For Reappear Candidates (Old Syllabus (2022-2023))

Exam Code: 117904 **Paper Code: 9418**

Programme: Bachelor of Computer Applications (Semester IV)
Course Title: Data Structures
Course Code: BCAL - 4111

Time allowed: 3 hrs **Max Marks: 60**

Note: Attempt five questions in all selecting atleast one question from each section. The fifth question can be attempted from any section. each question carries equal (12) marks.

Section A

1. Explain various types of data structures with their applications.
2. Describe the memory representation of a two-dimensional array. Write and explain the algorithm for inserting an element at a specific position.

Section B

3. Describe and compare any two sorting algorithms.
4. Explain the concept of singly and doubly linked lists. Write algorithms for inserting nodes in both.

Section C

5. Discuss the stack data structure. Explain its implementation using arrays and provide a real-world application example.
6. Define circular queue. Explain its operations using an array-based implementation and discuss its advantages over a linear queue.

Section D

7. What is a binary search tree (BST)? Explain the operations of insertion and deletion in BST with suitable examples.
8. Define a graph. Explain breadth-first search (BFS) and depth-first search (DFS) algorithms with example traversals.

FOR REAPPEAR CANDIDATES ONLY (2023-24.)

Exam Code: 117904
(50)

Paper Code: 9419

Programme: Bachelor of Computer Applications
Semester-IV

Course Title: Data Structures

Course Code: BCAL-4111

Time Allowed: 3 Hours

Max Marks: 60

Note: There are eight questions in the question paper divided into four sections A-D of 12 marks each. Attempt atleast one question from each section. The fifth question may be attempted from any section.

Section A

1. Explain time space trade-off among algorithms with example. (12)
2. a) Write algorithms to insert and delete elements from an array. (6)
   b) Using Bubble sort algorithm, sort the following set of elements in ascending order.
   89, 67, 14, 46, 1, 23, 59, 100 (6)

Section B

3. a) Write different types of hash functions. (6)
   b) How can you resolve collisions in hashing? (6)

4. Write algorithms for the following.
   a) inserting an element at the end of the linked list (4)
   b) Deleting the first element of the linked list (4)
   c) Searching the location of an element in the linked list (4)

Section C

5. Write step by step procedure of Quicksort algorithm with the help of example. (12)
6. a) How can you represent priority queue in memory? (6)

   b) Give an example to convert infix expression to postfix expression. (6)

Section D

7. Sort the elements in ascending order using Heapsort algorithm. Also compare the complexity of this algorithm with other sorting algorithms.
   99,88,77,66,55,44,33,22,11 (12)
8. Write a note on the following.
   a) DFS (4)
   b) Binary Search tree (4)
   c) Applications of graph (4)

Exam Code: 117904 **Paper Code: 4253**
(50)

Programme: Bachelor of Computer Applications
Semester-IV

Course Title: Data Structures

Course Code: BCAL-4111

Time Allowed: 3 Hours **Max Marks: 80**

Note: There are eight questions in the question paper divided into four sections A-D of 16 marks each. Attempt atleast one question from each section. The fifth question may be attempted from any section.

Section A

1. Explain time space trade-off among algorithms with example. (16)
2. a) Write algorithms to insert and delete elements from an array. (8)
   b) Using Bubble sort algorithm, sort the following set of elements in ascending order.
   89, 67, 14, 46, 1, 23, 59, 100 (8)

Section B

3. a) Write different types of hash functions. (8)
   b) How can you resolve collisions in hashing? (8)

4. Write algorithms for the following.
   a) inserting an element at the end of the linked list (5)
   b) Deleting the first element of the linked list (5)
   c) Searching the location of an element in the linked list (6)

Section C

5. Write step by step procedure of Quicksort algorithm with the help of example. (16)
6. a) How can you represent priority queue in memory? (8)
   b) Give an example to convert infix expression to postfix expression. (8)

Section D

7. Sort the elements in ascending order using Heapsort algorithm. Also compare the complexity of this algorithm with other sorting algorithms.
   99,88,77,66,55,44,33,22,11 (16)
8. Write a note on the following.
   a) DFS (6)
   b) Binary Search tree (5)
   c) Applications of graph (5)

Exam Code: 117904 **Paper Code: 4254**

Programme: Bachelor of Computer Applications

(Semester-IV)

Course Title: Information Systems

Course Code: BCAL-4112

Time: 3 Hours **Theory: 80**

Note: Attempt five questions in all, selecting at least one question from each section. The fifth question may be attempted from any section. Each question carries 16 marks.

SECTION- A

1. Explain various ways of capturing Online Information with suitable layouts.
2. Differentiate between Data, Information and Knowledge. What are the characteristics of valuable information? Discuss.

SECTION- B

3. Development life cycle of Information System consists different phases. Explain the working of each phase.
4. (a) Explain structured, unstructured and semi-structured decision in Information System.
   (b) What are Systems? Explain its various components.

SECTION- C

5. Write the characteristics, types and components of Decision Support System (DSS).
6. Describe the role of planning, implementation and controlling Management Information System (MIS) with suitable case-study.

SECTION- D

7. Explain Accounting Information System in detail along with its advantages and disadvantages.
8. Design a case-study for Transaction Processing System (TPS) by representing its components.

(For Reappear Candidates Only (2022-2023))

Exam Code: 117904 **Paper Code: 9420**

Bachelor of Computer Applications (Semester-IV)

Course Title: Information Systems

Course Code: BCAL-4112

Time: 3 Hours **Theory: 60**

Note: Attempt five questions in all, selecting at least one question from each section. The fifth question may be attempted from any section. Each question carries 12 marks.

Section- A

1. Explain various ways of capturing Online Information with suitable layouts.
2. Differentiate between Data, Information and Knowledge. What are the characteristics of valuable information? Discuss.

Section- B

3. Development life cycle of Information System consists different phases. Explain the working of each phase.
4. (a) Explain structured, unstructured and semi-structured decision in Information System.
   (b) What are Systems? Explain its various components.

Section- C

5. Write the characteristics, types and components of Decision Support System (DSS).
6. Describe the role of planning, implementation and controlling Management Information System (MIS) with suitable case-study.

Section- D

7. Explain Accounting Information System in detail along with its advantages and disadvantages.
8. Design a case-study for Transaction Processing System (TPS) by representing its components.

(For Reappear Candidates Old Syllabus (2022-2023))

Exam Code: 117904 **Paper Code: 9421**

Programme: Bachelor of Computer Applications (Semester-IV)

Course Code: BCAL-4113

Course Title: Internet Applications

Time Allowed: 3 Hours **Max. Marks: 60**

Note: Attempt five questions in all, selecting at least one question from each Section. The fifth question can be attempted from any section. Each question carries 12 marks.

Section-A

1. a. What is Internet? How is it different from ordinary network? How does the Internet work?
   b. Explain the working of DNS?
2. What is Search Engine? Explain the components and working of Search Engine?

Section-B

3. Write a note on:
   a. File Transfer Protocol (FTP)
   b. TCP/IP
4. What is a table? Perform the following:
   a. Create a table with 2 rows and 3 columns and align it to the center.
   b. Now add the background image to this table.
   c. Create a table as shown below:

<table>
<tr><td colspan="2">1</td><td>2</td><td rowspan="3">3</td></tr>
<tr><td rowspan="2">4
6</td><td>5</td><td rowspan="2">6</td></tr>
<tr><td>7</td></tr>
<tr><td>8</td><td colspan="2">9</td></tr>
</table>

Section-C

5. What is CSS? Discuss various parts of CSS rule? Discuss various background properties available in CSS?
6. a. How is break statement is different from continue statement in Javascript?
   b. What is DOM? What is the purpose of DOM? Explain different levels of DOM?

Section-D

7. What is a Wordpress? How can we manage pages in a wordpress?
8. a. Explain the role of mailchimp in wordpress and how can we use it?
   b. Write a note on Live Chat?

(For Reappear Candidates Only (2022-2023) and (2023-2024))

Exam Code: 117904 **Paper Code: 9422**

Programme: Bachelor of Computer Applications Semester-IV
Course Title: Computer Architecture
Course Code: BCAL-4114

Time allowed: 3 Hours **Max Marks: 60**

Note: Attempt five questions in all, selecting at least one question from each section. The fifth question can be attempted from any section. Each question carries equal (12) marks.

Section-A

Q1. What are Registers? Explain the various registers of computer?

Q2. What are shift and arithmetic operations? Explain examples of each.

Section-B

Q3. What are addressing modes? Explain it in detail.

Q4. Explain PUSH and POP instructions? Also explain stack organised CPU.

Section-C

Q5. What is memory? Explain the memory hierarchy in detail.

Q6. What is cache memory? Explain the working of cache memory.

Section-D

Q7. What is mode of transfer? Explain different modes of transfer?

Q8. Difference between parallel and distributed computers.

Paper Code: 4255

Programme	Exam Code	Course Code
Bachelor of Computer Applications	117904	BCAL-4113
Bachelor of Science (Information Technology)	118004	BITL-4111

Semester-IV
Course Title: Internet Applications
(70)

Time Allowed: 3 Hours **Max Marks: 80**

Note: Attempt five questions in all. Each question carries equal (16) marks. Candidate are required to attempt at least one question from each section and fifth question can be attempted from any section.

Section A

1. What is Internet? How is it different from ordinary network? How does the Internet work? (16)
2. What is DNS? Explain the types and working of DNS? How DNS is different from IP address? (16)

Section B

3. a. Discuss the role of Frames of HTML?
   b. What is a form? Explain different form elements available in HTML. (8+8)

4. Write a note on:
   a. Images in HTML
   b. Hyperlink in HTML (8+8)

Section C

5. What is CSS? Discuss various parts of CSS rule? Discuss the procedure for the creation of CSS. (16)
6. Describe various font and background families that can change the content creation? (16)

Section D

7. What is a Wordpress? How can we manage pages in a wordpress? (16)
8. a. What is a Plugin? Describe the role of plugin in creation of a website? List some plugins that comes with wordpress?
   b. Difference between page and post? (10+6)

Paper Code: 4256

Programme Name	Course Title	Course Code	Exam Code
Bachelor of Computer Applications	Applied and Discrete Mathematics	BCAL-4114	117904
Bachelor of Science (Information Technology)	Applied and Discrete Structures	BITL-4112	118004

Semester - IV

Time Allowed: 3 Hours **Max. Marks: 80**

Note: Attempt five questions in all, selecting at least one question from each section. Fifth question may be attempted from any section. Each question carries 16 marks.

Section A

1. a. Verify that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ where
$A = \{1,2,3,4 \ldots\ldots, 10\}$,
$B = \{2,4,6, \ldots\ldots, 10\}$,
$C = \{2,3,5,7\}$

b. Let $A = \{2,4,6,8\}$, $B = \{2,3,5,7\}$ and $U = \{1,2,3,\ldots\ldots 9\}$, then verify that
$(A \cup B)^C = A^C \cap B^C$

c. In a survey of 260 college students, the following data were obtained:
64 had taken a Mathematics course
94 had taken computer science course
48 had taken a business course
28 had taken both mathematics and business course

26 had taken both mathematics and computer science course
22 had taken both computer science and business course
14 students had taken all the three courses

i. How many students were surveyed who had taken none of the three types of courses?
ii. Of the surveyed courses, how many had taken only computer science course?

(4+4+8)

2. a. In a group of 70 people, 45 speak Hindi language and 33 speak English language and 10 speak neither Hindi nor English. How many can speak both English as well as Hindi language? How many can speak only English language?

b. Let A = {1,2,3}, B = {3,4}, C = {4,5,6}. Find
(i) A X (B ∩ C)
(ii) (A X B) ∩ (A X C)
(iii) A X (B U C)
(iv) (A X B) U (A X C)

(8*2)

Section B

3. Let P = {2, 3, 4, 5}. Consider the relation R and S on P defined by
R = {(2, 2), (2, 3), (2, 4), (2, 5), (3, 4), (3, 5), (4, 5), (5, 3)}
S = {(2, 3), (2, 5), (3, 4), (3, 5), (4, 2), (4, 3), (4, 5), (5, 2), (5, 5)}.
Find the matrices of the above relations.
Use matrices to find the following composition of the relation R and S.
i. R∘S
ii. RoR
iii. SoR
iv. SoS

(4*4)

4. For the given functions f and g, find ((f∘g)(x)) and ((f∘f)(x)) where the functions are as follow:

a. $f(x) = 2x + 3,\ g(x) = 3x$
b. $f(x) = (x+1)/(x-1),\ g(x) = (x-1)/(x+1)$

(8*2)

Section C

5. a. Prove that $(p \rightarrow r) \rightarrow (q \rightarrow s) = (p \wedge q) \rightarrow (r \vee s)$

b. Check the validity of the argument:
If I work, I cannot study. Either I work or pass mathematics.
I passed mathematics. Therefore, I study.

(8*2)

6. a. Let the universe be Z, the set of integers. Which of the following propositions are equivalent over Z?

i) $0<n^2 \leq 4$ ii) $0<n^3 \leq 8$ iii) $0<n \leq 2$

b. Over the universe of Books, define the propositions B (x): x has a blue cover, M (x): x has a mathematics book, U (x): x is published in the united states and R (x,y): The bibliography of x includes y.

Translate into words $(\exists x)\ (M(x) \wedge \sim B(x))$
Express using quantifiers:

i. Every book with a blue cover is a mathematics book.
ii. There are mathematics books that are published outside the United States.
iii. Not all books have bibliographies.

(8*2)

Section D

7. a) Prove that $A^3 - 4A^2 - 3A + 11I = 0$ if

$$A = \begin{bmatrix} 1 & 3 & 2 \\ 2 & 0 & -1 \\ 1 & 2 & 3 \end{bmatrix}$$

b) Show that the matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 5 & 2 & 6 \\ -2 & -1 & -2 \end{bmatrix}$ is nilpotent and find its index.

(8*2)

8. Solve the following equation:

$x + y + z = 6$

$x + 2z = 7$

$3x + y + z = 12$

(16)

Paper Code: 4261

Programme	Course Code	Exam Code
Bachelor of Computer Applications	BCAM-4117	117904
Bachelor of Science (Information Technology)	BITM-4117	118004

Semester IV

Course Title: Foundation of Statistical Computing

Time Allowed: 3 Hours **Max Marks: 50**

Note: Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section. Each question carries 10 marks.

Section – A

1. Explain aadvantages of R Programming language.
2. Explain the concept of Computational Problem Solving.

Section – B

3. Explain factors and tables in R with examples.
4. Explain Decision Making, Loop and Loop Control Statements in R with Programming examples.

Section – C

5. Write a program script in R to check leap year
6. Explain input and output functions in R.

Section – D

7. Explain KNN model.
8. Explain graphs along with graph syntax in R