Question Paper Set of

S.Y.B.SC.IT. – Sem-III

Regular Exam

University of Mumbai

October, 2022

12/10/

PRAHLADRAI DALMIA LIONS COLLEGE OF COMMERCE & ECONOMICS	
REGULAR , OCTOBER, 2022	
DEPARTMENT: BSCIT	SEMESTER: III
CLASS: SYBSCIT	SUBJECT: Database Management Systems
DURATION: 2:30	MARKS: 75

1. **Attempt *any three* of the following:** 15

a. Write short note on CODD'S 12 RULES

b. Explain DBMS architecture in brief.

c. Explain 3 schema architecture in dbms

d. Write a short note on data models in DBMS.

e. Explain ER diagram in detail.

f. Write a short note on UML.

2. Attempt any three of the following: 15

a. Write short note on set operator

b. Write a short note on joins in DBMS.

c. Explain 1NF, 2NF and 3NF with the help of an example.

d. Write short note on Relational Algebra

e. Explain various keys used in DBMS.

f. Write short note on Constraints in DBMS

3. Attempt any three of the following: 15

a. How to create, update and delete views. Explain with the help of an example.

b. Write a short note on mysql alter table statement.

c. Solve the following queries

1. Display records from the employee table where jobs start from letter 'M'.
2. Display records from employee table in the alphabetical order of job and arrange in descending order of salary.
3. Display unique values of jobs from the employee table.
4. Display all employees with ename starting with letter 'j'.
5. Display employees where the third letter of the job is 'a'.

d. **Create the following table and insert 5 five meaningful records in each table.**

STUDENT

Attribute	Datatype	Constraint
Rollno	Number	Primary key
Fname	Varchar2(15)	
Lname	Varchar2(15)	
Course_name	Varchar2(15)	NOT NULL
Major	Varchar2(15)	
Email_id	Varchar2(15)	

e. Write short note on Triggers in DBMS

f. Explain any 5 Aggregate functions in DBMS.

4. Attempt any three of the following: 15

a Explain atomicity and durability requirements of transaction.

b With the help of diagrams explain various states of transaction.

c What are concurrent executions? Explain concurrency control schemes.

d Write short note shadow paging.

e What are timestamp based methods? Explain in brief.

f Explain database recovery management with the help of log based recovery.

5. Attempt any three of the following: 15

a. Write a short note on PL/SQL Block.

b. Explain case statements in PL/SQL.

c. Explain %TYPE and %ROWTYPE with the help of an example.

d. Write a short note on stored functions in PL/SQL.

e. Accept a number from the user and display its table using while loop & for loop.

f. Accept two numbers from the user and display its addition, subtraction, multiplication, division and remainder using PL/SQL.

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PRAHLADRAI DALMIA LIONS COLLEGE OF COMMERCE & ECONOMICS

REGULAR, OCTOBER 2022

DEPARTMENT: BSCIT	SEMESTER: III
CLASS: SYBSCIT	SUBJECT: DATA STRUCTURE
DURATION: 2:30	MARKS: 75

1. Attempt *any three* of the following: **15**

a. Define Data Structure. What are the different types of data structure?

b. What are the characteristics of an algorithm? Explain.

c. Define Asymptotic Notation. Explain Big O Notations with suitable diagram.

d. Define Array. Explain memory representation of one dimensional array.

e. What are the limitations of Array? Explain.

f. How is the Sparse Matrix stored in memory? Explain.

2. Attempt *any three* of the following: **15**

a. Explain comparison between Array and Linked List.

b. Define singly linked list. Write an algorithm to traverse a singly linked list.

c. Write a short note on the Circular Linked List.

d. What are the applications of Linked List? Explain.

e. Write an algorithm to insert an element at the end of the linked list.

f. Explain any three operations that can be performed on a singly linked list.

3. Attempt *any three* of the following: **15**

a. What are the different applications of Queue? Explain.

b. Write an algorithm to insert an element in a queue.

c. Write a short note on priority queue.

d. Convert the following infix expression to a postfix expression.
Infix Expression: (A/(B – C)*D+E)

e. Define Stack. What are the operations that can be performed on stack? Explain.

f. Write a program to find the factorial of a number using recursion.

4. Attempt *any three* of the following: **15**

a Explain the following terms related to tree with example
Path, Degree of Node, Leaf node, Root node, Parent node

b Construct A Binary Tree from Inorder and Preorder Traversal

Inorder :	40	20	50	10	60	30
Preorder :	10	20	40	50	30	60

c Write a short note on Huffman algorithm and explain the concept with an example.

d Define sorting. What are the different methods of sorting? Explain.

e Explain Preorder Traversal of Binary Tree with suitable example.

f Write an algorithm to search an element in an array using a sequential search method.

5. Attempt *any three* of the following: **15**

a. Consider the sequence 89, 18, 49, 58, 9 of numbers. Store data using linear probing for the given table size of 10.

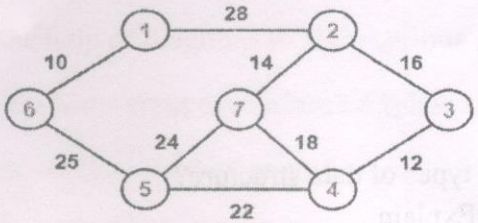
b. Explain Bucket Hashing with an example.

c. What is hashing? Explain the properties of a good hash function.

d. Define Graph. Explain any five terminologies related to graphs.

e. Explain Breadth First Search – Graph Traversal algorithm with example.

f. Find the minimum cost spanning tree using Prim's Algorithm for the below graph.



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PRAHLADRAI DALMIA LIONS COLLEGE OF COMMERCE & ECONOMICS	
EXTERNAL EXAMINATION, October, 2022	
DEPARTMENT: Information Technology	SEMESTER: III
CLASS: SYBSCIT	SUBJECT: Python Programing
DURATION: 2:30 HRs	MARKS: 75

Q.1 Attempt any THREE of the following **15**

A List and explain the different features of Python

B Explain the use of Brackets, Braces and Parentheses.

C What is operator? What is operator precedence? List rules for operator precedence in python.

D Write a python script to display 1st 10 Even and odd numbers separately using control statements.

E Write a python script to accept the required input from user and calculate the value for $\sum_{i=1}^{5} x_i$ using while loop.

F Write the output for following snippet.

1.
```
color = ["red", "big", "tasty"]
fruits = ["apple", "banana", "cherry"]
for x in color:
    for y in fruits:
        print(x, y)
```

2.
```
a = 330
b = 33
print(a/b+a)
print(b*10/a)
```

Q.2 Attempt any THREE of the following **15**

A What is function? Explain the usage of functions with example. .

B Write output for following python snippet

1.
```
def my_function(*num):
    print(num[2])
my_function(1,2,3,4,5)
```

2.
```
def try(k):
    if(k>0):
        result = k + try(k-1)
        print(result)
try(5)
```

C What are Boolean functions? Write a program to justify Boolean functions.

D What is string slicing? Illustrate variations in slicing with example.

E "Python strings are mutable." Is this statement valid in Python? Illustrate with example.

F Write a python program to accept string from user. Perform following on user input.

a. Display string in lower case
b. Display string upper case
c. Display length of string
d. Display string in reverse order.
e. Make a Copy of string

Q.3 Attempt any THREE of the following **15**

A What is List? How to create List in python?

B Illustrate the difference between remove() and pop() with example.

C Explain the difference between List and Tuple

D Are Tuples Mutable? Justify with example.

E Write a python program to read content from a text file

F Write a program to store student details using dictionary and display the same.

Q.4 Attempt any THREE of the following **15**

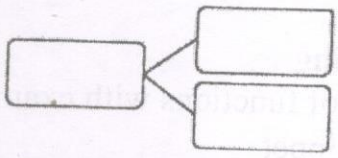
A Write a note on multithreading.

B Explain random module.

C List and explain any two principles of OOP with example.

D Write a program to achieve method overriding.

E Identify the type of Inheritance in the figure given below. Implement the same using python



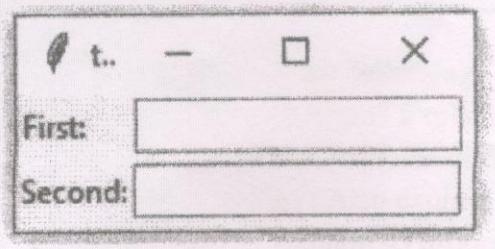
F What is module? How to create and use module in python?

Q.5 Attempt any THREE of the following **15**

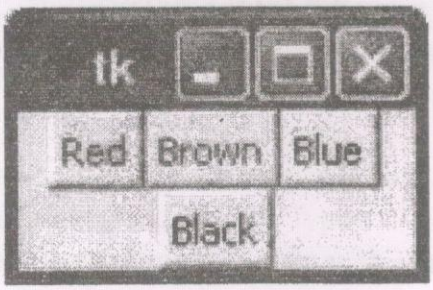
A List and explain standard properties for widgets.

B Illustrate the difference between Pack and Place layout manager

C Create the following GUI using grid geometry manager.



D Create the following GUI using pack layout manager. Set the foreground color for all buttons with respective color.



E Write steps to establish connection to MySQL database from python

F Write a python program to select all records from table in given database.

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PRAHLADRAI DALMIA LIONS COLLEGE OF COMMERCE & ECONOMICS

REGULAR , OCTOBER, 2022

DEPARTMENT: BSCIT	SEMESTER: III
CLASS: SYBSCIT	SUBJECT: COMPUTER NETWORKS
DURATION: 2:30	MARKS: 75

1. Attempt *any three* of the following: **15**

a. What is data communication? Explain its various characteristics.

b. What is network? List & explains different types of network.

c. Explain Mesh topology? Also explain its advantages and disadvantages.

d. What is OSI model? Explain its different layers and their functions.

e. Define Transmission Impairment and explain how it is caused?

f. State the different types of Transmission modes. Explain any one of them.

2. Attempt *any three* of the following: **15**

a. Explain Wavelength-Division Multiplexing (WDM).

b. Explain Frequency Hopping Spread Spectrum (FHSS).

c. Write a short note on Infrared.

d. Explain Circuit Switching in detail.

e. Define Error. Explain its Types.

f. What is checksum? Explain with example.

3. Attempt *any three* of the following: **15**

a. Write a short note on data link control services.

b. Explain PPP transition states.

c. Write short note on CSMA along with persistence strategy.

d. Write a short note on Thin Ethernet.

e. Explain Bluetooth architecture.

f. What are the advantages of VLAN?

4. Attempt *any three* of the following: **15**

a Explain different notation of IPv4 address?

b Write a short note on subnetting.

c An organization is granted the block 130.34.12.64/26. The organization needs four subnetworks, each with an equal number of hosts. Design the subnetworks and find the information about each network.

d Explain types of extension headers in IPv6.

e Explain the different types of ICMP messages.

f What is the inefficiency in mobile IP? Explain with the solution.

5. Attempt *any three* of the following: **15**

a. What are the services of TCP?

b. Explain Go-Back-n Protocol of transport layer.

c. Explain Static, Dynamic and Active Documents.

d. Explain various phases used in mail transfer.

e. Explain Local login and Remote login with respect to telnet.

f. Define and give example of the following: i.FQDN. ii.PQDN

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PRAHLADRAI DALMIA LIONS COLLEGE OF COMMERCE & ECONOMICS	
REGULAR , OCTOBER, 2022	
DEPARTMENT: BSCIT	SEMESTER: III
CLASS: SYBSCIT	SUBJECT: Applied Mathematics
DURATION: 2:30	MARKS: 75

1. Attempt *any three* of the following: **15**

a. Explain following Matrices with one example each.
   a) Identity Matrix
   b) Null Matrix

b. Prove that $A(B+C) = AB + AC$
For Matrices, $A = \begin{bmatrix} 1 & -1 \\ 1 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 \\ 2 & 3 \end{bmatrix}$ *and* $C = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$

c. Simplify $(2+3i)(3+4i)$

d. Add the given Matrices $P = \begin{bmatrix} 4 & -1 \\ 2 & 3 \end{bmatrix}$ *and* $Q = \begin{bmatrix} 3 & 1 \\ 2 & 0 \end{bmatrix}$

e. Find $\log(3+4i)$

f. Given, $Z_1 = 4+2i$, $Z_2 = -3+3i$, find $Z_1 + Z_2$ and also find $Z_1 - Z_2$

2. Attempt *any three* of the following: **15**

a. Solve the given DE using method of Separation of Variables
$y\,dy = x\,dx$

b. Write the general solution of following:
   a) Exact Differential Equation
   b) Linear Differential Equation

c. Solve the given Exact DE
$(2x - y + 1)dx + (2y - x - 1)dy = 0$

d. Check if the given DE is Exact or not
$(3y)dx + (3x)dy = 0$

e. Solve the given Linear DE
$$\frac{dy}{dx} + \frac{2x}{(x^2+1)}\,y = x$$

f. Solve the given DE using method of Separation of Variables
$$\frac{dy}{dx} = xy + x + y + 1$$

3. Attempt *any three* of the following: **15**

a. Find $L[1]$

b. Explain First shifting property of Laplace transform with a suitable example

c. Write LT of following:

a) $f(t) = \sin 2t$

b) $f(t) = \cos 3t$

d. Write a note on Dirac Delta function

e. Find Inverse Laplace Transform of $\frac{2}{s^2+4}$

f. Explain Heaviside Unit step function with suitable diagram

4. Attempt *any three* of the following: **15**

a. Evaluate $\int(2x+3)dx$

b. Evaluate $\int_0^1 x\,dx$

c. Evaluate $\int\left(\frac{2x}{x^2+1}\right)dx$

d. Evaluate $\iint(x+y)dx\,dy$

e. Evaluate $\iiint(x+y+z)\,dzdydx$

f. Evaluate $\iiint xyz\,dzdydx$

5. Attempt *any three* of the following: **15**

a. Prove that $|\overline{(n+1)} = n!$

b. Explain Gamma function

c. Find $|\overline{(7/2)}$

d. Evaluate $\int_0^1 (x.logx)^6\,dx$

e. Write a note on Error Function

f. Write properties of Gamma and Beta functions
