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MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION,
SEPTEMBER - 2023
SECOND SEMESTER
MCA 205A - E- COMMERCE
(Under C.B.C.S. Revised Regulations w.e.f. 2020-2021)
(Common Paper to University and All Affiliated Colleges)

Time : 3 Hours

Max. Marks : 70

PART-A

- Answer any **FIVE** of the following questions. Each question carries **4** marks. ($5 \times 4 = 20$)
1. a) What is smart card? Discuss its benefits.
 - b) What is B2B commerce? What are the challenges?
 - c) Explain in brief about Mercantile models.
 - d) What is MIME used for? Explain.
 - e) Give the challenges in using Electronic Cash.
 - f) What is M-Commerce? Explain.
 - g) What is the role of E-Commerce in SCM?
 - h) What do you mean by E-Mail personalization. Explain.
 - i) Write in brief about Internet Governance.
 - j) What is PCI? Explain its use.

PART - B

Answer **FIVE** questions, choosing **ONE** question from each Unit. Each question carries **10** marks.

($5 \times 10 = 50$)

UNIT - I

2. i) Explain the anatomy of E-Commerce applications.
ii) Write about the network infrastructure required in an organization for using E-Commerce.
3. i) Write about the Global Information Distribution.
ii) Write about E-Commerce and Media Convergence.

(OR)

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UNIT - II

4. i) Give an overview of Internet applications.
ii) Explain about globalization of academic Internet.

(OR)

5. i) Discuss about WWW in the E-Commerce Architecture.
ii) Explain about Consumer oriented E-Commerce Models.

UNIT - III

6. i) What is EDI? Explain. How is EDI implemented? What are the challenges?
ii) Explain about VANs and their applications.

(OR)

7. i) Discuss about Digital token based e-payment systems.
ii) Discuss about various components related to Inter-Organisational Commerce.

UNIT - IV

8. i) Discuss about Intra-organization E-Commerce and customization.
ii) Explain about workflow automation and coordination.

(OR)

9. i) Write about Document library types and issues with them.
ii) Write about various Email based marketing strategies.

UNIT - V

10. i) Compare and contrast E-Commerce and M-Commerce.
ii) Discuss about various payment methods used in M-Commerce. Discuss the challenges.

(OR)

11. i) Write about Mobile app based marketing. Explain with examples.
ii) Write about various M-Commerce based transaction models.
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MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION,

SEPTEMBER - 2023

SECOND SEMESTER

MCA 203 - DATA COMMUNICATION AND COMPUTER NETWORKS

(Under C.B.C.S. Revised Regulations w.e.f. 2020-2021)

(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. $(5 \times 4 = 20)$

1. a) List the ordered layers of OSI model.
- b) Write the features of SONET.
- c) What is error detection and correction? Explain about error correction.
- d) Describe the differences between 3G and 4G.
- e) What do you mean unicast routing?
- f) Write the purpose of ICMP protocol.
- g) Explain briefly about process-to-process delivery.
- h) What is QoS? Explain about QoS in switched networks.
- i) What is Socket interface? What are its benefits.
- j) Give the essential features of SMTP.

PART - B

Answer **Five** questions, choosing **ONE** question from each Unit. Each question carries **10** marks.

$(5 \times 10 = 50)$

UNIT - I

2. With a neat diagram explain about the FDM, WDM and TDM.

(OR)

3. Compare and Contrast between Analog signals and Digital Signal and transmission mechanisms.

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UNIT - II

4. Explain about the Stop and wait, Go-back-n protocols.

(OR)

5. i) Discuss about Wireless LAN's in detail.
ii) Briefly explain about frame relay.

UNIT - III

6. Explain about IPv6 protocol with a neat sketch.

(OR)

7. Describe the BGP in detail.

UNIT - IV

8. Explain about the Kerberos protocol.

(OR)

9. Explain about the e-mail security.

UNIT - V

10. Explain about the Distribution of name space and DNS in the Internet.

(OR)

11. Explain about the FTP and HTTP.

MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION,

SEPTEMBER - 2023

SECOND SEMESTER

MCA 202 - DATA STRUCTURES USING JAVA

(Under C.B.C.S. Revised Regulations w.e.f. 2020-2021)

(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 Abstract Data Type? Explain.
- b) Write about the complexity of isempty, isfull, push and pop operations in Stack.
- c) Write algorithm for inorder traversal without recursion.
- d) What is the difference between a binary tree and a binary search tree?
- e) What is the maximum height of any AVL Tree with 7 nodes? Assume that the height of a single node is 0.
- f) What is a Red Black tree? Explain.
- g) Write any five features of B+ Trees.
- h) What is radix sort? Explain with an example.
- i) Write an algorithm for Binary search. What is the worst case complexity?
- j) Is a B-Tree self balancing tree? Justify your answer with an example.

PART - B

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

UNIT - I

2. i) Discuss about best, average and worst case complexities of selection sort algorithm.
- ii) Convert $A+B*C/D-E+F$ into postfix notation. Explain the procedure and data structures used.

(OR)

3. i) Write an algorithm for polynomial addition using linked lists.
- ii) Discuss atleast two applications each of stacks and queues.

UNIT - II

4. i) Write a program to construct a binary tree for a given set of 'n' nodes.
ii) Write an algorithm for traversing a binary tree in inorder and postorder.

(OR)

5. i) Write the Dijkstra's algorithm for Single Source Shortest Path Problem.
ii) Write about UNION-FIND operations.

UNIT - III

6. i) How is an AVL tree different from B-Tree?
ii) Discuss various operations in Splay Trees with an example.

(OR)

7. i) Discuss about Binary Heap with examples.
ii) Write about implementation of priority queue using binary heap.

UNIT - IV

8. i) Discuss Merge sort algorithm with an example.
ii) Write a recursive algorithm for quicksort.

(OR)

9. i) Describe the procedure of K-way merging with example.
ii) What is the complexity of K-Way merge.

UNIT - V

10. i) Write about Cylinder surface Indexing.
ii) What is Hash Table? What are its applications?

(OR)

11. i) Explain about different operations on B+ Trees.
ii) Write Linear search algorithm and explain with an example. Also explain its worst case complexity.
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MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION,**SEPTEMBER - 2023****SECOND SEMESTER****MCA 204 - ADVANCED DATABASE MANAGEMENT SYSTEMS***(Under C.B.C.S. Revised Regulations w.e.f. 2020-2021)**(Common Paper to University and All Affiliated Colleges)***Max. Marks : 70****Time : 3 Hours****PART-A**

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

1. a) What is meant by physical data independence?
- b) What is a candidate key? How is it identified?
- c) What is a weak-entity set?
- d) What is a view? Explain with an example.
- e) Explain group by and having clauses with examples.
- f) What is ODBC? When is it used and How?
- g) What is a persistent pointer?
- h) Write about nesting and unnesting.
- i) How is duplicate elimination done by sorting? Explain.
- j) What are ACID properties? Explain their significance in database design.

PART - B

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

UNIT - I

2. i) Write about different levels of data abstraction. Explain with a neat diagram.
- ii) What is DDL? What are the consistency constraints that can be implemented?

(OR)

3. i) Write about natural join operation of two relations with an example.
- ii) Consider the following relational schema.

*Employee(empno, name, office, age)**Books(isbn, title, authors, publisher)**Loan(empno, isbn, date)***(1)****[P.T.O]**

Write the following queries in relational algebra.

- a) Find the names of employees who have borrowed a book published by McGraw Hill.
- b) Find the names of employees who have borrowed all books published by McGraw Hill.
- c) Find names of employees who have borrowed more than five books of that publisher.
- d) For each publisher, find names of employees who have borrowed more than five books of that publisher.

UNIT - II

4. i) How are null values handled? Explain.
ii) Write about any five aggregate operations in SQL.

(OR)

5. i) What is a trigger? Discuss its implementation with an example for inserting a record into a table.
ii) What is embedded SQL? Discuss the circumstances in which you use embedded SQL instead of SQL only.

UNIT - III

6. i) Discuss about array and multi-set types in SQL.
ii) Write about persistency of objects with examples.

(OR)

7. i) Write about XML Document Schema.
ii) Explain about querying and transformation.

UNIT - IV

8. i) Explain hash join algorithm.
ii) Explain how to evaluate an expression using multiple operations in Query processing.

(OR)

9. i) Write about selection size and join size estimations.
ii) Discuss about cost-based optimisation.

UNIT - V

10. i) Write the state diagram of a transaction and explain.
ii) How do you handle the effect of transaction failures during concurrent execution.

(OR)

11. i) Explain Two phase locking protocol.
ii) Explain about deadlock detection and recovery.

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MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION,
SEPTEMBER - 2023

SECOND SEMESTER

MCA 201 - COMPUTER ORIENTED OPERATIONS RESEARCH

(Under C.B.C.S. Revised Regulations w.e.f. 2020-2021)

(Common Paper to University and All Affiliated Colleges)

Max. Marks : 70

Time : 3 Hours

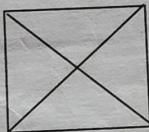
PART-A

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

1. a) Explain slack, surplus and artificial variables with example.
b) Write about weak dual property and strong dual property.
c) Consider the transportation problem shown in table below, Find the Initial basic feasible solution using Northwest corner method.

	D	E	F	G	Available
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Requirement	200	225	275	250	

- d) Give the mathematical formulation of assignment problem.
e) State and formulate linear programming model for maximal flow problem.
f) What is spanning tree? Find all the spanning trees of a following graph.



- g) Define the terms Pay off, Value of game, Saddle point.

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(1)

[P.T.O]

- h) Solve the game whose payoff matrix to the player A and B is given below

		B		
		I	II	III
		1	7	2
A	I	6	2	7
	II	5	2	6
	III			

- i) Define transient and steady state of queueing system.
j) Define following terms with respect to CPM/PERT :
i) event, ii) activity iii) Processor activity iv) dummy activity.

PART - B

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

UNIT - I

2. a) Solve the following LPP by graphical method

$$\text{Max } z = 9x_1 + 13y$$

$$\text{Subject to constraint } 2x_1 + 3y \leq 18$$

$$2x_1 + y \leq 10 \text{ and } x_1, y \geq 0$$

- b) Solve the following LPP by simplex method

$$\text{Maximum } Z = 11x_1 + 4x_2$$

$$\text{Subjected to } 7x_1 + 6x_2 \leq 84$$

$$4x_1 + 2x_2 \leq 32 \text{ and } x_1, x_2 \geq 0.$$

(OR)

3. Solve the following LPP using dual simplex method:

$$\text{Minimize } z = 2x_1 + x_2$$

$$\text{Subject to } 3x_1 + x_2 \geq 3$$

$$4x_1 + 3x_2 \geq 6$$

$$x_1 + 2x_2 \geq 3 \quad x_1, x_2 \geq 0$$

UNIT - II

4. Company has factories A₁, A₂ and A₃ which supply to warehouses at W₁, W₂ and W₃. Weekly Factory capacities are 240, 200 and 130 units respectively. Weekly warehouses requirements are 190, 150 and 110 units respectively. Unit transportation in costs Rs. As follows:-

	W ₁	W ₂	W ₃	Supply
A ₁	16	20	12	240
A ₂	14	8	18	200
A ₃	26	24	16	130
Demand	190	150	110	450

Find initial basic solution by Vogel Approximation method and also optimum solution by MODI method.

(OR)

5. Solve the assignment problem represented by the following matrix using Hungarian method.

	A	B	C	D
1	2	3	4	5
2	4	5	6	7
3	7	8	9	8
4	3	5	8	4

UNIT - III

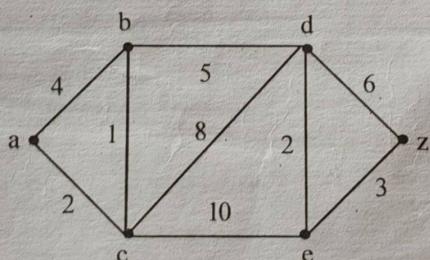
6. a) Write optimal equation of Floyd's algorithm and also solve for the digraph with weight matrix.

$$\begin{bmatrix} 0 & \infty & 3 & \infty \\ 2 & 0 & \infty & \infty \\ \infty & 7 & 0 & 1 \\ 6 & \infty & \infty & 0 \end{bmatrix}$$

- b) Write about the Maximal Flow Problem Algorithm

(OR)

7. a) Write about Prims algorithm for constructing minimum spanning tree.
b) Using Dijkstra algorithm to Find a Shortest Path from *a* to *z*.



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UNIT - IV

8. Use dominance to reduce the pay-off matrix and solve the game with the following pay-off matrix.

	B_1	B_2	B_3	B_4
A_1	3	2	4	0
A_2	3	4	2	4
A_3	4	2	4	0
A_4	0	4	0	8

(OR)

9. Consider the following pay-off matrix and determine the optimal strategy

		B		
		I	II	III
A	I	6	9	4
	II	5	10	7
	III	9	8	9

UNIT - V

10. a) Describe operating characteristics of queueing system.
b) If for a period of 2 h in a day (8 - 10 am) trains arrive at the yard every 20 min, but the service time continues to remain 36 min and then Calculate average queue length on the assumption that the time capacity of the yard is limited to 4 trains only.

(OR)

11. A Project consists of the following activities the details of which are given below.

Activity	1-2	1-3	1-4	2-5	3-5	4-6	5-6
t_m	1	4	2	1	5	5	6
t_o	1	1	2	1	2	2	3
t_p	7	7	8	1	14	8	15

Draw a network diagram for this project. Find the critical path, the expected project completion time also. Determine the float and free float of each activity.