

Course Code: 20MCA102

Course Name: ADVANCED DATABASE MANAGEMENT SYSTEMS

Max. Marks: 60

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

1. Explain the concepts of physical data independence and logical data independence with a typical real-world example for each. (3)
2. Explain any three mapping constraints used in the ER Model using appropriate examples. (3)
3. Consider the relation R(A, B, C, D, E, F) with the FDs {AB→C, BC→AD, D→E, CF→B}. Compute {A, B}⁺. (3)
4. Differentiate between BCNF and 3NF with an example. (3)
5. Define deadlock and discuss any two strategies for managing deadlocks. (3)
6. What is a transaction log? Why is it used for? (3)
7. Explain Open Hashing and Closed Hashing. (3)
8. Differentiate between Dense index and Sparse index with example. (3)
9. Define Fragmentation. Consider a College database that keeps records of all registered students in a Student table with the schema. Student (RegNo, Name, Course, Address, Semester, Fees, Marks). Create a fragment for the accounts section of the college to store the fees details of the registered students. (3)
10. Explain the use of gossip protocol in Cassandra. (3)

PART B

Answer any one question from each module. Each question carries 6 marks.

Module 1

1. Write briefly on any six advantages of database approach over conventional file-based approach. (6)

OR

2. Draw an E-R diagram of a library database with entities Book, Publisher, Staff, and Readers. Assign significant relationships between the entities. Use meaningful names for entities and relationships. Also, there should be an ISA relationship in the diagram. (6)

Publisher
id
name

Book

id
name
isbn
author
price
publisher
pub name

Readers

id
name
book borrowed
date

Module II

- 13 (a) Explain the inference rules (Armstrong's Axioms) for Functional dependency. (3)
 (b) Explain functional dependency and various types of FDs. (3)

OR

- 14 Explain the Minimal Cover algorithm. Given a relation $M(P, Q, R, S, T, U)$ with FDs, $E = \{P \rightarrow R, PQ \rightarrow R, R \rightarrow SU, RS \rightarrow U, TR \rightarrow PQ\}$. Compute the minimal cover of E . (2)
 (4)

Module III

- 15 Explain the transaction recovery process. Differentiate the deferred-write and write-through transaction recovery procedures. (6)

OR

- 16 Briefly discuss on the two-phase locking protocol used in concurrency control. How does it ensure concurrency? (6)

Module IV

- 17 Explain the various RAID levels with appropriate diagrams (6)

OR

- 18 Describe the steps of query processing and evaluate the query processing cost of primary index with equality on key and non-key attribute. (6)

Module V

- 19 Discuss about the process of sharding and replication in MongoDB (6)

OR

- 20 (a) Analyse the concept of object-oriented databases and distributed databases. (3)
 (b) What is type inheritance and table inheritance? (3)

MC-MCA-2-
RHEV

Course Code: 20MCA104

Course Name: ADVANCED COMPUTER NETWORKS

Max. Marks: 60

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

- 1 Explain protocol layering and its advantages. (3)
- 2 Describe the working of file transfer protocol with suitable figures. (3)
- 3 Compare TCP and UDP at the transport layer. (3)
- 4 Explain multiplexing and de-multiplexing with diagrams. (3)
- 5 Draw the format of the IPv6 packet header, highlighting the significance of each field. (3)
- 6 Differentiate between routing and forwarding. (3)
- 7 Explain token passing and polling-based multiple access protocol with examples. (3)
- 8 What is the use of the checksum method? A sender has two data items to send: 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 and 1 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1. Compute checksum for the data. (3)
- 9 Explain the piconet and scatternet architecture of Bluetooth. (3)
- 10 What is the use of VPN and the techniques to guarantee privacy for organizations using VPN? (3)

PART B

Answer any one question from each module. Each question carries 6 marks.

Module I

- 11 Explain the techniques and mechanisms that guarantee the quality of service of the network to deliver predictable service to an application program. (6)

OR

- 12 Explain the layered architecture of the TCP/IP reference model. (6)

Module II

- 13 How the flow and error control service is provided by the transport layer using Go-Back-N and Selective-Repeat protocols. Depict the working using timing diagrams. (6)

OR

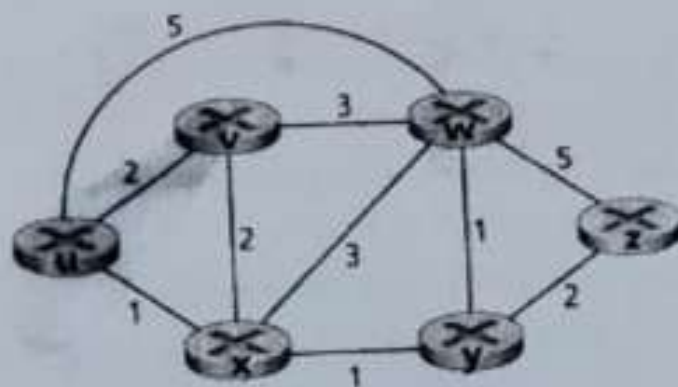
- 14 Explain TCP segment structure with the frame format. (6)

Module III

- 15 How routing is performed in the internet using interdomain routing protocol BGP (6)

OR

- 16 Explain the working of link state routing. Use Dijkstra's algorithm and show the tabular summary of the algorithm's computation to find the shortest path for node U in the above graph. (6)



U → X, Y : 2
 V → 3
 W, Y, Z : 3

Module IV

- 17 Explain CRC. Generate codeword at sender and perform checking of codeword at receiver. Assuming no error for the dataword 1100 and divisor 1101 using CRC. (6)

OR

- 18 Elucidate the techniques character-oriented framing and bit-oriented framing in data link control (DLC) to organize the bits that are carried by the physical layer. (6)

Module V

- 19 With neat diagram explain the architecture of IEEE 802.11 Wireless LAN. (6)

OR

- 20 a) Elaborate the working of traffic analysis tools. (3)
 b) Explain any 3 tools/ commands for troubleshooting used by network administrators. (3)

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Second Semester MCA (2 Year) Degree Regular and Supplementary Examination June 2023

Course Code: 20MCA188

Course Name: ARTIFICIAL INTELLIGENCE

Max. Marks: 60

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

- 1 ✓ What is Knowledge? How is it classified? (3)
- 2 ✓ What is meant by state space representation of a problem? Explain. (3)
- 3 ✓ What are admissible Heuristics? Give examples. (3)
- 4 - What is Steepest ascend hill climbing? How does it differ from Hill climbing? (3)
- Explain with appropriate examples.
- 5 ✓ What is the drawback of Minimax algorithm? Discuss. (3)
- 6 Consider the following facts and represent in FOPL: (3)
- a) Bill has at least one sister.
- b) All purple mushrooms are poisonous.
- c) Every gardener likes the Sun.
- 7 ✓ What is the advantage of Frame based knowledge representation scheme over (3)
- FOPL? Explain with an example.
- 8 ✓ Compare Supervised, Unsupervised and Reinforcement learning techniques. (3)
- 9 ✓ What is MYCIN? Explain. (3)
- 10 ✓ What is the difference between Fuzzy Logic and Binary logic? Give examples. (3)

PART B

Answer any one question from each module. Each question carries 6 marks.

Module 1

- 11 What is a Production System in AI? Explain various types of Production (6)
- Systems with appropriate examples.

OR

- 12 Explain various task domains of AI. (6)

Module II

- 13 Compare Best first search and Breath first Search algorithms. (6)

OR

- 14 Illustrate Iterative Deepening search with an example. (6)

Module III

- 15 Discuss Alpha-Beta cut-off algorithm with the help of an example. (6)

OR

- 16 Express the following concepts as a semantic network structure with interconnected nodes and labeled arcs: (6)

IGNOU is an open university. It is located in Delhi. IGNOU has a Vice chancellor and has regional centers. IGNOU has a school of studies which offers Academic Programmes such as MCA and BCA. MCA has Syllabus and CS-51 is a MCA syllabus. School of studies has a Director.

Module IV

- 17 Consider the following facts and represent it in FOPL: (6)

Ram is a good student. All good students have high grades. All good students with high grades are bright. Show that Ram is bright using Resolution.

OR

- 18 What is Goal Stack planning? Solve the following Blocks World problem using goal stack planning algorithm. (6)

**Module V**

- 19 What is the importance of an Expert System? Mention its characteristic features. (6)
Explain Architecture of an expert system.

OR

- 20 With appropriate examples, perform any three operations on Fuzzy sets? (6)

Good student (✓)
has →

MC-MCA-2- Dr 81

Course Code: 20MCA164

Course Name: ORGANIZATIONAL BEHAVIOUR

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

- 1 Define organizational behaviour. What are the benefits and problems of organizational behaviour? (3)
- 2 What is workforce diversity? How to manage diversity? (3)
- 3 Discuss any three personal factors of behaviour. (3)
- 4 What is perception? Why does it fail? (3)
- 5 What are values? How do they differ from attitudes? (3)
- 6 What is ERG theory? Discuss its merits and limitations. (3)
- 7 What is a group? How is it different from a team? Explain. (3)
- 8 Write short notes on charismatic leadership. (3)
- 9 Explain any three creativity inducing factors. (3)
- 10 What is matrix structure? What are its advantages? (3)

PART B

Answer any one question from each module. Each question carries 6 marks.

Module I

- 11 Explain the following: (6)
- Scientific Management
 - Hawthorne Studies

OR

- 12 Compare and contrast career management and talent management. (6)

Module II

- 13 State and explain the intelligent measurement tests. (6)

OR

- 14 Explain any three principles of learning techniques in detail. (6)

Module III

- ✓ 15 Compare and contrast Maslow's need hierarchy with Herzberg's two-factor theory of motivation. (6)

OR

- 16 What is the relationship between stress and personality? What aspects of personality might tend to increase or decrease stress? (6)

Module IV

- ✓ 17 How intergroup conflicts are resolved? Explain. (6)

OR

- 18 Explain the behavioural theory of leadership in detail. (6)

Module V

- 19 Explain how culture is created in organizations. (6)

OR

- ✓ 20 What is innovation? Explain the process of innovation. (6)
