S.Y.C.S

# S.Y.C.S

Oct. 2024-25

Regular Sem - III

S.Y.CS
11/10/24

S111024131M

**Time:(2 ½ Hours)** **[Total Marks: 75]**

NB: 1 All questions are compulsory.
2 Figures to the right indicate marks.
3 Mixing of sub-questions is not allowed.

**Q1** **Attempt any four.** **20**

A Explaintuple data type in python.

B Find the modulus and principal argument of the complex number $\frac{(1+2i)}{1-(1-i)^2}$.

C Find the square root of 21-20i.

D State and explain arithmetic operations of vector in python.

E Solve the Triangular system.
$2x_1+2x_2-4x_3=10$
$X_2+2x_3=3$
$5x_3=20$

F Express the vector (2,6) as a linear combination of vectors (1,1) and (2,3).

**Q2** **Attempt any four.** **20**

A Find matrix vector multiplication.

1. $A=\begin{matrix}1 & 2\\ 3 & 4\\ 5 & 6\end{matrix}$ and v=[2,3]

2. $\begin{matrix}1 & 3 & 1\\ 4 & 5 & 6\\ 7 & 8 & 9\end{matrix}$ and v=[4,8,3]

B Find vector matrix multiplication using dot product.

3. V= [1,2,3] $A=\begin{matrix}1 & 2\\ 3 & 4\\ 5 & 6\end{matrix}$

4. V= [7,9] $A=\begin{matrix}9 & 8\\ 7 & 6\\ 2 & 1\end{matrix}$

C Find the null space of the given system.
$2x_1 + x_2 = 0$
$x_1 + 2x_2 = 0$

D Consider a (2,5) encoding function such that
e(00)=00000 e(10)=11001
e(01)=01011 e(11)=11111
find minimum distance and how many errors can detect?

E Find the inverse of A
$A=\begin{matrix}1 & -1 & -2\\ 2 & -3 & -5\\ -1 & 3 & 5\end{matrix}$

[P.T.O]

F Show that given vectors are linearly dependent.
S={(4,-1,0),(2,1,3),(0,1,2)} in $R^3$.

20

**Q3 Attempt any four.**

A Solve the given system of linear equation using gauss elimination method.
X+5y=7
-2x-7y=-5

B Write a note on internet worm.

C Reduce the given matrix A in Echelon form.

$$A = \begin{matrix} 1 & -4 & -3 \\ 1 & -5 & -3 \\ -1 & 6 & 4 \end{matrix}$$

D Write a note on NumPy.Matlib library in python.

E Check whether the given set is orthogonal set.
{(1,2,1),(4,-2,0),(2,4,-10)}

F How to transform matrix to echelon form in python.

15

**Q4 Attempt any five.**

A Express $\frac{(6+i)(2-i)}{(4+3i)(1-2i)}$ in the form a+ib.

B Solve the following.
1. 1.1+0.1+0.0+1.1
2. 0+1.1+0.1+0.0

C Let a=(-1,3,4,7) and b=(-3,-2,1,0) be vectors in $R^4$. Find a+b.

D Write a note on page rank algorithm.

E Find the factors of a number 120.

F Find the norm of the vector u=(2,6,3,8).

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10/10/24

S10102404M

**Time:(2 ½ Hours)** **[Total Marks: 75]**

N.B. 1 All questions are compulsory.
2 Figures to the right indicate marks.
3 Mixing of sub-questions is not allowed.

**Q1** **Attempt any Four.** **20**

A Define OS. Explain multiprocessor operating system.
B Write a note on layered approach.
C Explain indirect message passing system in detail.
D With the help of suitable diagram explain process control block.
E Write a note on operations on process.
F State and explain any five system calls.

**Q2** **Attempt any Four.** **20**

A Explain pre-emptive scheduling in detail.
B Draw Gantt chart for SJF for the following and find average waiting time
And turn-around time.

| Process ID | CPU burst time | Arrival Time |
|---|---|---|
| P1 | 10 | 2 |
| P2 | 8 | 1 |
| P3 | 12 | 5 |
| P4 | 4 | 4 |
| P5 | 6 | 3 |

C With suitable example explain resource allocation graph.
D Discuss the techniques of recovery from deadlock.
E Write a note on dinning philosopher problem.
F Consider a system with three processes p1 through p3 and four resource types A, B, C .

| PID | Allocation | | | Need | | |
|---|---|---|---|---|---|---|
| | A | B | C | A | B | C |
| P1 | 0 | 1 | 0 | 7 | 4 | 3 |
| P2 | 3 | 0 | 2 | 0 | 2 | 0 |
| P3 | 3 | 0 | 1 | 6 | 0 | 0 |

| Available | | |
|---|---|---|
| A | B | C |
| 2 | 3 | 0 |

Compute the need array and check whether system is under safe state or not. Also find safe sequence.

[P.T.O]

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**Q3** **Attempt any Four.**

A Write a note on free space management technique.

B Consider the following page references string and find total number of page faults using LRU and FIFO where page frame size is 3.
c d e d e f c e d f

C Explain page replacement technique with the help of suitable diagram.

D Write a note on demand paging.

E Consider a disk queue with requests for I/O to blocks on cylinders
98, 34, 56, 122, 56, 75, 67, 183
Find total head movement of cylinders of head starts at 56 using FCFS scheduling.

F Write a note on tree structured directories.

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**Q4** **Attempt any Five.**

A Write a note on multicore programming.

B Enlist and explain process state.

C Write a note on deadlock prevention.

D With suitable diagram explain swapping technique.

E Briefly explain critical section problem.

F State and explain different attributes of file.

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S4CS
14/10/24

S1410242 3M

**Time: 2½ hrs** **Max. marks: 75**

N.B.:

1. Figures to right indicate full marks.
2. All questions are compulsory.
3. Illustrations, in-depth answers and diagrams will be appreciated.

**Q1** **Attempt any four of the following.** **20**

**a)** With the help of an example, explain the working of a circular array.

**b)** Convert the infix expression ((A + B) * C) - D to postfix.

**c)** What is a deque and how does it differ from a standard queue? Explain.

**d)** Explain how to insert an element into a singly linked list.

**e)** Write a short note on stack ADT.

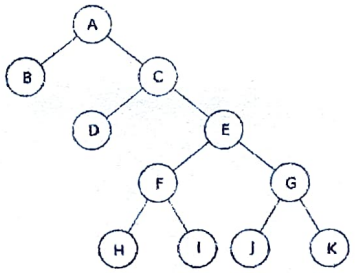
**f)** Solve the following expression using the algorithm for balancing of symbols: ((A+B)+[C-D]}

**Q2** **Attempt any four of the following.** **20**

**a)** Differentiate between Queue and Priority Queue.

**b)** Explain how to delete an element from a doubly linked list.

**c)** For the given binary tree, find the in-order, pre-order, and post-order traversals:




**d)** Given the sequence of numbers, show the step-by-step insertion into a BST: 30, 20, 40, 10, 25, 35, 50.

**e)** Define Binary tree. State and explain the types of binary tree.

**f)** Let A, B, C, D, E, F, G be data items with the following assigned weights: Apply the Huffman Algorithm and construct a 2-tree with minimum weighted path. Also find the Huffman Code.

| Data items | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| Probability | 22 | 5 | 11 | 19 | 2 | 11 | 25 | 5 |

**Q3** **Attempt any four of the following.** **20**

**a)** What is a graph? With the help of suitable example explain directed and undirected graph.

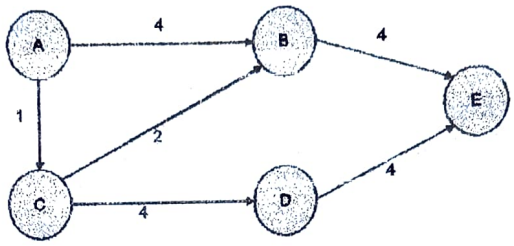
**b)** Explain the implementation of DFS with an example.

**c)** Insert the following sequence of keys in the hash table using linear probing technique for collision resolution.
Keys:50,700,76,85,92,73,101
Hash function: k mod 7

[P.T.O]

d) What is Collision in hashing? Explain the techniques for collision resolution.

e) Find the shortest path using Dijkstra's Algorithm for the following graph:




f) Discuss the similarities and differences between an adjacency matrix and an adjacency list.

**Q4 Attempt any five of the following.** 15

a) Explain the working of threaded binary tree.

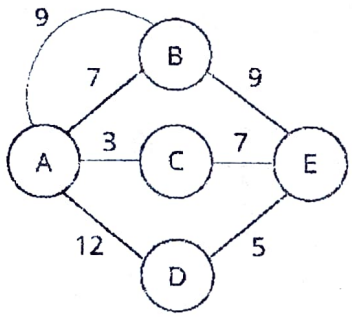
b) State and explain the operations of queue.

c) Define: i) Bipartite graph ii) Directed Cyclic graph iii) Spanning tree

d) Write a short note on Abstract Data type.

e) Explain the concept of binary heap.

f) Find the minimum spanning tree and minimum spanning cost using Kruskal's Algorithm for the following graph:

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Time: 2½ hrs | S1510243 | M | Full marks: 75

SYCS
15/10/24

Notes:

1. Figures to right indicate full marks.
2. All questions are compulsory. Use internal options to the questions.
3. Illustrations, in-depth answers and diagrams will be appreciated.
4. Mixing of sub-questions is not allowed.

**Q1 Attempt any four of the following.** **20**

a) Write a note on Sequences.

b) Explain the different types of parameters in a PL/SQL procedure. Write a procedure that demonstrates the use of all three types of parameters.

c) What are the advantages of PL/Sql? Explain.

d) Write a PL/SQL block to calculate the area of a circle for radius values from 1 to 5. Store the radius and corresponding area into a table named circle_area. Ensure the table contains two columns: radius (for the radius values) and area (for the calculated areas).

e) Differentiate between a for loop and a while loop by using PL/SQL block examples.

f) Write a PL/SQL program to find the Fibonacci series of first 10 numbers.

**Q2 Attempt any four of the following.** **20**

a) What is basic syntax of oracle exception handling block? Explain.

b) Explain implicit cursor with example.

c) Write a PL/SQL block for VARRAY for employee name and salary and count total number of employee present in the array, display all the employee names with salary.

d) What is PL/SQL exception handling and why it is needed? Explain.

e) Define following terms with example :
(i) declaring. (ii) opening. (iii) closing a cursor.

f) What is user-defined exception? Explain.

**Q3 Attempt any four of the following.** **20**

a) What is serializability? Write a note on view serializability? Explain.

b) Explain ECA rule.

c) Write a note on two phase locking protocol.

d) How does the Two-Phase Commit (2PC) protocol work in distributed database systems? Explain its phases.

e) Define log. What are the contents of log record? Explain.

f) What are the ACID properties in database systems? Explain with example.

**Q4 Attempt any five of the following.** **15**

a) Write advantages of PL/SQL.

b) Explain the role of NULL values with an example in PL/SQL block.

c) What is the difference between Errors and Exceptions?

d) What is lock? Explain it along with its types.

e) How do two transactions conflict? Explain.

f) What is user-defined exception? Explain.

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SYCS
16/10/24

S16102438M

Time: $2^{1/2}$ Hours Total Marks: 75

Notes:

1. Figures to right indicate full marks.
2. All questions are compulsory.

Q. 1 Attempt any four of the following. (20M)

A Difference between C++ and Java.
B Describe Java program Structure.
C What is Collection Framework? Explain with suitable examples.
D Write a note on Inheritance.
E Write a Java program on Constructor overloading.
F Write a java program that display given number is Armstrong number or not.

Q. 2 Attempt any four of the following. (20M)

A Explain JFC features.
B Write a note on Text entry components of Swing.
C Explain the following method:
1.forName() 2.createStatement() 3.executeUpdate()
4.next() 5.prepareStatement() 6.close()
D Explain different methods of ResultSet object.
E Write Swing java program that displays three colors to three different shapes.
F Write a JDBC program that retrieves the records from Student having field Rollno, Name and class.

Q. 3 Attempt any four of the following. (20M)

A What is JavaBeans? Explain with jsp bean tags.
B Explain JSP life cycle.
C Write a note on JSON.
D Compare GenericServlet and HttpServlet
E Write a Servlet program that display date and time.
F Write a program in JSP that takes number from Html page and JSP code displays square and cube values.

Q. 4 Attempt any five of the following. (15M)

A What is Servlet ? Enlist life cycle methods.
B What is Synchronization? Explain methods.
C Write a note on Servlet Session.
D Explain following term
a)Jsp forward b) jsp action c) jsp set and get property.
E Enlist Exception classes with description.
F What is Event? Give examples of events.

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S171024469

S4CS
17/10/22

Time: $2^{1/2}$ Hours

Total Marks: 75

Notes:

1. Figures to right indicate full marks.
2. All questions are compulsory. Use internal options to the questions.
3. Illustrations, in-depth answers and diagrams will be appreciated.
4. Mixing of sub-questions is not allowed.

Q. 1 Attempt any four of the following. (20M)

a) Explain following CSS background properties with an example:
   i) background-repeat
   ii) background-position
   iii) background-color
   iv) background-attachment

b) Write a HTML program for following output:

Username

Password

Reset Login

c) How the Ordered List and Unordered List created in HTML5? Explain.

d) Write a note on Image Maps.

e) Differentiate between:i) TextArea and Texfield ii) Radiobutton and Checkbox.

f) Explain any five text formatting tags in HTML5.

Q. 2 Attempt any four of the following. (20M)

a) Write a JavaScript programfor display Fibonacci series.

b) Explain the following with example:
   i) alert() ii) prompt()

c) What is validation? Write a program to validate email address.

d) How to create objects in JavaScript? Explain with an example.

e) Write a note on JavaScript Timer.

f) What is the difference between XML and HTML? Explain.

Q. 3 Attempt any four of the following. (20M)

a) What is the use of PHP? Explain advantages of PHP.

b) Define JQuery. Explain features of JQuery.

c) With the help of diagram explain Ajax Web Application Model.

d) Explain the following function with respect database handling on PHP:
   i) mysqli_connect()
   ii) mysqli_select_db()

P.T.O.

iii) mysqli_query()
iv) mysqli_fetch_array()
v) mysqli_close()

e) What is AJAX? Explain XMLHttpRequest Object with its properties.

f) Write a PHP program to check the given number is even or odd by using ternary operator.

Q. 4 Attempt any five of the following. (15M)

a) Write a JavaScript program to input a number from user into variable n, display table of factorial up to n.

b) What is the purpose of following CSS properties to work with fonts? Give example.

i) font-family
ii) font-style
iii) font-size

c) How to create object in JavaScript? Explain.

d) Explain any three PHP Comparison Operators.

e) What is function in JavaScript? Explain.

f) How to create links in HTML5? Explain its tags with an example.

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S4CS
18/10/24

S181024 57M

**Time: 2½ hrs** **Max. marks: 75**

Notes:

1. Figures to right indicate full marks.
2. All questions are compulsory.

**Q1** **Attempt any four of the following.** **20**

**a)** What the common grammatical errors in writing? Explain with suitable examples.

**b)** Define tone. State and explain any four types of tones.

**c)** Write a short note on:

i) Keeping verbs active ii) Chunking Information

**d)** State and explain different types of sentences.

**e)** Explain in brief the ideal length for the following content:

i) Facebook post ii) Tweets iii) Line of text

iv) Paragraph v) YouTube video

**f)** Write a short note on content referencing.

**Q2** **Attempt any four of the following.** **20**

**a)** Explain 5W's and 1H of infographics.

**b)** What are the tips to write an effective landing page? Explain.

**c)** State and explain the guidelines for writing a successful home page.

**d)** Write a short note on the science of visualization.

**e)** Describe the various types of audiences.

**f)** Explain the most effective ways to differentiate your profile from others on LinkedIn.

**Q3** **Attempt any four of the following.** **20**

**a)** Define Intellectual property. State and explain the types of intellectual properties

**b)** What is legal writing? Explain the features of legal writing.

**c)** Explain the different types of editing tools.

**d)** Write a short note on plagiarism.

**e)** State and explain any five research and knowledge management tools.

**f)** Write a note on Google Authorship.

**Q4** **Attempt any five of the following.** **15**

**a)** Describe how to write annual reports.

**b)** Write in brief any three tips to consider while writing headlines.

**c)** Explain how to use lists in content writing.

**d)** Write a short note on copyright infringement.

**e)** State and explain any three productivity tools.

**f)** Write a note on writing succinctly.

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