Roll No. ☐☐☐☐☐☐☐☐ ☐☐ Total No. of Pages : 02

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B.Sc. (Data Analytic) (Sem.–1)

MATHEMATICS

Subject Code : UGCA1901

M.Code : 91479

Date of Examination : 08-12-2023

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Write briefly :

a) Describe set $A = \{x : (x \geq 0) \text{ and } (x^2 \leq 10), x \in Z\}$ in Roaster form.

b) Difference of sets.

c) Conjunction.

d) Express the statement "*If it is cold he takes tea and not cold drink*" in symbolic form and state its negation.

e) Square Matrix.

f) Does AB = θ always imply A = θ or B = θ, where A and B are matrices.

g) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 3 & 1 \\ 4 & 5 \end{bmatrix}$ find (A+B)'

h) If $a, a+d, a+2d$ ..... is an AP, write n^{th} term and sum to the first n terms.

i) Geometric progression.

j) Arithmetic mean.

SECTION-B

2. For sets U = {1, 2, 3, –12}, A = {1, 3, 5, 8, 9}, B = {5, 10, 11, 12} Verify that

$A - B = A \cap B^c = B^c - A^c$

3. Prove by constructing truth table that

$p \wedge (q \vee r) = (p \wedge q) \vee (p \wedge r)$

4. For what values of x, y, z, w

$$2\begin{bmatrix} x & y \\ z & w \end{bmatrix} = \begin{bmatrix} x & 5 \\ -1 & 3w \end{bmatrix} + \begin{bmatrix} 4 & x+y \\ z+w & 3 \end{bmatrix}$$

5. If $A = \begin{bmatrix} 1 & 1 & -1 \\ 2 & -3 & 4 \\ 3 & -2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} -1 & -2 & -1 \\ 6 & 12 & 6 \\ 5 & 10 & 5 \end{bmatrix}$.

Show that AB is null matrix and BA is not null matrix.

6 a) If the first, second and last terms of the AP are 5, 9, 101, respectively, find the total number of terms in the AP.

b) If x and y are two numbers whose AM is 10 and GM is 8. Find the numbers.

7. a, b, c are the three numbers in GP and their sum is 28. If ab + bc + ca = 224. Find the numbers.

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B.Sc. (Data Analytic) (Sem–2)

DATABASE MANAGEMENT SYSTEMS

Subject Code : UGCA1922

M.Code : 91982

Date of Examination : 17-11-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION-A

1. **Answers the following questions :**

   a) Explain the key components of a DBMS (Database Management System).

   b) Elaborate on the role of the ER Model in the design of databases.

   c) Define Stored Programs in the context of databases.

   d) What is PL/SQL and how does it differ from standard SQL?

   e) Discuss the purpose of Cursors in SQL.

   f) Explore the concept of Multi-valued Dependencies in database design.

   g) Define First, Second and Third Normal Forms in database normalization.

   h) Explain the concept of Referential Integrity in database management.

   i) What are some common security measures used in database management?

   j) How do database recovery processes ensure data consistency and integrity?

SECTION-B

2. Describe the three-level architecture of a DBMS and the roles of each level in efficient data management.

3. Differentiate between Relational Algebra and Relational Calculus for database querying.

4. Define Boyce-Codd Normal Form (BCNF) and its importance in database design, supported by an example.

5. Outline the structure and design principles of distributed databases, discussing their advantages and challenges.

6. Explain Concurrency Management in databases and associated issues.

7. Discuss challenges and strategies for database security, including access control and encryption, with examples of security measures.

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B.Sc (Data Analytic) (Sem–2)

OBJECT ORIENTED PROGRAMMING USING C++

Subject Code : UGCA-1909

M.Code : 91983

Date of Examination : 21-11-2023

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION-A

1. **Answer briefly :**

a) Differentiate between = and = = operators with the help of an example.

b) What is the effect of absence of break in switch case in C++ ?

c) Explain the concept of Data Encapsulation.

d) Explain the use of 'super' keyword.

e) What are the input and output operators used in C++? What is the return type of main ()?

f) What is Visibility mode? What are the different inheritance Visibility modes supported by C++?

g) List the syntax of any two functions used to get input from the user in C++.

h) What do you mean by Dangling Pointers?

i) What is the purpose of defining a Destructor function?

j) Explain the purpose of using this pointer.

SECTION-B

2. What is Object Oriented Programming? Distinguish between Procedure-Oriented Programming and Object-Oriented Programming.

3. Write a program in C++ to find the reverse of a given number.

4. What is a constructor? Can we overload constructors? Explain with the help of an example.

5. Write the different steps involved in processing a file. Write a program to write characters onto a file and to read characters from a file.

6. What is inheritance? Explain with example how to inherit a class in C++? Also write a C++ program to demonstrate use of protected data members in inheritance.

7. Explain the concept of Virtual and Pure Virtual Functions with the help of examples.

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B.Sc. (Data Analytic) (Sem.–2)

PROBABILITY AND STATISTICS

Subject Code : UGCA1985

M.Code : 91981

Date of Examination : 23-11-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. **Write briefly :**

   a) Random experiment

   b) Independent events

   c) Standard Deviation

   d) Characteristics of a good average

   e) Range

   f) Median

   g) Conditional probability

   h) Statistics

   i) Coefficient of variation

   j) Trial and Event.

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SECTION-B

2. Calculate standard deviation for the following data :

Size of item	6	7	8	9	10	11	12
Frequency	3	6	9	13	8	5	4

3. Calculate the Median from following data :

X	0	1	2	3	4	5	6	7	8
f	1	8	28	56	70	56	28	8	1

4. Explain Baye's theorem using relevant example.

5. In a survey among few people, 60% read Hindi newspaper, 40% read English newspaper and 20% read both. If a person is chosen at random and if he already reads English newspaper find the probability that he also reads Hindi newspaper.

6. Write a note on :

   a) Probability density function with example

   b) Marginal density function with example.

7. Calculate Mode of distribution from the data below :

Marks:	10-20	20-30	30-40	40-50	50-60	60-70
No .of students:	3	7	10	10	11	9

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B.Sc. (Data Analytic) (Sem.–3)

OPERATING SYSTEMS

Subject Code : UGCA1923

M.Code : 92552

Date of Examination : 08-12-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. **Write briefly :**

   a) Write atleast two functions of an Operating System.

   b) Define the term Kernel and Shell.

   c) Write atleast two benefits of threads.

   d) Differentiate between Paging and Segmentation Scheme of Memory Management.

   e) Write the advantages of Virtual Memory.

   f) What is memory protection in memory management?

   g) List the various file attributes.

   h) Differentiate between seek time and rotational latency.

   i) Write in brief about Scheduling in Multiprocessor Operating System?

   j) What are the issues in Distributed Operating System?

SECTION-B

2. Write a detailed note on Process synchronization.
3. Explain the following scheduling algorithms with a suitable example

   a) FCFS

   b) Round Robin

4. Explain the Paging Scheme of Memory Management in detail.
5. Write a detailed note on various Page Replacement Algorithms.
6. Explain in detail about I/O devices and Controllers.
7. Write a detailed note on Real Time Operating System.

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Total No. of Questions : 07

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B.Sc. (Data Analytic) (Sem.–3)

DATA WAREHOUSE AND MINING

Subject Code : UGCA-1931

M.Code : 92553

Date of Examination : 11-12-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. **Write briefly :**

a) Define Data Warehouse.

b) What is metadata?

c) Define Apriori Algorithm.

d) Define Data Cube.

e) What is Gini Index?

f) What is precision?

g) What is data visualization?

h) What are different challenges in clustering the data?

i) Let us suppose that there are 200 pages available on Internet for machine learning. The search on this term returns total 210 pages, out of which 190 belongs to Machine Learning, calculate precision and recall for our algorithm.

j) What is the significance of high false negative results?

SECTION-B

2. What is Data Mining? Explain the knowledge discovery process.

3. The distance between some Indian cities is given below. Apply the clustering algorithm to make three clusters. Indicate intermediate steps.

	Bathinda	Patiala	Delhi	Amritsar	Mathura
Bathinda	0	190	400	250	460
Patiala	190	0	240	225	300
Delhi	400	240	0	450	60
Amritsar	250	225	450	0	510
Mathura	460	300	60	510	0

4. What is OLAP? Explain its architecture, characteristics and multi dimensional view.

5. How do we evaluate classifier's accuracy? Explain different techniques for accuracy estimation.

6. What is classification? Explain decision tree induction by taking a suitable example.

7. What are different approaches to build a data warehouse?

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B.Sc. (Data Analytic) (Sem.–3)

DATA STRUCTURES

Subject Code : UGCA-1915

M.Code : 92554

Date of Examination : 13-12-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION-A

1. **Write briefly :**

   a. Design an algorithm to find the kth smallest element in a two-dimensional array, where each row and column is sorted.

   b. Which type of data is best managed by AVL Tree and why?

   c. Describe the potential risks and benefits of using function pointers in C++ for dynamic behavior.

   d. Describe a scenario where an adjacency matrix is preferred over an adjacency list for representing a graph.

   e. Describe the process of dynamic resizing in a hash table.

   f. How would you detect if a linked list contains a cycle?

   g. What is the difference between a complete binary tree and a full binary tree?

   h. Elaborate functioning of doubly linked list with a suitable diagram.

   i. Write down worst case time complexity of various sorting algorithms. Which algorithm may be considered best for sorting?

   j. What are the applications of queue in computer science?

SECTION-B

2. Describe the concept of a circular linked list and its applications. Explain how circular linked lists are different from linear linked lists and provide examples of problems that can be solved using circular linked lists.

3. Discuss the concept of graph traversal algorithms. Explain Depth-First Search (DFS) and Breadth-First Search (BFS) and provide examples of their applications in graph analysis and problem-solving.

4. Discuss the design considerations and implementation details of a priority queue data structure that supports both insertion and deletion of elements in logarithmic time complexity. Elaborate in detail.

5. Describe the merge sort algorithm and how it works by dividing and conquering. Explain its time complexity, stability and memory usage. Provide insights into scenarios where merge sort is advantageous.

6. Discuss the process of rotating nodes in AVL trees. Describe the four types of rotations (single left, single right, double left-right and double right-left) and how they help in maintaining the balance of the tree?

7. Describe the fundamental differences between static and dynamic data structures. Provide examples of each type and discuss the advantages and disadvantages of using one over the other in various scenarios.

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B.Sc.(Data Analytic) (Sem.–3)

PROGRAMMING IN PYTHON

Subject Code : UGCA1914

M.Code : 92558

Date of Examination : 15-12-2023

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION-A

1. **Write briefly :**

   a) Define Function.

   b) What are operators? Give example.

   c) Define break points.

   d) Write syntax to create class in python.

   e) How single value can be assigned to multiple variables in single statement?

   f) What is the correct extension of the Python file?

   g) Define error handling.

   h) Syntax to print a statement.

   i) How do you declare a variable in Python?

   j) Who developed python language and when?

SECTION-B

2. What is a Python Module? Explain its significance in programming. How are Python modules created and how do you import and use them in a program? Provide examples.

3. Define debugging. What is the Python debugger (pdb)? How do you debug code using break points? Write a program to take input from user and print factorial of a number.

4. What is a conditional statement in Python and how is it used? Give an example of an if-statement that checks if a number is positive or negative.

5. What is a Python function? Explain its role and significance in programming. Explain with example the process of defining and calling a Python function.

6. Explain in detail different operations that can be applied on files in python. How can you create a new directory in Python? What is the difference between a method and a function?

7. What is a variable in Python and how is it declared and assigned a value? Explain with the help of an example.

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B.Sc. (Data Analytic) (Sem.–4)

DIGITAL MARKETING

Subject Code : UGCA1947

M.Code : 93430

Date of Examination : 20-11-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. **Write briefly :**

   a) Digital marketing

   b) Content marketing

   c) SEO

   d) Segmenting

   e) Web analytics

   f) P-O-E-M Framework

   g) Blogging

   h) Keywords

   i) Role of adverts

   j) Social media engagement.

SECTION-B

2. What is the scope of digital marketing in India? How is digital marketing strategy implemented?

3. What are the various techniques of blogging? Which blogging platforms would you recommend to a new blogger?

4. What do you understand by Facebook marketing? What is the anatomy of an ad campaign?

5. What are the features of mobile marketing? Write a note on mobile marketing tools.

6. What are the various web analytic tools? What is its purpose& goals?

7. What are the challenges of Content Marketing? How can they be overcome?

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Bachelor of Science (Data Analytic) (Sem.–5)

COMPUTER NETWORK

Subject Code : UGCA1913

M.Code :94087

Date of Examination: 23-11-2023

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. **Write short notes on :**

   a) What is digital transmission?

   b) Write about use of Modem.

   c) Differentiate between LAN and WAN.

   d) Write the use of optical fiber.

   e) Define Distortion.

   f) Discuss PPP protocol.

   g) What is need of Addressing?

   h) Write a short note on congestion control policies.

   i) Discuss TCP/UDP.

   j) Define concept of Cryptography.

SECTION-B

2. What are the different topologies in networks? Write their advantages.

3. a. Discuss multiplexing.

   b. Compare message switching with packet switching.

4. What do you mean by Routing? Explain the concept of shortest path routing.

5. What are the responsibilities of the data link layer? How it is used for error detection and correction?

6. Explain the IEEE Token Bus and Ring standards used in computer networks.

7. What is the purpose of Application Layer? Discuss the protocols used in this layer.

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Bachelor of Science (Data Analytic) (Sem.–5)

LINUX OPERATING SYSTEM

Subject Code : UGCA2021

M.Code : 94092

Date of Examination : 28-11-2023

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION-A

1. **Write briefly:**

   a. What is KDE?

   b. What are aliases?

   c. What are pipes in Linux?

   d. Write any command for managing file.

   e. Give rules for naming variable.

   f. Which command is used to create a new directory in Linux?

   g. Discuss FTP.

   h. Give concept of super user.

   i. What are network services in Linux?

   j. What is the need of Backup management?

SECTION - B

2. Describe the basic structure of the Linux Operating System.

3. What is the use of vi editor? Write about its commands.

4. What is the role of shells in the Linux environment? Explain its types.

5. Explain how files are managed by Linux Administration?

6. Which office and database application is commonly used on Linux software management?

7. What are some common control statements used in shell scripting?

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Bachelor of Science (Data Analytic) (Sem.–5)

WEB DESIGNING

Subject Code : UGCA1927

M.Code : 94080

Date of Examination:17-11-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Explain the following :

   a) HMTL

   b) Footer

   c) Test styles

   d) Unordered List

   e) Border

   f) ROWSPAN

   g) Hyperlink

   h) CSS

   i) Object

   j) Loop.

SECTION-B

2. Define web server and its use. Also explain web client and web browser.

3. Explain the structure of HTML web page with example.

4. How we can and graphics to HTML document? Explain the use of alt attribute.

5. Differentiate between submit button and reset button in forms.

6. Describe different types of operators and loops in Java script.

7. Define functions. Also discuss function call, function parameters and function clouser.

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