MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION, JANUARY - 2022

SECOND SEMESTER

PAPER MCA 202 : DATA STRUCTURES USING JAVA

(Under C.B.C.S. New Regulations w.e.f. 2020-2021 and 2016-2017)

(Common paper to University and all Affiliated Colleges)

Time : 3 Hours **Max. Marks : 70**

PART - A

(Compulsory)

Answer any **FIVE** of the following questions. Each question carries **4** marks. **(5×4=20)**

1. a) Explain Big Oh Notation. With example.

b) What is STACK? Write and explain algorithm for PUSH & POP.

c) Discuss threaded binary trees.

d) Explain Union and Find operations.

e) What is AVL tree? Explain.

f) Explain Binary Heap with example.

g) Write an algorithm to implement insertion sort with suitable example.

h) Apply selection sort on the following elements : {21, 11, 5, 78, 49, 54, 72, 88}

i) Give a brief notes on hash tables.

j) Write short note on Hash Index.

PART-B

Answer **FIVE** questions, choosing **ONE** question from each Unit Each question carries **10** marks **(5×10=50)**

UNIT-I

2. Write algorithm for insert and delete a node from doubly linked list.

(OR)

3. a) List the applications of stack ? Explain recursion for finding a factorial of a number brief.

   b) Explain how Queues can be implemented using linked list.

UNIT-II

4. Explain the tree traversal techniques with an example.

(OR)

5. Discuss about Minimum cost spanning tree using Kruskal's Algorithm and Dijkstra's algorithm for single source shortest path problem.

UNIT-III

6. Explain the Splay tree insertion and deletion with suitable example.

(OR)

7. Discuss Red-Black Trees insertion and deletion with examples.

UNIT-IV

8. Write a Routine for sorting elements using quick sort method. Explain the working the routing with an example.

(OR)

9. Describe the procedure of K-Way merge sort with example.

UNIT-V

10. What do you mean by Searching? Explain linear search and Binary search with help of example.

(OR)

11. Explain B+-Tree and Prefix B+- Trees. With differences.

[Total No. of Pages : 3

12-00-2-04R

MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION, JANUARY - 2022

SECOND SEMESTER

Seat no : 80022

PAPER MCA 204: ADVANCED DATABASE MANAGEMENT SYSTEMS

(Under C.B.C.S. New Regulations w.e.f. 2020-2021 and 2016-2017)

(Common paper to University and all Affiliated Colleges)

Time : 3 Hours **Max. Marks : 70**

PART - A

(Compulsory)

Answer any **Five** of the following questions. Each question carries **4** marks. **(5×4=20)**

1. a) What is the purpose of Database Systems?

b) Define Data Model. List the categories of data models.

c) What is the use of SQL DDL?

d) Define Embedded SQL.

e) Define structured types. Give an example.

f) List few applications of XML.

g) Briefly discuss the steps involved in query processing.

h) Write about Hybrid Merge Join.

i) List the properties of the transactions.

j) Write about deadlock detection and recovery.

PART - B

Answer **Five** questions, choosing **One** question from each Unit. Each question carries **10** marks. **(5×10=50)**

UNIT - I

2. a) What do you mean by database design? Illustrate how a database for a university college could be designed.

   b) Discuss the design issues in Entity Relationship database schema.

(OR)

3. a) Explain with examples the structure of relational databases.

   b) How to represent weak entity sets? Discuss.

UNIT - II

4. a) Explain with suitable examples the queries on a single relation and multiple relation.

   b) Explain with examples the mechanism of nested subqueries.

(OR)

5. a) How many aggregate functions are supported in SQL? List them and specify the purpose.

   b) Define integrity constraint. Give examples.

UNIT - III

6. a) With examples explain object identity and reference types in SQL.

   b) Explain about XPath and XQuery language.

(OR)

7. a) What is the purpose of persistent programming languages? How it can be distinguished from languages with embedded SQL?

   b) Briefly discuss the commonly used API's for XML and specify the purpose of it.

UNIT - IV

8. a) Explain with an example External sort-merge algorithm.

   b) Give pictorial representation of equivalences.

(OR)

9. a) Explain with an example Nested loop join operation.

   b) Write about join size estimation.

UNIT - V

10. a) Explain about transaction atomicity and durability.

    b) What is multi-version schemes? Explain briefly Multiversion timestamp ordering and multiversion two phase locking.

(OR)

11. a) Briefly discuss about lock based protocols.

    b) How to handle deadlocks? Explain in detail.

MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION, JANUARY - 2022

SECOND SEMESTER

PAPER MCA 203 : DATA COMMUNICATION AND COMPUTER NETWORKS

(Under C.B.C.S. New Regulations w.e.f. 2020-2021 and 2016-2017)

(Common paper to University and all Affiliated Colleges)

Time : 3 Hours **Max. Marks : 70**

PART - A

(Compulsory)

Answer any **FIVE** of the following questions. Each question carries **4** marks.

(5×4=20)

1. a) List and define different network topologies.

b) Define Logical, Physical and port addresses.

c) What is Virtual LAN? What are its advantages?

d) Write a brief note on ATM.

e) Compare IPV4 and IPV6.

f) Define Unicast routing and Multicast routing.

g) Compare Flow control and Error control.

h) Define a Public key and Private key.

i) What is meant by Tunneling ? Explain.

j) What is FTP? Explain it in brief.

PART-B

Answer **FIVE** questions, choosing **ONE** question from each Unit Each question carries **10** marks **(5×10 = 50)**

UNIT-I

2. a) Describe the characteristics of layered architecture.

   b) Write a brief note on SONET.

(OR)

3. Describe about types of transmission media with their merits and demerits.

UNIT-II

4. What are the different types of error detection methods? Explain.

(OR)

5. What is high level data link control (HDLC)? Explain HDLC frame format in detail.

UNIT-III

6. Write a detailed note on services expected from the network layer.

(OR)

7. Describe in detail the operation of OSPF protocol by considering a suitable network.

UNIT-IV

8. a) Explain the features and applications of UDP.

   b) Elucidate congestion control in datagram subnets.

(OR)

9. a) Write a note on Web security.

   b) Explain any one of the Symmetric-key ciphers in brief.

UNIT-V

10. What is DNS? What is the purpose of it? Describe DNS in the internet.

(OR)

11. Explain about World wide Web Architecture in detail.

[Total No. of Pages : 4 12-00-2-05R

MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION, JANUARY - 2022

SECOND SEMESTER

PAPER MCA 205A : E-COMMERCE

(Under C.B.C.S. New Regulations w.e.f. 2020-21 and 2016-2017)

(Common Paper to University and all Affiliated Colleges)

Time : 3 Hours **Max. Marks : 70**

PART - A

(Compulsory)

Answer any **FIVE** of the following questions. Each Question carries **4** marks.**(5×4=20)**

1. a) Briefly discuss the framework of E-Commerce.

   b) What Network Infrastructure is required to implement E-Commerce? Discuss.

   c) Discuss the components of NSFNET.

   d) Discuss any one Mercantile model from Merchant's Perspective.

   e) List the types of Electronics Payment systems and give example for each.

   f) Identify and list the risks in Electronic Payment Systems.

   g) What do you mean by Intra Organization E-Commerce? Discuss.

h) What are the types of digital document library available? Specify the purpose.

i) Write Short notes on M-Commerce.

j) Discuss few transaction models.

PART - B

Answer **FIVE** questions, choosing **ONE** question from each Unit. Each question carries **10** marks. **(5×10=50)**

UNIT - I

2. a) Discuss the elements of E-Commerce Applications with a diagram.

   b) What are the demands and requirements of Market Participants? Discuss.

(OR)

3. a) Explain the components of the I-way with the help of a diagram.

   b) Briefly Discuss the two technologies used in global information distribution networks.

UNIT - II

4. a) Draw a diagram representing network hierarchy in a campus network interconnecting multiple local area networks to the internet.

   b) Discuss the architectural framework of electronic commerce.

(OR)

5. a) What is the use of Secure Messaging and Structured Document Interchange Services? Discuss.

   b) Briefly Discuss the different consumer oriented services.

UNIT - III

6. a) What is E-Cash? List the Properties of E-Cash.

   b) Differentiate Electronic Data interchange from Electronic Mail.

(OR)

7. a) What is financial EDI? Discuss the types of Financial EDI.

   b) Explain with a diagram the functioning of the four layers of EDI Software.

UNIT - IV

8. a) What is the difference between private and public electronic commerce? Discuss.

   b) Write short notes on SCM.

(OR)

9. a) What is Electronic Brokerage? Discuss the types of electronic brokerages in internal markets.

   b) Briefly discuss about the types of digital documents.

UNIT - V

10. a) What are the limitations of mobile commerce? Discuss.

b) Explain different transaction models.

(OR)

11. a) What are the payment methods supported in mobile commerce? Discuss.

b) What is Mobile App Marketing? Discuss.

MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION, JANUARY - 2022

SECOND SEMESTER

PAPER MCA 201 : COMPUTER ORIENTED OPERATIONS RESEARCH

(Under C.B.C.S. New Regulations w.e.f. 2020-21 and 2016-2017)

(Common Paper to University and all Affiliated Colleges)

Time : 3 Hours **Max. Marks : 70**

PART - A

(Compulsory)

Answer any **FIVE** of the following questions. Each Question carries **4** marks. **(5×4=20)**

1. a) What are the essential characteristics of a linear programming model?

b) What is unbound solution, and how does it occur in graphical method?

c) Differentiate between Optimal solution and feasible solution.

d) Discuss the variations in assignment problem.

e) Explain the shortest route problem with an example.

f) Write down the steps used in solving Network Model using Fulkerson's Rule.

g) Explain the basic elements of Game Theory.

h) Write the assumptions made in game theory.

i) Discuss the rules for Network Construction.

j) A car park contains 5 cars. The arrival of cars in Poisson at a mean rate of 10 per hour. The length of time each car spends in the car park is exponential distribution with mean of 5 hours. How many cars are in the park on the average?

PART - B

Answer **FIVE** questions, choosing **ONE** question from each Unit. Each question carries **10** marks. **(5×10=50)**

UNIT - I

2. Solve the following linear programming problem by simplex method

Maximize $Z = 5x_1 + 3x_2$

Subject to constraints $3x_1 + 5x_2 \le 15$,

$5x_1 + 2x_2 \le 10$ and $x_1, x_2 \ge 0$

(OR)

3. Solve the following by Graphical Method

a) Min $Z = 20x_1 + 10x_2$ Subject to the Constraints

$x_1 + 2x_2 \le 40, 3x_1 + x_2 \ge 30, 4x_1 + 3x_2 \ge 60$ and $x_1, x_2 \ge 0$.

b) Maximize $Z = 5x_1 - 4x_2 + 3x_3$

Subject to

$2x_1 + x_2 - 6x_3 = 20$

$6x_1 + 5x_2 + 10x_3 \le 76$

$8x_1 - 3x_2 + 6x_3 \le 50$

$x_1, x_2, x_3 \ge 0$

UNIT - II

4. a) Obtain an initial basic feasible solution to the following TP using VAM.

	D_1	D_2	D_3	D_4	Supply
O_1	11	13	17	14	250
O_2	16	18	14	10	300
O_3	21	24	13	10	400
Demand	200	225	275	250	950

b) Briefly Discuss about N-Jobs K Machines Problems.

(OR)

5. What is the unbalanced Assignment Problem? How is it solved by the Hungarian method?

UNIT - III

6. Calculate the earliest start, earliest finish, latest start and latest finish of each activity of the project given below and determine the critical path of the project.

Activity	1-2	1-3	1-5	2-3	2-4	3-4	3-5	3-6	4-6	5-6
Duration	8	7	12	4	10	3	5	10	7	4

(OR)

7. a) Discuss about Floyid's Algorithm with example.

b) What is Maximal Flow Problem? Explain.

UNIT - IV

8. What do you mean by two-person zero sum game? And explain about pure strategy and mixed strategy in game theory with example.

(OR)

9. Explain Arithmetic Model for $n \times n$ Games with example.

UNIT - V

10. Arrivals of a telephone booth are considered to be poisson with an average time of 10 min. between one arrival and the next. The length of a phone call is assumed to be distributed exponentially with mean 3 min.

a) What is the probability that a person arriving at the booth will have to wait?

b) The telephone department will install a second booth, when convinced that an arrival has to wait on the average for at least 3 min. for phone. By how much the flow of arrivals should increase in order to justify a second booth?

c) What is the average length of the queue that forms time to time?

d) What is the probability that it will take him more than 10 minutes altogether to wait for the phone and complete his call?

(OR)

11. a) In detail discuss various Queuing Models.

b) Demonstrate Critical Path analysis with Suitable example.
