Question Paper Set of

S.Y.B.SC.IT. – Sem-III

Regular Exam

University of Mumbai

October, 2019

PRAHLADRAI DALMIA LIONS COLLEGE OF COMMERCE & ECONOMICS	
EXTERNAL EXAMINATION, October, 2019	
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 $\sum_{i=1}^{5} a^i$ using while loop.

F Write the output for following snippet.

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

2.
```
a = 330
b = 33
print("A") if a > b else print("=") if a == b else print("B")
```

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 Dictionary? How to create Dictionary 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 handle IO Exception.

Q.4 Attempt any THREE of the following 15

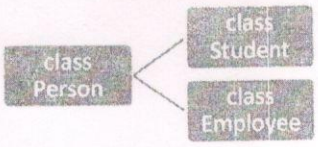
A What is regular expression? Explain the use of regular expression with example.

B What are the different functions used to match the regular expression?

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



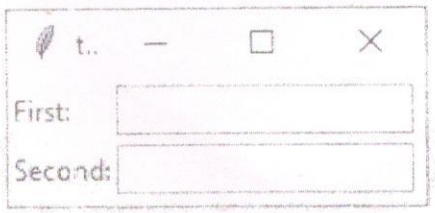
F What is module? How to create and use module in python?

Q.5 Attempt any THREE of the following 15

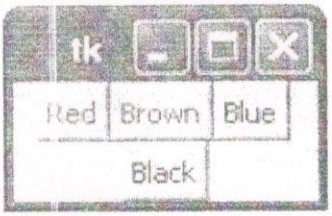
A List and explain standard properties for widgets.

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 (Caption of Button).



E Write steps to establish connection to MySQL database from python.

F Write a python program to create table in a given database.

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EXTERNAL EXAMINATION, OCTOBER, 2019

DEPARTMENT: INFORMATION AND TECHNOLOGY	SEMESTER: III
CLASS: SYBScIT	SUBJECT: Applied Mathematics
DURATION: 2:30	MARKS: 75

Q.1) ATTEMPT ANY THREE FROM THE FOLLOWING: **(15 Marks)**

a) Find the rank of the matrix by Echelon form.

$$\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$$

b) Examine for consistency and solve, if consistence

$x + y + z = 3$; $2x - y + 3z = 1$; $4x + y + 5z = 2$; $3x - 2y + z = 4$

c) Examine whether the vectors.

$X_1 = [3 \quad 1 \quad 1]$, $X_2 = [2 \quad 0 \quad -1]$, $X_3 = [4 \quad 2 \quad 1]$ are linearly independent.

d) Express $\frac{-1}{2} + \frac{\sqrt{3}}{2}i$ in polar form.

e) Prove that $(1 + i\sqrt{3})^8 + (1 - i\sqrt{3})^8 = -2^8$

f) Show that $\frac{1 + \cos\theta + i\sin\theta}{1 + \cos\theta - i\sin\theta} = \cos\theta + i\sin\theta$.

Q.2) ATTEMPT ANY THREE FROM THE FOLLOWING: **(15 Marks)**

a) Solve $x\frac{dy}{dx} + \frac{y^2}{x} = y$

b) Solve: $\frac{dy}{dx} = \frac{x + y + 1}{2x + 2y + 1}$

c) Solve $(x^2 - 3xy + 2y^2)\,dx + (3x^2 - 2xy)\,dy = 0$

d) Solve $(x^2y^2 + xy + 1)\,y\,dx + (x^2y^2 - xy + 1)\,x\,dy = 0$

e) Solve $\cos x\frac{dy}{dx} + y\sin x = \sec^2 x$

f) Solve : $(D^3 + 4D)\,y = \sin 2x$.

Q.3) ATTEMPT ANY THREE FROM THE FOLLOWING: **(15 Marks)**

a) If $L\{f(t)\} = \frac{4s}{s^2 + 2s + 3}$ then Find $L\{f(2t)\}$.

b) Find Laplace transform of $\frac{1 - \cos t}{t}$.

c) Find Laplace transform of $f(t) = t\,e^{3t}\sin 2t$.

d) Find inverse Laplace transform of $\frac{3s + 1}{(s - 1)(s^2 + 1)}$

e) Find inverse Laplace transform of $\frac{s^2 - 2s + 3}{(s-1)^2 (s+1)}$.

f) Find inverse Laplace transform by convolution theorem

$$F(s) = \frac{1}{(s-2)^4 (s+3)}.$$

Q.4) ATTEMPT ANY THREE FROM THE FOLLOWING: **(15 Marks)**

a) Evaluate : $\int_0^1 \int_0^y xy\, e^{-x^2} dx\, dy.$

b) Change the order of integration and evaluate $\int_0^1 \int_{x^2}^x xy\, dx\, dy$

c) Evaluate $\iint xy(x+y)\, dx\, dy$ over the area between curve $y = x^2$ and the line $y = x$.

d) Evaluate: $\iiint (x + y + z)\, dx\, dy\, dx$ over the tetrahedron bounded by the planes $x = 0$, $y = 0$, $z = 0$ and $x + y + z = 1$.

e) Evaluate : $\int_{-1}^1 dz \int_0^z dx \int_{x-z}^{x+z} (x + y + z)\, dy.$

f) Evaluate $I = \int_0^2 \int_0^x \int_0^{2x+2y} e^{x+y+z}\, dx\, dy\, dz.$

Q.5) ATTEMPT ANY THREE FROM THE FOLLOWING: **(15 Marks)**

a) Evaluate $\int_0^\infty \sqrt{x}\, e^{-x^3} dx$

b) Evaluate $\int_0^1 x^5 (1 - x^3)^{10} dx$

c) Evaluate : $\int_0^1 (x \cdot \log x)^6 \cdot dx$

d) Show that : $\int_0^\infty \frac{1 - e^{-ax}}{x} \cdot e^{-x} \cdot dx = \log(a + 1).$

e) Show that : $\int_0^\infty \frac{\cos \lambda x}{x} (e^{-ax} - e^{-bx})\, dx = \frac{1}{2} \log\left(\frac{b^2 + \lambda^2}{a^2 + \lambda^2}\right)$

f) Show that : $\text{erf}_c(-x) + \text{erf}_c(x) = 2$. Also prove that $\text{erf}(\infty) = 1$

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REGULAR EXAM , OCTOBER, 2019

DEPARTMENT: INFORMATION AND TECHNOLOGY	SEMESTER: III
CLASS: SYBSCIT	SUBJECT: Database Management Systems
DURATION: 2:30 Hrs.	MARKS: 75

1. Attempt any three of the following: 15

A. Write any five basic sql statements with example of each.
B. Explain DBMS architecture in brief.
C. Explain instance and schema in dbms.
D. Write short note on data models in dbms.
E. Explain ER diagram in detail.
F. Write short note on UML.

2. Attempt any three of the following: 15

A. Write short note on Set operator
B. Write short note on Joins in DBMS.
C. Explain 1NF, 2NF and 3NF with the help of an example.
D. How to create , update and delete view. Explain with the help of an example.
E. Explain various keys used in DBMS
F. Explain group by query statement with the help of an example.

3. Attempt any three of the following: 15

A. Write short note on SQL Alter table statement.
B. Explain constraints with the help of an example.
C. Write short note on business Rule.
D. Write queries to state how to control user access.
E. How to access data from multiple tables. Explain with the help of an example.
F. Solve the following queries

1. Display records from employee table where job 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 job from employee table.
4. Display all employees with ename starting with letter 'j'.
5. Display employees where third letter of job is 'a'.

4. Attempt any three of the following: 15

A Explain Atomicity and Durability requirements of transaction.
B With the help of diagram 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 short note on PL/SQL Block.
B. Explain case statement in PL/SQL.
C. Explain %TYPE and %ROWTYPE with the help of an example.
D. Write short note on stored function in PL/SQL.
E. Accept a number from the user and display it's table using while loop & for loop.
F. Accept two numbers from the user and display its addition, subtraction, multiplication, division and remainder.

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EXTERNAL EXAMINATION, October, 2019

DEPARTMENT: Information Technology	SEMESTER: III
CLASS: SYBScIT	SUBJECT: Computer Networks
DURATION: 2:30 HRs	MARKS: 75

Q.1 Attempt any THREE of the following 15

A Explain with block diagram schema of communication system.

B Draw and explain OSI Model in detail.

C Explain below parameters of communication.

- Channel capacity
- Data rate
- Bandwidth
- Noise
- Error rate

D Explain in detail Line coding with classifications.

E Explain Pulse code modulation in details with PCM receiver.

F Draw and explain ASK (Amplitude Shift Key).

Q.2 Attempt any THREE of the following 15

A Explain concept of multiplexing and demultiplexing in detail.

B Explain various transmission media available with their classification.

C Write short note on wireless media.

D Draw and explain virtual circuit packet.

E Consider that the bit sequence given below is to be transmitted and sequence = 10110010, Draw the resulting wave form for below:

- Unipolar RZ
- Polar RZ
- AMI
- Split Phase Manchester

F Explain transmission impairments and various attributes of transmission.

Q.3 Attempt any THREE of the following 15

A Explain HDLC frame structure in detail.

B Draw and explain code division multiple access.

C Write short note on cellular telephone size.

D What are the characteristics of broadcast routing?

E List and explain different duties of network layer.

F Write short note on Implementation of connection orientation service.

Q.4 Attempt any THREE of the following 15

A Draw and explain OSPF in detail.

B Write short note on Electronic mail.

C Draw and explain IPv6 packet format in detail.

D Draw and explain STOP AND WAIT ARQ system.

E Write short note on UDP (User Datagram Protocol).

F Write short note on TCP/IP (Transmission Control Protocol/Internet Protocol).

Q.5 Attempt any THREE of the following 15

A Write short note on DNS (Domain Name System).

B Draw and explain RFC 882 message formats in detail.

C Write short note on FTP (File Transfer Protocol).

D For the address 24.46.8.95 identify the type of network and find the network address.

E Explain Linear data modulation in detail.

F Write short note on WWW.

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REGULAR EXAM, OCTOBER, 2019

DEPARTMENT: INFORMATION AND TECHNOLOGY	SEMESTER: III
CLASS: SYBSCIT	SUBJECT: Data Structure
DURATION: 2:30 Hrs.	MARKS: 75

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

a. What is array? What are the different types of array?
b. Explain different types of data structure.
c. Explain Omega and Theta notation with suitable diagram.
d. What are different types of Sparse Matrix? Explain
e. Explain with an example how to merge two sorted array.
f. Write a program to search for an element in an array of size 5.

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

a. What is Circular Linked List? How to traverse a Circular linked list.
b. Write an algorithm to search for a node in a linked list based on a specific value.
c. Explain the applications of linked list.
d. Write an algorithm for reversing the single linked list.
e. Explain how to represent a sparse array using an array and a linked list.
f. What is the need of two way linked list? Explain the structure of a node in a two way linked list.

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

a. Define Stack. Discuss the basic operations performed on the stack.
b. What is recursion? What are the disadvantages of recursion?
c. Write an algorithm to convert infix expression to postfix operations.
d. Check whether the following expression is valid
[(3+4)*5-[6/7]+{8*9}-3]
e. What are the applications of Queue?
f. Write an algorithm to insert and delete a node from a Queue.

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

a. Write an algorithm for insertion sort.
b. What is Searching? Explain different types of searching methods.
c. Explain traversing of binary tree.
d. Reconstruct the binary tree whose in-order and post-order traversals are:
In-order Traversal : 4 8 2 5 1 6 3 7
Post-order Traversal : 8 4 5 2 6 7 3 1
e. Create a heap for the given elements 15 7 10 2 20 15 18
f. Write short note on Red Black Tree.

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

a. What are the different ways to represent Graph in memory? Explain.
b. Explain Breadth-First of Graph traversal with example.
c. Explain with example Prim's Algorithm to find the Minimum Spanning Tree.
d. Explain in brief about spanning tree with suitable example.
e. What is Hashing? Explain Linear Probing with suitable example.
f. Consider the sequence 3, 5, 13, 24, 33. Solve it using quadratic probing for the given table size of 10.