

SECTION-B

2. What are the types of Listeners? Explain Barriers to Listening.
3. Explain the essentials of communication (7C's of Effective Communication).
4. Write a Paragraph on '*The Roles of IT (Information Technology) in Education*'.
5. Write a letter to a dealer asking for a discount of 15% for office tables.

SECTION-C

6. Write a memo from the Manager to the Supervisor on not completing his task on time.
7. Discuss the format of formal report.
8. What is a personal resume? What is its significance in business writing?
9. What is an e-mail? Write an email asking for a job vacancy to the HR manager of a company.

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MCA - May - 2022

Roll No.

Total No. of Questions : 09

Total No. of Pages : 03

MCA (Sem.-1)

DISCRETE STRUCTURES AND OPTIMIZATION

Subject Code : PGCA-1917

M.Code : 79035

Date of Examination : 02-08-22

Time : 3 Hrs.

Max. Marks : 70

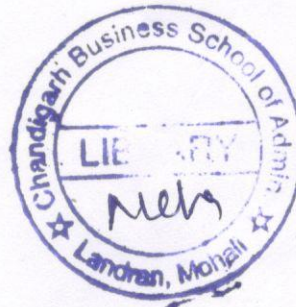
INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Explain the following :

- a) Indegree and outdegree of a graph
- b) Hashing functions
- c) Partial order relations
- d) DeMorgans' law of Boolean algebra
- e) Define homomorphism with example
- f) Abelian group
- g) Define chromatic number
- h) Define lattice with example
- i) Define power set
- j) Hamiltonian circuit.

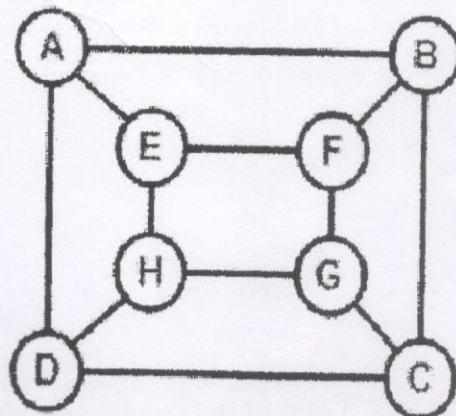


SECTION-B

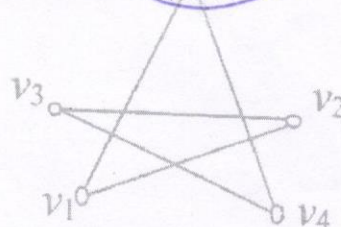
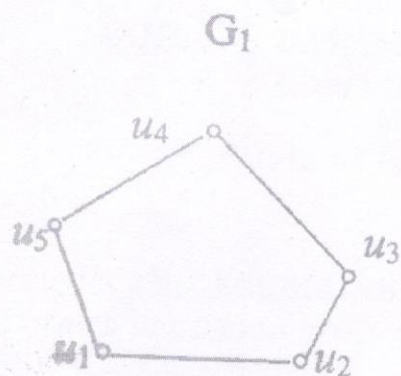
2. For each of the following relations R on Z , determine if R is reflexive, symmetric or transitive and specify the equivalence class of 1 if R is an equivalence relation on Z :
 - a) $(a, b) \in R$ if a divides b
 - b) $(a, b) \in R$ if $a^2 = b^2$
3. Convert the following Boolean expression into standard Product of Sum (POS) form
 - a) $\overline{A}BC = \overline{A}\overline{B} + AB\overline{C}D$
 - b) Reduce this Boolean expression by Demorgan law
 $(AB'.(A+C))'+A'B.(A+B+C)'$
4. A large software development company employs 100 computer programmers, out of them, 45 are proficient in Java, 30 in C#, 20 in Python, 6 in C# and Java, 1 in Java and Python, 5 in C# and Python, and just 1 programmer is proficient in all three languages above. Determine the number of computer programmers that are not proficient in any of these three languages. Also draw the Venn diagram of this question.
5. What is the solution of the recurrence relation $a_n = -a_{n-1} + 4a_{n-2} + 4a_{n-3}$ with $a_0 = 8$, $a_1 = 6$ and $a_2 = 26$.

SECTION-C

6. State the clear difference between group, semigroup and monoid with suitable example.
7. Consider an algebraic system $(N, +)$, where the set $N = \{0, 1, 2, 3, 4, \dots\}$. The set of natural numbers and $+$ is an addition operation. Determine whether $(N, +)$ is a monoid.
8.
 - a) Define Hamiltonian path in a graph and how it is different than Euler path? Explain it with a help of suitable example.
 - b) Identify the Hamiltonian path and circuit in the figure below.



Define isomorphism in graph with a suitable example. State the conditions which need to be fulfilled by two graphs in order to be isomorphic. Prove that the G_1 and G_2 are isomorphic.



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Roll No.

Total No. of Questions : 09

MCA (Sem.-1)

ADVANCED DATA STRUCTURES

Subject Code : PGCA-1952

M.Code : 79037

Date of Examination : 06-08-22

Time : 3 Hrs.

Max. Marks : 70

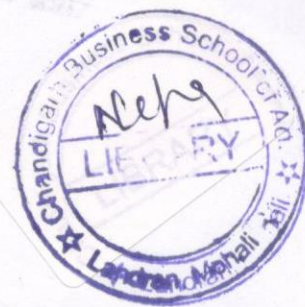
INSTRUCTIONS TO CANDIDATES :

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2. SECTION - B & C have **FOUR** questions each.
3. Attempt any **FIVE** questions from SECTION B & C carrying **TEN** marks each.
4. Select atleast **TWO** questions from SECTION - B & C.

SECTION-A

1. Write short notes on :
- What do you mean by amortized analysis? Explain.
 - Explain the importance of counting sort.
 - What are the advantages of open addressing?
 - Explain the properties of AVL tree.
 - List and explain any two string functions.
 - Which algorithm is used to solve all pairs shortest path problem?
 - What is graph?
 - What is binomial heap?
 - List the applications of Minimum Spanning Tree (MST).
 - Write the time complexity of Brute force algorithm in string matching.
- 



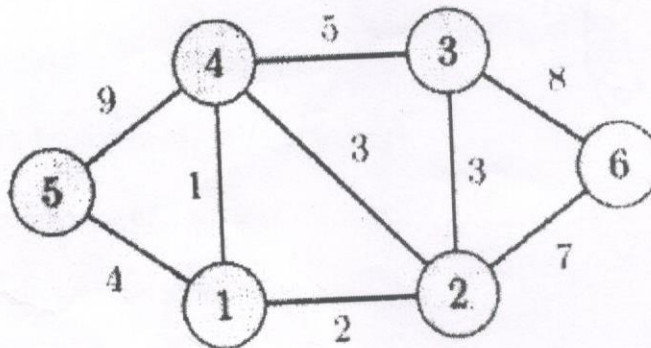


SECTION-B

- 2) Show the following :
- $n^2 + 50n = O(n^2)$
 - $n^2 + n^2 + n^2 = 3n^2 = O(n^3)$
- 3) If the following sequence of numbers is to be sorted using quick sort, then show the iterations of the sorting process.
- 42, 34, 75, 23, 21, 18, 90, 67, 78
- 4) Explain the following with the help of an example :
- Open addressing
 - Perfect hashing.
- 5) What item is at the root after the following sequence of insertions into an empty splay tree: 1, 11, 3, 10, 8, 4, 6, 5, 7, 9, 2. Provide the detailed tree structure (step-wise).

SECTION-C

- 6) Solve minimum spanning tree of the following graph.



- Differentiate between adjacency matrix and adjacency list representation with the help of an example.
- Explain Rabin Karp string matching algorithm along with an example.
- How does Knuth Morris-Pratt (KMP) algorithm works? Explain along with an example.

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Total No. of Questions : 09

Total No. of Pages : 02

MCA (Sem.-1)

ADVANCED DATABASE MANAGEMENT SYSTEM

Subject Code : PGCA-1953

M.Code : 79038

Date of Examination : 09-08-22

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1) Write short notes on :

- a) RDBMS and DBMS
- b) Cardinality
- c) Normalization
- d) Relational Algebra
- e) Transaction management
- f) Parallel database
- g) Distributed transaction
- h) Temporal hierarchies
- i) Spatial relationships
- j) XML Schema.





SECTION-B

- 2) Discuss the main characteristics of database approach and how it differs from traditional file system?
- 3) A set of FD's for the relation R {A, B, C, D, E, F} is
 $AB \rightarrow C, C \rightarrow A, BC \rightarrow D, ACD \rightarrow B, BE \rightarrow C, EC \rightarrow FA, CF \rightarrow BD, D \rightarrow E$ Find a minimum cover for this set of FDs.
- 4) Differentiate between Strict two-phase locking protocol and conservative two-phase locking protocol for concurrency control in databases with the help of an example.
- 5) Explain in detail various types of relational query languages.

SECTION-C

- 6) Write short notes on :
 - a) Categories of Data models.
 - b) Multimedia Databases.
 - c) Spatial Databases.
- 7) What do you understand by distributed databases? Give the various advantages and disadvantages of distributed database management systems.
- 8) Explain NOSQL Database with example.
- 9) Discuss the difference between intra query parallelism and intra operation parallelism.

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Master of Computer Application (Sem.-1)

Subject Code : PGCA-1952

M.Code : 79037

Date of Examination : 07-02-22

Max. Marks : 70

1. Attempt any FIVE question(s), each question carries 14 marks.

1. Explain with example bucket sorting algorithm.
2. What are AVL trees? Explain its RR, LL, LR and RL rotations.
3. Differentiate between Probabilistic and Competitive analysis.
4. What is a heap and its types? How to insert and delete the nodes from heap?
5. Write an algorithm to perform quick sort with example.
6. Differentiate between depth-first and breadth-first search algorithms.
7. Discuss in detail Brute Force Algorithm.
8. Write algorithms of string copy and string concatenation.



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Total No. of Pages : 02

Max. Marks : 70

1. Attempt any FIVE question(s), each question carries 14 marks.
1. Define communication. Explain its process, indicating clearly the role of each constituent element.
2. a) Write a detailed note on the principles of effective communication.
b) Discuss various components of non-verbal communication.
3. As the Secretary of the Residents Association of your colony, prepare a circular for all residents regarding the conversion of copper cables into fiber optic cables so that no resident has any problem with the quality of communication services. In your circular, mention whether additional funds will be required and explain how the conversion process will not disrupt the lives of the residents in any way.
4. Imagine that you visited a place of tourist interest. Write a paragraph of about 350 words on your travel experience and what you learnt from it.
5. Assuming that you are the Administrative Officer of Finesse Garments, Kondapur, Hyderabad, write an enquiry letter for the following items with the Royal Furniture Mart, Ameerpet, Hyderabad : Office Chairs 40, Office Tables 20, File Racks 25, Steel Almirahs 10, Open Shelf 5.
6. Assume that you have planned to apply for various posts. You have just completed Post-graduation. You have secured first rank. You have received a gold medal in your post-graduation, participated in extra-curricular activities and in group discussions and achieved many prizes. Now, prepare a resume and a cover letter.
7. State the reason why, in business, the term 'presentation' has come to be used more commonly than 'public speaking'. What are the various steps involved in planning out a presentation?

8. Write a precis of the following passage and suggest a suitable title :

Communication is essentially a social affair. Man has evolved a host of different systems of communication which render his social life possible-social life not in the sense of living in packs for hunting or for making war, but in a sense unknown to animals. Most prominent among all these systems of communication is, of course, human speech and language. Human language is not to be equated with the sign systems of animals, for man is not restricted to calling his young, or suggesting mating, or shouting cries of danger; he can with his remarkable faculties of speech give utterance to almost any thought. Like animals, we too have our inborn instinctive cries of alarm, pain, etc., say Oh! Ah! we have smiles, groans, and tears; we blush, shiver, yawn, and frown. A hen can set her chicks scurrying up to her, by clucking communication established by release mechanism-but human language is vastly more than a complicated system of clucking. The development of language reflects back upon thoughts; for with language thoughts may become organised, new thoughts evolved. Self-awareness and the sense of social responsibility have arisen as a result of organised thoughts. Systems of ethics and law have been built up man has become self-conscious, responsible, a social creature. Speech and writing are by no means our only system of communication. Social intercourse is greatly strengthened by habits of gesture-little movements of the hands and face. With nods, smiles, frowns, hand-shakes, kisses, first shakes, and other gestures we can convey most subtle understanding. Also, we have economic systems for trafficking not in ideas but in material goods and services; the tokens of communication are coins, bonds, letters of credit, and so on. We have conventions of dress, rules of the road, social formalities, and good manners; we have rules of membership and function in business, institutions, and families. But life in the modern world is coming to depend more and more upon 'technical' means of communication, telephone and telegraph; radio and printing. Without such technical aids, the modern city-state could not exist one week, for it is only by means of them that trade and business can proceed; that goods and services can be distributed where needed; that railways can run on a schedule; that law and order are maintained; that education is possible. Communication renders true social life practicable, for communication means organisation. Communication engineers have altered the size and shape of the world.

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Pages : 02

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Master of Computer Application (Sem.-1)

Subject Code : PGCA-1951

M.Code : 79036

Date of Examination : 03-02-22

Max. Marks : 70

1. Attempt any FIVE question(s), each question carries 14 marks.

1.
 - a) Write a function in Python, INSERTQ(A,data) and DELETEQ(A) for performing insertion and deletion operations in a Queue. A is the list used for implementing queue and data is the value to be inserted.
 - b) How can you traverse, insert and delete elements from an array using inbuilt functions. Elaborate using Python code.
2.
 - a) Write a Python program to delete the first occurrence of the given word in a List, where words can repeat. .
 - b) Write a Python program to check whether a string is a palindrome or not using recursion.
 - c) Write a Python program to sort a list according to the length of the elements.
3. Define Exception. How can you catch a specific type of exception in Python? Elaborate, How can you assign a name to the Exception object in Python? List and explain different types of exceptions in Python.
4. Write an example of a class in Python. Explain concept of Inheritance with example in Python. How can it achieve data abstraction? Discuss.
5.
 - a) What are the various String operators in Python? Illustrate.
 - b) How can you create or use calendar class in Python? Write code for creating calendar using Python.
6.
 - a) Write a Python program to order Tuples using an external list given during run time.
 - b) What is need of dictionaries? Write a Python program to read list of Dictionaries from file.



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7. What is the need of creating modules in Python? How they are different from functions? Illustrate using Python code. How will you search path for a module? Write advantages of Python packages.
8. a) Why do we need environment variables in setting up Python?
b) Differentiate between Associative and Non Associative Operators.
c) What is the need of Data type conversion? Write Python code to differentiate between implicit and explicit data type conversion.

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Total No. of Pages : 02

Total No. of Questions : 08

Master of Computer Application (Sem.-1)
DISCRETE STRUCTURES & OPTIMIZATION

Subject Code : PGCA-1917

M.Code : 79035

Date of Examination : 01-02-22

Max. Marks : 70

Time : 2 Hrs.

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE question(s), each question carries 14 marks.

1. a) Prove the following :

$$X \cap (Y \cup Z) = (X \cap Y) \cup (X \cap Z)$$

- b) How many symmetric relations will there be on a set of three elements?

2. Investigate the function $f(x) = x^2 + 3x + 2$ for increasing and decreasing function in its entire domain.

3. Prove that the set $\{0,1,2\}$ forms a field with respect to addition and multiplication modulo 3.

4. a) Simplify the following Boolean functions using the Karnaugh map :

$$F = x' y' z' + x' y z' + x y z' + x y' z'$$

- b) Find the number of diagonals of a polygon having n sides.

5. Prove that every group of prime order is cyclic.

6. a) In how many ways can 5 boys and 5 girls be arranged in a round table so that 2 girls are not seated together?

- b) Solve the following recurrence relations :

$$a_r = 6a_{r-1} - 8a_{r-2}, \text{ given that } a_0 = 4 \text{ and } a_1 = 10$$

7. Prove that in a graph G the number of vertices having an odd degree is always even.

8. a) A graph G is disconnected if and only if its vertex set V is partitioned into two non-empty, disjoint subsets V_1 and V_2 such that there exists no edge in G whose one end vertex is in V_1 and the other is in V_2 .
- b) Define a regular graph and a complete graph. Draw a regular graph that is also complete.

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Pages : 02

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Master of Computer Application (MCA)
ADVANCED DATABASE MANAGEMENT SYSTEM
 Code: PGCA-1953

M.Code : 79038

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. What is DBMS? Explain the different components of DBMS. What are the advantages of DBMS over Traditional File Processing system?
2. What is an ER model? What are the different types of attributes and how are they represented in ER diagrams? Explain the concept of strong and weak entity sets with the help of examples.
3. What is Functional Dependency? Explain in detail the first three Normal Forms and the Boyce Codd Normal form (Along with anomalies and examples).
4. Define Relational Algebra. Explain the fundamental operations of Relational Algebra with the help of examples.
5. a) What is a Parallel Database? What are the benefits of Parallel Database?
b) Discuss the locking protocols used in distributed serializability.
6. a) What are the advantages of a distributed database management system over a centralized DBMS?
b) Explain Concurrency Control and Recovery in Distributed Databases.
7. What is a Spatial Database System? Explain the different spatial data types, data structures and methods of storage.
8. Explain in detail multidimensional database system. Also explain what are NOSQL databases?

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