

(3 Hours)

[Total marks: 80]

- Note (1) Question No. 1 is compulsory.
 (2) Attempt any four out of remaining six questions.
 (3) Answer to sub-questions should be grouped together.

- Q1. (a) Write short notes on the following (Any Three) 12
 1. Data partitioned parallelism
 2. KDD Process
 3. Neural network
 4. Star Schema
 (b) Differentiate between (Any Two) 8
 1. Parallel & distributed databases
 2. Data warehouse Vs data mart
 3. OID Vs URL
 4. Supervised Vs Unsupervised learning
- Q2. (a) What is multidimensional data cube of hyper cube? How slice and dice technique fits into this model? 7
 (b) Explain architecture of distributed DBMS. 8
- Q3. (a) What is frequent itemsets? What is apriory property? Describe an algorithm for finding frequent itemsets. 7
 (b) Explain asynchronous replication process in detail. 8
- Q4. (a) List the characteristics of XML. Explain XML documents and databases. 7
 (b) Explain agglomerative algorithm of clustering in detail with an example. 8
- Q5. (a) What is data warehouse? Why is it needed? Explain ETL process in detail. 7
 (b) Describe collection hierarchies. How do they differ from inheritance? 8
- Q6. (a) What are 3 lock management schemes in DDBMS? Explain in detail with example. 7
 (b) What is classification technique? Explain decision tree in detail. 8
- Q7. (a) Compare MOLAP & ROLAP. 7
 (b) Explain Atomic types, structured types and reference types in ORDBMS. 8

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- a) Question No. 1 is compulsory
- b) Attempt **any four** from the remaining six questions
- c) Assumptions should be made whenever required and should be clearly stated
- d) Answers to sub questions should be answered together
- e) Illustrate answers with diagrams wherever necessary
- f) Use of Calculators is permitted

- Q1 A What is a spread spectrum ? Explain and differentiate the various types of spreading the spectrum 10
- B Explain the various methods used in MAC layer in IEEE 802.11 to govern access to communications channel 10
- Q2 A Define free space loss. Suppose a transmitter produces 100W of power. 8
- (i) Express the transmit power in dBW.
- (ii) If the transmitter's power is applied to unity gain antenna with a 1200 MHz carrier frequency, what is the received power at a free space distance of 100m?
- B Explain the GSM architecture 7
- Q3 A What are error correction codes used in wireless communication? Explain convolution codes with a suitable example. 8
- B What is international roaming? How does the GSM handle to reduce the trombning effect? 7
- Q4 A What are MANETS? Analyze the routing algorithms used in the MANETS? 8
- B Discuss the IEEE 802.15 standard 7
- Q5 A List the modifications made to the transport layer to adapt to the wireless communications 8
- B What is handover? Explain the GSM handover 7
- Q6 A Explain the IEEE 802.16 Standard. 8
- B Explain the various generations of cellular systems. 7
- Q7 A Write Short Notes on **any three** :- 15
- a) Frequency reuse
 - b) Multipath propagation
 - c) Antenna
 - d) WAP

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- N.B.:**
- 1) Question No.1 is **compulsory**.
 - 2) Attempt any **four** from the remaining **six** questions.
 - 3) Use of calculator is allowed.

1. (a) Differentiate between Biological Neural Network and Artificial Neural Network? (05)
- (b) Explain Mutation operator in GA? (05)
- (c) Differentiate between Hard Computing and Soft Computing? (05)
- (d) Explain the significance of weights in ANN? (05)
- 2 (a) Explain various operations on Fuzzy sets and Fuzzy Relations? (08)
- (b) We want to compare the strength of two types of concrete. Four concrete masonry units (CMUs) from each type of concrete are stressed until they fail. The lowest stress at failure of a CMU is denoted 1, and the highest stress at failure is denoted 4, so the CMUs are rank ordered by failure stress, that is, $X = \{1, 2, 3, 4\}$. Since "failure" of CMUs is fuzzy, the membership value for a specific CMU represents the judgment that the CMU really failed. The following fuzzy sets represent the failure estimates for the two different concrete types

$$\tilde{A} = \left\{ \frac{0.15}{1} + \frac{0.25}{2} + \frac{0.6}{3} + \frac{0.9}{4} \right\}.$$

$$\tilde{B} = \left\{ \frac{0.2}{1} + \frac{0.3}{2} + \frac{0.5}{3} + \frac{0.8}{4} \right\}.$$

Calculate the union, intersection, and the difference for the two concrete types.

- 3 (a) An engineer is testing the properties, strength and weight of steel. (08)
- Suppose he has two fuzzy sets \tilde{A} , defined on a universe of three discrete strengths, $\{s_1, s_2, s_3\}$, and \tilde{B} , defined on a universe of three discrete weights, $\{w_1, w_2, w_3\}$. Suppose \tilde{A} and \tilde{B} represent a "high-strength steel" and a "near-optimum weight," respectively, as shown,

$$\tilde{A} = \left\{ \frac{1}{s_1} + \frac{0.5}{s_2} + \frac{0.2}{s_3} \right\}.$$

$$\tilde{B} = \left\{ \frac{1}{w_1} + \frac{0.5}{w_2} + \frac{0.3}{w_3} \right\}.$$

(i) Find the fuzzy relation for the Cartesian product of A and B, that is, find $R=A \times B$. Here, the Cartesian product would represent the strength-to-weight characteristics of a near maximum steel quality.

(ii) Suppose we introduce another fuzzy set, C, which represents a set of "moderately good" steel strengths, say, for example, the following:

$$C = \left\{ \frac{0.1}{s_1} + \frac{0.6}{s_2} + \frac{1}{s_3} \right\}.$$

Find the relation between C and B using a Cartesian product, that is, find $S = C \times B$

- (b) Explain architecture of Adaline and Madaline Networks with the help of diagram? (07)
4. (a) How General Genetic algorithm is different from traditional algorithm? Explain General genetic algorithm with the help of flowchart. (08)
- (b) Define Fuzzy Decision making. List different fuzzy decision making techniques and Explain any 2 fuzzy decision making techniques with the help of an example. (07)
5. (a) What do you understand by Defuzzification? List various defuzzification techniques and explain any two of them. (08)
- (b) Explain working of Mamdani FIS with the help of a diagram? (07)
6. (a) Using the inference approach find the membership values for triangular shapes I, R, E, IR and T for a triangle with angles 85° , 50° , and 45° (08)
- (b) Explain Perceptron Learning network with the help of labeled diagram (07)
7. Attempt any three :- (15)
- (a) Associative Memory Network
- (b) Consider the following matrix

$$R = \begin{bmatrix} 1 & 0.8 & 0 & 0.1 & 0.2 \\ 0.8 & 1 & 0.4 & 0 & 0.9 \\ 0 & 0.4 & 1 & 0 & 0 \\ 0.1 & 0 & 0 & 1 & 0.5 \\ 0.2 & 0.9 & 0 & 0.5 & 1 \end{bmatrix}.$$

Perform the λ -cut operations for the values $\lambda = 0.4$ and $\lambda = 0.2$

(c) Activation Functions in ANN

(d) Special Network

(e) Travelling salesman problem with example

V(CBSGS)

(3 hours)

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Note:

1. Q1 is compulsory
2. Attempt any *four* from remaining six questions
3. Figures to right indicate full marks

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| 1 | a. What are threads? How are they different from process? Explain various thread models. | 10 |
| | b. What is Clock Synchronization? Explain with a diagram, How logical clocks are implemented with counters and physical clock. | 10 |
| 2 | a. What is the difference between the Load balancing and Load sharing approaches for process scheduling in Distributed System. | 8 |
| | b. What is cloud computing? Discuss the different characteristics of Cloud Computing. | 7 |
| 3 | a. What are the issues in designing Distributed systems? | 8 |
| | b. Discuss IPC in MACH. | 7 |
| 4 | a. Compare RPC and RMI implementation, Explain implementation of RPC mechanism with the help of a diagram. | 8 |
| | b. How Data Security is maintained in the cloud. | 7 |
| 5 | a. Explain Client server binding with special focus on server location, simultaneous binding and exception handling for RPC. | 8 |
| | b. What is Critical Section? How will you implement Mutual Exclusion Algorithm? | 7 |
| 6 | a. Differentiate between Message Passing and Shared Memory. | 8 |
| | b. Explain in detail absolute and consistent message ordering techniques. | 7 |
| 7 | Write a short note on any three of the following | 15 |
| | i. Map reduce | |
| | ii. Fault Tolerance | |
| | iii. Happened Before relationship | |
| | iv. Service Oriented Architecture | |
| | v. Grid Computing | |

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- N.B. : 1) Question No.1 is **compulsory**.
2) Attempt any **Four** from the remaining **Six** questions.
3) Figures to the right indicate full marks

1. (a) Write Short Note (**Any Four**) (15)
 - 1 Attack vector
 - 2 Cyber squatting
 - 3 Buffer Over Flow
 - 4 Cyber law
 - 5 The Children's Internet Protection Act
2. (a) What is SQL injection and what are the different countermeasures to prevent the attack (8)
(b) What is Proxy Servers and Anonymizers explain in detail. (7)
3. (a) What is IT Act, 2000? List down the issues & salient features of Indian IT act. (8)
(b) What is Intellectual Property in the Cyberspace of Cyber security? (7)
4. (a) Write Short note on Children's Online Privacy Protection Act (COPPA). (8)
(b) Explain Internet Filtering Encryption issues in detail? (7)
5. (a) Explain Credit Card Frauds in Mobile and Wireless Computing? (8)
(b) Explain A global Perspective of cybercrimes in detail? (7)
6. (a) Explain Cost of Cyber Crimes and IPR Issues with suitable diagram. (8)
(b) Explain Botnet Attack in detail? (7)
7. (a) What are different ways of password cracking? (8)
(b) How are Cybercrimes classified? Explain with examples. (7)

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- N.B:** (1) Question No.1 is compulsory.
(2) Answer any **four** from remaining **six** questions.

1. (a) Define multimedia. Discuss the components and the applications of multimedia. 10
(b) Suppose eight characters have a distribution A:(1), B:(1), C:(1), D:(2), E:(3), F:(5), G:(5), H:(10). Draw a Huffman tree for this distribution. Calculate the total number of bits required to transfer these alphabets. 10
2. (a) Explain types of graphics. Differentiate between vector image and bitmap image. 8
(b) Discuss the differences among multimedia, interactive multimedia, hypertext, and hypermedia. 7
3. (a) Explain in details various types of animation. 8
(b) What are the important steps and considerations in recording and editing digital audio? 7
4. (a) List and describe the three different types of authoring systems and discuss the advantages of each one. 8
(b) Discuss several considerations in shooting and editing video for multimedia. 7
5. (a) Describe the four primary stages in a multimedia project. 8
(b) Explain the process and elements of a multimedia project proposal. 7
6. (a) Discuss different types of multimedia structures and how they might be organized. 8
(b) What is Compression? Explain JPEG compression technique in details. 7
7. Write short notes on following topics (Any Three) 15
 - (a) Principles of Animation
 - (b) Working of CD-ROM
 - (c) CBT
 - (d) Hot Spots, Hyperlinks and buttons
