institute of Science and Technology

Department of Computer Science & Engineering

Delhi – Meerut Road, Sikri Kalan, Ghaziabad, Uttar Pradesh – 201204



Academic Year: 2024-25 (ODD)

Test : Internal Examination-II
 Course Code & Title : 21CSC305P/Machine Learning
 Year & Sem : III/V

Date & Session: 28/09/2024 (FN)
 Duration: 1 Hour & 30 Minutes
 Max. Marks: 50

Part - A

Answer All Questions

(1M x 10Q = 10 Marks)

Q.N.	Question	Marks	BL	CO	PO
1.	In a linear classifier, the decision boundary is typically represented by: a. A hyperplane c. A tree structure b. A circle d. A non-linear curve	1	L1	2	2
2.	Which one is a common prior used in Bayesian logistic regression? a. Uniform prior c. Kernel b. Gaussian (Normal distribution) d. Bayesian Linear Regression	1	L1	2	4
3.	For a given data set and model, the Maximum Likelihood Estimation (MLE) finds the parameter values that: a. Minimize the residuals b. Maximize the log of the posterior probability c. Maximum likelihood of observing the data d. Minimize the likelihood function	1	L2	2	4
4.	In SVM, which one is a commonly used kernel function? a. Sigmoid Kernel c. Decision Kernel b. Normal Kernel d. Support Kernel	1	L2	2	2
5.	Which of the following is an example of a linear model used for classification? a. K-Nearest Neighbors c. Logistic Regression b. Decision Trees d. Random Forest	1	L1	2	2
6.	In K-means clustering the common distance metric is a. Manhattan distance c. Euclidean distance b. Cosine similarity d. Mahalanobis distance	1	L2	3	4
7.	In the context of clustering, what is a "centroid"? a. Randomly data point c. Mean of data points b. Farthest Point d. Mode value	1	L1	3	4
8.	Method is commonly used to estimate the factors in factor analysis is a. Gradient descent c. SVM b. MLE d. PCA	1	L1	3	2
9.	The main goal of Principal Component Analysis (PCA) is a. To increase the dimensionality of the data b. To reduce the dimensionality of the data while preserving as much variance as possible c. To classify data points into clusters d. To predict future data points based on historical data	1	L1	3	2
10.	In hierarchical clustering, what is a "dendrogram"? a. A method for calculating distances between points b. A visual representation of the data points c. A tree-like diagram that shows the sequence of merges or splits d. A method for assigning cluster labels to the data	1	L2	3	2

Part - B**Answer Any Two Questions****4M x 2Q = 8 Marks**

11. Discuss the concept of Bayesian linear regression and how it differs from traditional linear regression? 4 L2 2 1
12. How do you define the maximum likelihood function for a given model? 4 L3 2 3
13. Use the least square method to determine the equation of line of best fit for the data. 4 L3 2 1

3	2	10	11	3	6	5	6
12	1	12	9	4	9	6	1

Part - C**Answer Any Two Questions****4M x 2Q = 8 Marks**

14. Differentiate between divisive and agglomerative clustering. 4 L2 3 2
15. What is factor analysis? Also mention its key reasons. 4 L1 3 2
16. How does EM handle missing data? Also briefly illustrate the working of EM algorithm. 4 L2 3 4

Part - D**Answer All Questions****12M x 2Q = 24 Marks**

17. (a) Describe the objective function of Ridge Regression. How ridge regression is dealing with multicollinearity? 12 L2 2 2

- (b) Explain in detail how SVM is used for classification along with the diagram. Also discuss various kernels involved in SVM. 12 L2 2 2
18. (a) For the given data, compute two clusters using K-means algorithm where initial cluster centers are (1.0, 1.0) and (5.0, 7.0). Execute for two iterations. 12 L3 3 4

Record Number	A	B
R1	1.0	1.0
R2	1.5	2.0
R3	3.0	4.0
R4	5.0	7.0
R5	3.5	5.0
R6	4.5	5.0
R7	3.5	4.5

(OR)

- (b) Give a thorough explanation of the significance of PCA in data analysis. Also mention the essential stages for using PCA in a dataset. 12 L2 3 2

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Academic Year: 2024-25 (ODD)

Test : Internal Examination II	Date & Session : 28.09.24 & AN
Course Code & Title : 21CSE361T & Database Security & Privacy	Duration: 1 Hour 30 Minutes
Year & Sem : 3 rd & 5 th	Max. Marks: 50

Answer all questions

Part - A

(10 x 1 = 10 Marks)

Q. No	Question	Marks	BL	CO	PO
1	Identify the primary purpose of using profiles in database user management. A) To limit access to certain SQL commands B) To control and define user session attributes C) To encrypt user data stored in the database D) To automatically create new users with default settings	1	L2	2	1
2	What is the effect of revoking a privilege from a user in SQL Server? A) Removes the user's ability to perform the specified action B) Deletes the user's account from the server C) Resets the user's role to a default setting D) Permanently locks the user's account	1	L2	2	1
3	The most important element in creating a secure password policy for a database environment: A) Allowing unrestricted password lengths B) Enforcing complexity requirements and regular expiration C) Granting maximum privileges by default D) Providing shared passwords for easier access	1	L3	2	2
4	The function of a database link in SQL Server is to: A) Enable the creation of temporary user accounts B) Facilitate connections between different databases for data access C) Automate the backup and recovery process D) Provide a graphical interface for managing users	1	L2	2	1
5	Outline the benefit of assigning roles to users in a SQL Server environment. A) Reduces the complexity of managing individual user privileges B) Eliminates the need for authentication C) Provides automatic backups of user data D) Increases the execution speed of SQL queries	1	L3	2	2
6	Identify the purpose of using Virtual Private Database (VPD) in Oracle. A) To create a backup of the database B) To control access to data at the row and column level C) To enhance query performance D) To increase storage capacity	1	L2	3	2
7	State the fundamental role of data encryption in application security: A) To speed up data retrieval processes B) To prevent unauthorized access to sensitive information C) To create indexes for faster searching D) To enhance the user interface of applications	1	L2	3	1
8	In what ways does the application context improve security in Oracle? A) Providing a mechanism for storing session-specific information B) Optimizing query execution plans for better performance C) Allowing the use of shared memory for faster processing	1	L2	3	2

	D) Automates the creation of database triggers					
9	Identify the security model that restricts access based on the user's role and responsibilities. A) Discretionary Access Control (DAC) B) Role-Based Access Control (RBAC) C) Mandatory Access Control (MAC) D) Attribute-Based Access Control (ABAC)	1	L1	3	2	
10	Outline the role of the Oracle Policy Manager in implementing Virtual Private Database (VPD). A) Automates the backup process B) Manages the definition and application of security policies C) Optimizes data compression for storage D) Improves user experience with graphical interfaces	1	L2	3	1	
Part B						
	Answer any two questions	4M x 2Q = 8 Marks				
11	Explain the concept of "authentication" in the context of SQL Server user management.	4	L2	2	1	
12	Identify the role of "linked servers" in a SQL Server environment.	4	L1	2	2	
13	Summarize the function of "password policies" in database management.	4	L2	2	2	
Part C						
	Answer any two questions	4M x 2Q = 8 Marks				
14	Explain the concept of "Application Security Models."	4	L2	3	2	
15	Describe the purpose of data encryption.	4	L1	3	1	
16	Elucidate the concept of a Virtual Private Database (VPD).	4	L2	3	3	
Part D						
	Answer all questions	12M x 2Q = 24 Marks				
17	(A) Analyze the best practices for designing and implementing password policies in SQL Server. Discuss how these practices contribute to overall database security and provide examples of potential security breaches that could occur without them. (OR) (B) Compare the use of "remote servers" and "database links" in SQL Server for accessing external databases. Evaluate their advantages and disadvantages in terms of performance, security, and ease of use.	12	L4	2	3	
18	(A) Evaluate the benefits and challenges of implementing data encryption in application security models. How does encryption help in protecting sensitive information, and what are the potential drawbacks? (OR) (B) Explain security models and describe their different types.	12	L3	3	3	

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Academic Year: 2024-25 (ODD)

Test	: Internal Examination III	Date & Session : 5/11/2024 & AN
Course Code & Title	: 21CSC301T & Formal Language and Automata	Duration: 1 Hour 30 Minutes
Year & Sem	: 3 rd & 5 th	Max. Marks: 50

Part - A

Answer all questions

Q. No	Question	(10 x 1 = 10 Marks)			
		Marks	BL	CO	PO
1	If a Turing Machine is in state q_1 and reads symbol 0, and there is an instruction $(q_1, 0) \rightarrow (q_2, 1, R)$, what will happen? A) The machine writes 0, moves left, and stays in q_1 B) The machine writes 1, moves right, and enters state q_2 C) The machine writes 1, moves left, and enters state q_2 D) The machine stays in state q_1 without making changes	1	1	4	2
2	Given the input string 1100, and a Turing Machine that accepts binary strings divisible by 4, what will be the final state of the machine if it halts? A) Accept state B) Reject state C) Undefined state D) Loop forever	1	1	4	2
3	Design a simple Turing Machine that checks if a binary string contains an equal number of 0's and 1's. Which approach can be chosen? A) Mark each 0 and 1 and match them one by one B) Count the 0's and 1's separately on different tapes C) Use a stack to count 0's and pop 1's D) Use two heads on the same tape to scan the 0's and 1's simultaneously	1	3	4	2
4	Determine the difference between recursive and recursively enumerable languages. A) Recursive languages are finite, recursively enumerable languages are infinite B) Recursive languages are decided by Turing Machines that always halt, while recursively enumerable languages are recognized by Turing Machines that may not halt C) Recursive languages are accepted by finite automata, while recursively enumerable languages are accepted by pushdown automata D) There is no difference	1	3	4	2
5	Consider a language L such that a Turing Machine halts and accepts all strings in L, but for strings not in L, the machine loops indefinitely. What can be said about L? A) L is recursive B) L is recursively enumerable but not recursive C) L is not recursively enumerable D) L is context-free	1	1	4	2
6	If P = NP is proven true, determine the significance. A) It would mean that all problems verifiable in polynomial time are also solvable in polynomial time B) It would prove that NP-complete problems cannot be solved efficiently C) It would show that every problem in PSPACE can be solved in polynomial time D) It would reduce the class NP to L	1	3	5	3
7	If you are tasked with proving a problem is NP-complete, which two key properties will be demonstrated? A) The problem is in NP and every NP problem can be reduced to it in polynomial time B) The problem is verifiable in logarithmic space and can be solved in polynomial space C) The problem can be solved in exponential time and is verifiable in polynomial time D) The problem is in NP and its complement is in NP	1	1	5	3

8	Predict which of the following statements is true about the Halting Problem? A) It can be solved using a deterministic Turing Machine B) It is undecidable by any Turing Machine C) It belongs to the complexity class NP D) It is solvable by a finite automaton	1	3	5	3
9	Determine what does the PCP ask to do? A) Whether there exists a matching between two sets of strings that creates identical concatenations B) Whether a context-free grammar can generate a string of a particular length C) Whether a Turing Machine will halt on a specific input D) Whether a problem is solvable in polynomial time by a non-deterministic machine	1	3	5	3
10	If a problem is reduced to the Post Correspondence Problem (PCP), what does this imply? A) The problem is undecidable B) The problem belongs to NP-complete C) The problem is in P D) The problem can be verified in polynomial time	1	1	5	3

Part B
Answer any two questions

4M x 2Q = 8 Marks

11	Construct a Turing Machine to compute the function $f(x)=x+1$ for a unary input, where the input is represented by a string of 1s. Explain the machine's operation step-by-step, including how it reads the input, updates the tape, and writes the result.	4	3	4	2
12	Design a Turing Machine to recognize the language $L=\{0^n1^n n\geq 1\}$; i.e., strings that consist of an equal number of 0s followed by 1s.	4	4	4	2
13	Suppose that a tape contains pair of integers m, k in unary form separated by a single 'x'. Construct a TM to replace its input by the value of the function $f(m,k)=m+k$.	4	3	4	2

Part C

Answer any two questions

4M x 2Q = 8 Marks

14	Explain how the concept of the Halting Problem is used to separate the class of decidable problems from the class of undecidable problems	4	2	5	3
15	Explain the concept of polynomial-time reductions in the context of NP-complete problems	4	2	5	3
16	Illustrate Modified Post Correspondence Problem (MPCP)? How does it differ from the standard Post Correspondence Problem (PCP)?	4	3	5	3

Part D

Answer all questions

12M x 2Q = 24 Marks

17	(A) Design a Turing Machine that multiplies two unary numbers. Describe the transition functions, the logic of copying numbers, and how the machine avoids overwriting or misplacing parts of the input. (OR) (B) Design Turing Machine that accepts the language $L=\{ww^R w\in\{0,1\}\}$. Explain how the two tapes help in recognizing the language, and describe the key transitions and operations performed by the machine.	12	4	4	2
18	(A) Interpret how the undecidability of the Halting Problem can be used to prove that other problems are undecidable. Give an example of a problem that can be reduced to the Halting Problem and explain how this reduction works. (OR) (B) Evaluate Post Correspondence Problem (PCP)? Define the problem formally and explain its input, configuration, and decision requirements. Provide a solution for the following puzzle $A=(b,a,ca,abc)$ $B=(ca,ab,a,c)$	12	4	5	3

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Academic Year: 2024-25 (ODD)

Test : Internal Examination III
Course Code & Title: 21CSC302J & Computer Network
Year & Sem : 3rd Year & V Sem

Date & Session : 06.11.2024 & AN
Duration: 1 Hour 30 Minutes
Max. Marks: 50

Answer all questions

Part - A

(10 x 1 = 10 Marks)

Q. No	Question	Marks	BL	CO	PO
1	In the context of ALOHA, what is a "collision"? A) The loss of data due to noise B) The simultaneous transmission of two or more packets on the same channel C) The failure to establish a connection D) The corruption of transmitted data	1	1	4	1
2	In a local network, if multiple devices are trying to access the same wireless channel, what mechanism is used by the MAC layer to avoid collisions? A) Error detection and correction B) Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) C) Flow control D) Address Resolution Protocol (ARP)	1	3	4	1
3	How a checksum is typically calculated? A) By compressing the data into a fixed-length code B) By summing the binary values of the data segments C) By performing encryption on the data D) By rearranging the bits in the data	1	2	4	1
4	In the sliding window protocol, what does the window size represent? A) The number of bits in each packet B) The maximum number of packets that can be sent before receiving an acknowledgment C) The size of the data being transmitted D) The maximum transmission unit (MTU)	1	1	4	1
5	In the Stop-and-Wait protocol, the sender is considered efficient when: A) The round-trip time (RTT) is very high. B) The bandwidth-delay product is low. C) The round-trip time (RTT) is very low compared to the transmission time. D) The receiver is busy processing incoming frames	1	1	4	1
6	How does Telnet establish a connection between a client and a server? A) By establishing a secure channel using SSL/TLS B) By using a handshake protocol over TCP C) By directly sending UDP packets D) By broadcasting data to all devices in the network	1	2	5	1
7 is used to transfer files over the Internet. A) HTTP B) FTP C) UDP D) MAC	1	1	5	1
8	The maximum size of a UDP packet payload is A) 65,535 bytes B) 1,500 bytes C) 9,000 bytes D) 512 bytes	1	1	5	1
9 is the default port number for HTTP A) 21 B) 23 C) 80	1	2	5	1

D) 443

- 10 The "BCC" field in an email
A) Sends a copy of the email to multiple recipients without showing their addresses
B) Specifies the main recipient of the email
C) Indicates that the email is confidential
D) Allows users to add comments

1 1 5 1

Part B
Answer any two questions

4M x 2Q = 8 Marks

- 11 Given the following data word: 101101, and a generator polynomial: 1101, demonstrate the process of generating the CRC code for this data word.
12 Differentiate between Go-Back-N (GBN) and Selective Repeat (SR), two variants of the sliding window protocol.
13 Describe the operation of CSMA with Collision Detection (CSMA/CD), as used in Ethernet networks.

4 3 4 1

4 2 4 1

4 1 4 1

Part C

Answer any two questions

4M x 2Q = 8 Marks

- 14 Describe the purpose of two separate channels (command and data channels) in FTP for communication?
15 Discuss the roles of key components such as email clients, email servers, and mail transfer agents (MTAs).
16 Identify the fundamental differences between TCP and UDP in terms of their characteristics and functionality.

4 1 5 1

4 2 5 1

4 2 5 1

Part D
Answer all questions

12M x 2Q = 24 Marks

- 17 (A) Given a data word of 7 bits: 1011001, demonstrate step by step process to construct a Hamming code using even parity. Identify the positions of the parity bits, explain how each parity bit is calculated, and provide the final Hamming code.
(OR)
(B) Compare the efficiency of Pure ALOHA and Slotted ALOHA. Specifically, calculate the maximum throughput for both protocols and discuss the impact of time slot synchronization in Slotted ALOHA. Why does Slotted ALOHA achieve a higher throughput compared to Pure ALOHA?

12 3 4 1

12 2 4 1

- 18 (A) Describe the architecture of the World Wide Web (WWW) and the role of HTTP as its primary communication protocol. Also explain, the relationship between web clients (browsers), web servers, and the resources they exchange (HTML, CSS, JavaScript, images, etc.).

12 1 5 1

(OR)

- (B) Explain the purpose of the TCP three-way handshake in the context of connection establishment. Describe each of the three steps (SYN, SYN-ACK, and ACK), and explain how these steps ensure a reliable and synchronized communication channel between the client and server.

12 1 5 1

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Academic Year: 2024-25 (ODD)

Test : Internal Examination III
 Course Code & Title : 21MAB302T & Discrete Mathematics
 Year & Sem : 3rd Year (5th Semester)

Date & Session : 07.11.2024 & AN
 Duration: 1 Hour 30 Minutes
 Max. Marks: 50

Part - A

Answer all questions

Q. No	Question	(10 x 1 = 10 Marks)			
		Marks	BL	CO	PO
1	Let \mathbb{N} be the set of natural numbers and $a, b \in \mathbb{N}$. Then which of the following is not a binary operation on \mathbb{N}	1	1	4	1,2
	a. $a * b = a + b$ b. $a * b = a - b$ c. $a * b = a^2 + b^2$ d. $a * b = ab$				
2	Which of the following group is abelian but not cyclic	1	1	4	1,2
	a. $(\mathbb{Q}, +)$ b. $(\mathbb{Z}_{11}, +_{11})$ c. $(\mathbb{Z}, +)$ d. $(\mathbb{Z}_6, +_6)$				
3	Which of the following ring is also an integral domain	1	1	4	1,2
	a. $(\mathbb{Z}_4, +_4, \times_4)$ b. $(\mathbb{Z}_7, +_7, \times_7)$ c. $(\mathbb{Z}_6, +_6, \times_6)$ d. $(\mathbb{Z}_{12}, +_{12}, \times_{12})$				
4	Let $(G, *)$ be a group. Then which of the following is not true	1	1	4	1,2
	a. Identity element of G is unique b. If G is abelian group, then G is cyclic c. Inverse of each element of G is unique d. If G is cyclic group, then G is abelian				
5	If the Hamming distance of a code is 6, then it can correct atmost	1	2	4	1,2
	a. 5 errors b. 3 errors c. 2 errors d. 6 errors				
6	A graph that has neither self-loops nor parallel edges is called as	1	1	5	1,2
	a. Simple Graph b. Multi Graph c. Pseudo Graph d. Null Graph				
7	Let $G = (V, E)$ be a complete graph and $ V = 4$. Then $ E $ is	1	2	5	1,2
	a. 6 b. 12 c. 90 d. 10				
8	The number of vertices of ODD degree in an undirected graph is	1	1	5	1,2
	a. Even b. Odd c. One d. Zero				
9	What will be the chromatic number of bipartite graph having n vertices	1	1	5	1,2
	a. n b. 2 c. 4 d. $n!$				
10	If a graph is a tree, then it may have	1	1	5	1,2
	a. circuits b. parallel edges c. n edges d. $n - 1$ edges				

Part B

Answer any two questions

4M x 2Q = 8 Marks

- 11 If \mathbb{R} is the set of real numbers and $*$ is the operation defined by $a * b = a + b + 3ab$, where $a, b \in \mathbb{R}$, show that $(\mathbb{R}, *)$ is a commutative monoid. Which elements have inverses and what are those inverses?

4 2 4 1,2

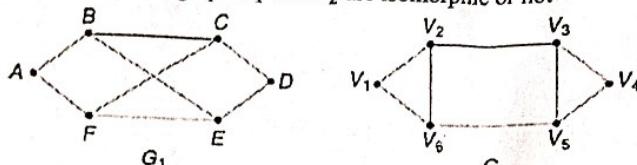
- 12 If $\sigma = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 2 & 4 & 1 \end{pmatrix}$, $\delta = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 1 \end{pmatrix} \in S_4$, Then find order and inverse of $\sigma \circ \delta$ and $\delta \circ \sigma$. 4 3 4 1,2
- 13 Prove that the code words generated by the parity check matrix $H = \begin{bmatrix} 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 \end{bmatrix}$ with respect to the encoding function $e: B^2 \rightarrow B^5$ form a group code. 4 3 4 1,2

Part C

Answer any two questions

4M x 2Q = 8 Marks

- 14 Verify whether the graph G_1 and G_2 are isomorphic or not 4 3 5 1,2



- 15 Prove that the number of edges in a bipartite graph with k vertices is atmost $\left(\frac{k^2}{4}\right)$. 4 3 5 1,2

- 16 State and prove the Handshaking theorem. 4 2 5 1,2

Part D

Answer all questions

12M x 2Q = 24 Marks

- 17 (A) (i) Let $f: (G, *) \rightarrow (G', \Delta)$ be a group homomorphism and H be a subgroup of G . Then prove that if $f(H) = \{f(h)|h \in H\}$ is a subgroup of G' .
(ii) Show that $(\mathbb{Z}_5, +_5, \times_5)$ is a field.

(OR)

- (B) Let $e: B^3 \rightarrow B^6$ be an encoding function corresponding generator matrix

$$G = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 & 0 & 1 \end{bmatrix}.$$

Find the code generated by G and hence find its minimum distance. Find parity check matrix and by using it decode the following received words and find original message.

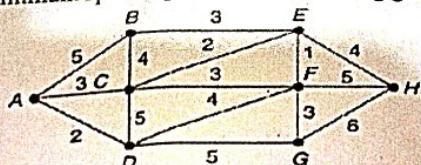
(i) 000110 (ii) 110001 (iii) 101001 (iv) 011111

- (A) (i) Give an example of a graph which contains (a) an Eulerian circuit that is also a Hamiltonian circuit (b) an Eulerian circuit, but not a Hamiltonian circuit (c) a Hamiltonian circuit, but not an Eulerian circuit.

(ii) Prove that in a simple disconnected graph G with 6 vertices and 2 components, the maximum number of edges is at most 10.

(OR)

- (B) Write the steps involved in Kruskal's Algorithm and by using it find minimum spanning tree of the following graph 12 4 5 1,2



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Academic Year: 2024-25 (ODD)

Test

: Internal Examination III

Course Code & Title: 21ECO103T, Modern Wireless

Communication System

Date & Session: 08/11/24; AN

Duration: 1 Hour 30 Minutes

Year & Semester

: III Year / V Semester

Max. Marks: 50

Part - A

Answer all questions

Q. No

Question

(10 x 1 = 10 Marks)

		Marks	BL	CO	PO
1	Which of the following is not a characteristic of 3G network? a) Communication over VoIP b) Unparalleled network capacity c) Multi-megabit Internet access d) LTE based network	1	1	4	1,4
2	What is the term used by ITU for a set of global standards of 3G systems? a) IMT 2000 b) GSM c) CDMA d) EDGE	1	1	4	1,4
3	Which of the following leads to evolution of 3G networks in CDMA systems? a) IS-95 b) IS-95B c) CDMA One d) CDMA2000	1	2	4	1,4
4	What does the number 2000 in IMT-2000 signifies? a) Year b) Number of subscribers per cell c) Number of cells d) Area (Km)	1	2	4	1,4
5	What is the meaning of WCDMA? a) Wideband Code Distribution Multiple Access b) Wideband Code Division Multiple Access c) Wideband Code Diffusion Multiple Access d) Wide Code Distribution Multiple Access	1	3	4	1,4
6	In which frequency range do the cordless phones mostly work? a) 43-50 MHz b) 88-108 MHz c) 540-1600 KHz d) 200-540 KHz	1	2	5	1,4
7	In a piconet, one master device _____ a) cannot be slave b) can be slave in another piconet c) can be slave in the same piconet d) can be master in another piconet	1	2	5	1,4
8	Which connection used in Bluetooth supports. a) point-to-point connections b) point-to-multipoint connection c) both point-to-point connections and point-to-multipoint connection d) multipoint to point connection	1	3	5	1,4
9	Technique used in wireless LAN is?. a) TDM b) OFDM c) SDM d) CDM (Channel Div. Mux)	1	2	5	1,4
10	The communication distance of IrDA is ----- meter/s a) 1 b) 100 c) 1000 d) 500	1	3	5	1,4

Part B
Answer any two questions **(4M x 2Q = 8 Marks)**

- | | | |
|----|--|--------------------------|
| 11 | Briefly write about the services available in IMT-2000 networks. | 4 2 4 1,4 |
| 12 | Write a short note on basic concepts of CDMA2000. | 4 3 4 1,4 |
| 13 | What is WiMAX? Discuss the physical layer features of WiMAX. | 4 2 4 1,4 |

Part C
Answer any two questions **(4M x 2Q = 8 Marks)**

- | | | |
|----|--|--------------------------|
| 14 | Mention some of the wireless LAN protocol layers. Discuss its physical layer in detail. | 4 2 5 1,4 |
| 15 | Discuss the impact of 'Unlicensed Spectrum' on rural broadband and mass media. | 4 2 5 1,4 |
| 16 | Briefly discuss the typical applications of short-range wireless communication technology. | 4 3 5 1,4 |

Part D
Answer all questions **12M x 2Q = 24 Marks**

- | | | |
|----|---|---------------------------|
| 17 | (A) Along with a diagram, describe the main features of a MIMO system. Explain the concept of spatial diversity. | 12 2 4 1,4 |
| | (OR) | |
| | (B) Describe the visions that were with the IMT 2000. Discuss how they get evolved. | 12 2 4 1,4 |
| 18 | (A) Explain how mobile apps helps in businesses, carriers and employment. Compare between previous and current trends in mobile applications. | 12 2 5 1,4 |
| | (OR) | |
| | (B) Explain Bluetooth technology and also write its security aspects, applications, advantages and disadvantages. | 12 3 5 1,4 |

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Academic Year: 2024-25 (ODD)

Test:

Course Code & Title: Internal Examination III
 Year & Sem: MACHINE LARNING 21CSC305P
 III & V

Date & Session :09/11/2024 AN
 Duration: 1 Hour 30 Minutes
 Max. Marks: 50

Answer all questions

Part - A

(10 x 1 = 10 Marks)

Q. No	Question	Marks	BL	CO	PO
1	Which type of HMM model is specified by the joint distribution of observations and hidden states? a) Discriminative Model b) Generative Model c) Heuristic Model d) Testing Model	1	1	4	2
2	The three main fundamental problems of HMM are: a) Likelihood, Decoding, Learning b) Posterior, Decoding, Learning c) Likelihood, Classification, Learning d) Likelihood, Decoding, Adapting	1	1	4	2
3	A dynamic programming algorithm for obtaining the maximum a posteriori (MAP) probability to estimate of the most likely sequence of hidden states: a) Scaling Factor b) Linear Dynamical Systems c) Viterbi Algorithm d) MLE	1	2	4	2
4	The probability in HMM model provides the relationship between hidden state and the observations, provided by the input data is defined by: a) Transitional Probabilities b) Emission Probabilities c) Initial Probabilities d) Hidden Probabilities	1	1	4	2
5	When latent variables are Gaussian; which model leads to state space model? a) LDS b) HMM c) MM d) CART	1	2	4	4
6	The acronym ‘BAGGING’ in context of Machine Learning is: a) Boosted Aggregated Generative Gradient Techniques b) Bootstrap Aggregating c) Bagged Algorithm Grouping d) Binary Aggregated Generalized Gradient	1	1	5	2
7	Which algorithm that can handle both categorical and numerical features in decision trees? a) CART b) ID3 c) C4.5 d) Random Forest	1	1	5	2

8	Ensemble learning algorithms are useful when: a) The dataset is small and low-dimensional b) The dataset is large and high-dimensional c) The dataset is perfectly balanced d) The dataset contains only categorical variables	1 1 5 2
9	An alternative approach is used to dispense with kernels altogether, and try to learn useful features directly from the input data is usually adapted by which approach? a) Adaptive Basis Function Approach b) CART approach c) Random Forest Approach d) Bayesian Model Approach	1 2 5 2
10	The linear response variable depends linearly on unknown smooth functions of some predictor variables is defined by which generalized linear model? a) Bayesian Model Averaging b) Adaptive Basis Function c) Generalized Additive Model d) General Boosting Model	1 2 5 4

Part B
Answer any two questions

11	Determine how the complexity of sequential data be limited by Markov Model as the number of observations increases?	4 2 4 4
12	Outline the procedure of Forward algorithm to improve the efficiency of probability calculations.	4 2 4 2
13	Interpret the concept of message passing in Sum-Product Algorithm.	4 4 4 2

Part C

Answer any two questions

4M x 2Q=8 Marks

14	Relate the concept of Bayesian Model Averaging of uncertainty.	4 2 5 2
15	Show how the Adaptive basis function model can adjust their parameters in response to new data.	4 2 5 2
16	Construct the process of Generalized Additive Model to analyze the complex relationships within data.	4 3 5 4

Part D
Answer all questions

12M x 2Q= 24 Marks

17	(A) Illustrate the key components of Viterbi algorithm. Given a set of training data, outline the steps to apply the Viterbi algorithm for determining the most likely sequence of states. (OR) (B) Summarize how Emission and Transition probabilities would be applied to calculate the probabilities of the observed sequence in Hidden Markov Model with suitable example.	12 2 4 2
18	(A) Provide the steps for splitting nodes in the CART algorithm for both classification and regression task. Give the importance of Pruning to prevent the overfitting. (OR) (B) Categorize the different type of Ensemble Learning techniques to improve the performance of a model.	12 4 5 2

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Academic Year: 2024-25 (ODD)

Test: Internal Examination III
Course Code & Title: 21CSE361T & Database Security and Privacy
Year & Sem: 3rd & 5th

Date & Session : 11.11.2024 & FN
Duration: 1 Hour 30 Minutes
Max. Marks: 50

Part - A

Answer all questions

(10 x 1 = 10 Marks)

Q. No	Question	Marks	BL	CO	PO
1	Fine-grained auditing is particularly useful for: A. Tracking system performance B. Monitoring specific user actions C. Automating data backups D. Enforcing data types	1	L1	4	2
2	DLL triggers in Oracle are mainly used for: A. Enforcing user access rights B. Automating report generation C. Auditing specific database actions D. Improving data retrieval speeds	1	L1	4	2
3	Key benefit of using Unified Auditing in Oracle is to: A. Increased database storage B. Simplified audit trail management C. Enhanced data redundancy D. Improved transaction speed	1	L2	4	1
4	SQL Server 2022 auditing includes: A. Only DML operations B. Only read operations C. A wide range of database events D. Only login attempts	1	L2	4	1
5	Audit policies in Oracle can be defined to monitor: A. Only data modifications B. User login attempts and actions C. Hardware performance metrics D. Network traffic	1	L1	4	2
6	Randomization methods in privacy-preserving data mining primarily aim to: A. Increase data variability B. Obfuscate original data values C. Enhance data mining speed D. Simplify data representation	1	L1	5	2
7	Group-based anonymization techniques often focus on: A. Individual data records B. Clustering similar data points C. Protecting data through aggregation D. Eliminating noise from data	1	L2	5	1
8	Curse of dimensionality refers to: A. Difficulty in managing large datasets B. Increased data redundancy	1	L2	5	1

- C. Challenges in analyzing high-dimensional data
 D. Simplification of data models

9	An algorithm that ensures the privacy of application results is: A. K-anonymity B. Apriori C. Decision trees D. Support vector machines	1	L1	5	2
10	A major challenge in privacy-preserving data mining is: A. Data visualization B. Balancing privacy with data utility C. Reducing data redundancy D. Enhancing computational speed	1	L2	5	1

Part B
Answer any two questions

11	Describe how Unified Auditing differs from traditional auditing methods in Oracle.	4M x 2Q=8 Marks			
12	Explain the role of fine-grained auditing in database security.	4	L2	4	2
13	List the main differences between auditing in SQL Server 2022 and Oracle 21c.	4	L3	4	2

Part C

Answer any two questions

14	Explain the concept of group-based anonymization. What are its advantages?	4M x 2Q=8 Marks			
15	List and briefly explain two applications of privacy-preserving data mining.	4	L2	5	1
16	Discuss how randomization methods contribute to privacy-preserving data mining.	4	L4	5	2

Part D
Answer all questions

17	(A) Evaluate the implications of auditing on database performance. How can organizations effectively balance the need for comprehensive auditing with the performance impacts? (OR) (B) Examine the challenges faced by database administrators in implementing auditing solutions. How can these challenges be mitigated?	12	L3	4	4
18	(A) Analyze the role of machine learning techniques in enhancing privacy preservation in data mining. How can these techniques be integrated with existing privacy-preserving methods? (OR) (B) Examine the implications of data anonymization techniques on data quality and mining results. How do these techniques affect the interpretability and usefulness of mined	12	L4	4	3
		12	L4	5	2
		12	L3	5	2