

May-2019

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Total No. of Questions : 09

MCA (2015 & Onwards) (Sem.-2)

Subject Code : MCA-202

M.Code : 72877

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

1. Explain the three level architecture of DBMS.

2. a. What is weak entity set? Explain with an example.

- b. Differentiate between binary and ternary relationships with example using E-R diagrams.

3. Differentiate between 3NF and Boyce-Codd normal form with examples.

4. a. Explain system recovery.
b. Explain two-phase locking.

5. What are problems of using Distributed DBMS? Explain.

6.
 - a. Explain client-server architecture.
 - b. Differentiate between MPSD and MPMD



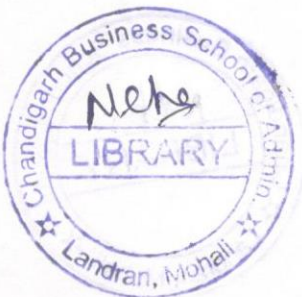
SECTION-D

7. Explain OLAP architecture in detail.
8. a. What is the difference between operational data and decision support data? Explain
b. Explain decision support system database properties.

SECTION-E

9. Answer briefly :

- a. What is transaction processing monitor?
- b. Define primary key.
- c. Define trivial dependency.
- d. Define 4 normal form.
- e. Define data fragmentation.
- f. Define serializability.
- g. Define ROLAP.
- h. Differentiate between simple and composite attribute.
- i. Differentiate between physical and logical independence.
- j. What is window query?



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Total No. of Pages : 02

MCA (2015 & Onward) (Sem.-2)
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
 Subject Code : MCA-201
 Paper ID : [72876]

Max. Marks : 60

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

1.
 - a) Describe Euler graph by taking suitable example.
 - b) If a graph G consists of edges $\{(a,c), (a,a), (b,c), (b,d), (d,c)\}$. Find Chromatic number of G .
2.
 - a) What is the application of Hamiltonian graph in Computer Science?
 - b) What is undirected graph? Discuss the relation between in-degree and out- degree of a graph.

3. a) If a set $A = \{a, b, c\}$, then find the power set $P(A)$.
b) What are Uncountable sets? Prove that set of rational numbers between $\{0, 1\}$ is uncountable.
4. a) If relation $R = \{(a,b), (b,b), (b,c), (d,b), (b,d), (d,d)\}$. Check whether R is equivalence relation or not.
b) "Cartesian product of two sets is a complete relation". Comment on the statement.

5. a) Explain different types of prepositions used in algebra of logic.
b) What is meant by '*Principle of mathematical induction*'? Explain.



6. a) Show that $(ab)' = a' + b'$ is a tautology.
b) How universal and existential quantifiers are used in algebra of logic? Explain by taking suitable examples.

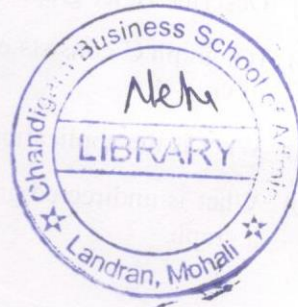
SECTION-D

7. a) Define upper triangular matrix. What is the significance of Null matrix in Computer Science? Explain.
b) "*Matrix multiplication is associative*". Justify the statement.
8. a) Discuss different Gauss Jordan method.
b) What is meant by idempotent matrix? Explain.

SECTION-E

9. **Write briefly :**

- a) Define transitive relation.
b) What is the significance of minset?
c) List two examples of Skew-Hermitian matrix.
d) What is meant by 'Closure property' of a relation?
e) What is the application of matrix in graphs?
f) List two properties of Eulerian graph.
g) Define Range and domain of a set.
h) Show that intersection of any set with universal set is a set itself.
i) Define Symmetric Matrix.
j) Every planar graph is 4-colorable. Comment on the statement.



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Total No. of Pages : 02

Total No. of Questions : 09

MCA (2015 & Onwards) (Sem.-2)
LINUX OPERATING SYSTEM
 Subject Code : MCA-205
 M.code : 72880

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

1. Discuss the different issues to be considered before the installation of Linux.
2. What is the importance of X-Windows? Also write a note on GNOME.

SECTION-B

3. Explain the installation and configuration of packages in Fedora.
4. What are the different tools available in Linux for user management? Discuss in detail.

SECTION-C

5. Discuss about different type of shells in Linux.
6. a) How do you set environment variable sin Linux? Explain.
b) Explain the File Management and manipulation in Linux.

SECTION-D

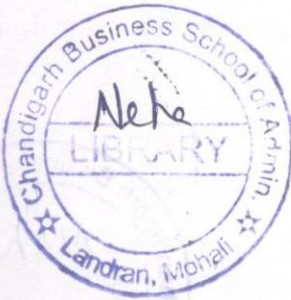
7. Explain the Installation and Configuration of printing services in Linux.
8. What is GRUB? Explain the configuration and commands of GRUB.



SECTION-E

9. Write briefly :

- a. What is LILO?
- b. What is Makeup file system?
- c. What is 'Init' service?
- d. What is the purpose of 'Chown' command?
- e. What is SetUID?
- f. What is RPM in Linux?
- g. What is KDE?
- h. What is Swap Space?
- i. What is a Boot Partition?
- j. What is the purpose of Redirection?



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MCA (2015 & Onward) (Sem.-2)

DATA STRUCTURES

Subject Code : MCA-203

M.Code : 72878

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.
 2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

- Q1 What is data structure? Explain different linear and non linear data structures.
- Q2 Write notes on the following:
- (a) Memory representation of array
 - (b) Static and dynamic memory management

SECTION-B

- Q3 What is binary tree? Write and explain an algorithm to delete an element from B+ tree.
- Q4 Define heap. Write various steps to create a heap of following elements:
- 16 14 3 4 1 9 10 8 2 7

SECTION-C

- Q5 Write and explain Dijkstra's algorithm for finding shortest path.
- Q6 What is depth first search? Write an algorithm for DFS. Give example to support your answer.

SECTION-D

- Q7 What is hashing? Explain various hashing techniques in detail.
- Q8 What is bubble sort? Discuss its working principle. Sort the following list of numbers using bubble sort:
- 4, 212, 376, 12, 52, 115, 35, 6, 98, 62, 34



SECTION-E

Q9 Answer briefly :

- (a) What is space time trade off?
- (b) What are various advantages of linked list over an array?
- (c) What are merits of priority queues?
- (d) Define LIFO and FIFO.
- (e) What is significance of recursion?
- (f) Differentiate tree and graph.
- (g) List various tree traversal techniques.
- (h) What are different types of trees?
- (i) Write average and worst case complexity of merge sort algorithm.
- (j) What are weighted and non weighted graphs?



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Total No. of Pages : 02

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MCA (2013 and 2014 Batch) (Sem.-2)
DATA COMMUNICATION AND NETWORKS

Subject Code : MCA-204

M.Code : 26055

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TWENTY marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

1. What are the various transmission media used in computer networks? Discuss the wireless transmission media in detail.
2. Compare and contrast OSI and TCP reference models. Give areas where each of these is used.

SECTION-B

3. What are the steps in the error control mechanism at the Data Link Layer? Discuss the three techniques for error control in the Data Link Layer.
4. Explain the working of the various CSMA protocols with a flowchart.

SECTION-C

5. Differentiate between interior and exterior gateway routing protocols and explain the Exterior Gateway Routing Protocol in detail.
6. Discuss the various techniques for troubleshooting the network problems.

SECTION-D

7. What do you mean by User Data Protocol (UDP)? How is it different from TCP? Discuss the working of UDP in detail.
8. What do you mean by Domain Name System (DNS)? Explain how DNS works? Discuss in detail about DNS records and DNS messages.

SECTION-E

9. Write briefly :

- a. What do you mean by digital transmission?
- b. How circuit switching is different from packet switching?
- c. Define virtual circuits.
- d. Differentiate between LAN and WAN.
- e. What do you mean by congestion?
- f. Briefly discuss IEEE 802.5.
- g. Write short note on internetworking.
- h. What do you mean by IP protocol?
- i. Write short note on WWW.
- j. Compare Flooding and Broadcast routing



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Total No. of Pages : 02

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MCA (2015 & Onwards) (Sem.-2)
RELATIONAL DATABASE MANAGEMENT SYSTEM
 Subject Code : MCA-202
 M.Code : 72877

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

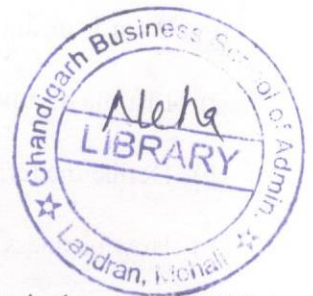
1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

1. What are the major factors to be considered for the database design? How data abstraction is useful? Explain.
2. Explain the concept of entity relationship model for different types of relationship.

SECTION-B

3. Compare the features of the following :
- a) Relational and Network model.
 - b) Transitive dependency and Multivalued dependency.
4. What are the properties of transaction? How transaction management is done with SQL? Explain.
- 



SECTION-C

5.
 - a) Differentiate centralized database design and distributed database design.
 - b) Compare the client server with DDBMS.
6. How different levels of Data and Process distribution are implemented? Explain.

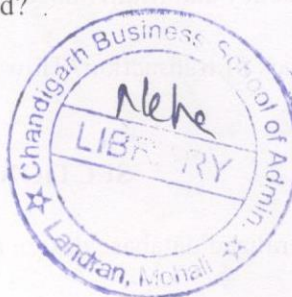


SECTION-D

7. How decision support system is useful for data analysis? Illustrate.
8. Write short note on the following :
 - a) Tools for Database administration
 - b) Schemas

SECTION-E

9. Write briefly :
 - a) What is the role of strong entity?
 - b) Define the term degree of relation.
 - c) Compare 2nd and 3rd normal form.
 - d) List the significance of locks.
 - e) What is meant by Integrity constraint?
 - f) List the disadvantages of Distributed databases.
 - g) Define the term domain.
 - h) How business intelligence is employed?
 - i) What is the role of OLAP?
 - j) Write a short note on star schema.



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MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

M.Code : 72876

Max. Marks : 60

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

1. What is meant by simple graph? Show that degree of a vertex in a simple graph of n -vertices cannot exceed $n-1$.
2. a) What is Euler Graph? State and explain the condition for checking whether a given graph is Eulerian or not.
b) What is meant by Chromatic Number? What are various applications of graph colouring in graph theory?

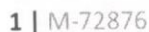
3. Prove that set of real numbers in the set $[0, 1]$ is uncountable set. Justify the proof.

4. State and prove the following concepts :

- a) De-Morgan Laws
- b) If a relation R on set A is reflexive, so is R^{-1}

5. If P, Q and R are three prepositions.

Prove that $(P \rightarrow (Q \rightarrow R)) \rightarrow ((P \rightarrow Q) \rightarrow (P \rightarrow R))$



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6. Using Principle of Mathematical Induction, prove that :

$$a + (a + d) + (a + 2d) + \dots + (a + (n - 1)d) = \frac{n}{2}(2a + (n - 1)d)$$

SECTION-D

7. Does scalar multiplication of two matrices commutative? (Yes/No), Also justify the result using an appropriate example.
8. Solve the following equations using Gauss Jordan Method :
- $$2x - y + 3z = 9, x + y + z = 6, x - y + z = 2$$

SECTION-E

9. Write briefly :

- Define directed graph.
- Write a short note on bipartite graph.
- Discuss briefly the concept of Cartesian product of a set.
- Define Partition of a set.
- What is the application of tautology in algebra of logic?
- Discuss the use universal quantifier by taking an example.
- Describe the application of transpose of a matrix in Computer Science.
- What is meant by rank of a square matrix?
- Why matrix inversion is needed in real world Computer Applications?
- Define equivalence relation.



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SECTION-D

7. What is GRUB? Explain the configuration of GRUB in detail.
8. a) Discuss 'quota management' in Linux.
b) Write a note on Linux Printing.

SECTION-E

9. Write briefly :

- a) What is system call?
- b) What is a domain?
- c) What is boot disk?
- d) What is a device driver?
- e) What is a shadow file?
- f) What is a Shell?
- g) What is 'su' command?
- h) What is LILO?
- i) What is 'init' service?
- j) What is the 'cron' program?



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SECTION-D

7. Write an algorithm to sort a set of elements using address calculation radix sort. (10)
8. What is Hashing? What are the various hash functions? Discuss each with the help of suitable example. (10)

SECTION-E

9. Write briefly :

- a) Define Omega notation for complexity.
- b) Which linear data structure is not conducive for insertion and deletion?
- c) What is a string? How string is initialized and declared?
- d) Explain the working of simple queue.
- e) Give the node structure of an expression tree.
- f) Define complete b-tree.
- g) Define Heap Sort.
- h) Define Trade-off of Algorithm.
- i) Define Array Pointers.
- j) What are Graph operations?



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SECTION-C

- Q5 a) Differentiate Hierarchical and shortest path routing.
b) What is meant by IP protocol? Explain its working in detail.
- Q6 Explain the following :
- a) ARP
 - b) Token Bucket Algorithm
 - c) Traceroute
 - d) Ping

SECTION-D

- Q7 a) Discuss the concept of flow control at transport layer.
b) Discuss the working of UDP protocol in detail.
- Q8 Explain the following by taking suitable example :
- a) Email
 - b) HTTP and HTTPS

SECTION-E

Q9 Write briefly :

- a) What is World Wide Web?
- b) Name the different layers of TCP/IP model.
- c) Discuss briefly about fiber optics communication.
- d) Why is logical link layer required?
- e) Comment on “channel allocation”.
- f) Describe the services offered by MAC layer.
- g) Enlist any two issues of Flooding algorithm.
- h) How is troubleshoot provided by netstat?
- i) Discuss two features of TCP.
- j) Name any two protocols at Application layer of TCP/IP model.



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