Q.P.Code: 00000230

B.SC.(CS) (Sem- II) July-2023

Programming with Python II

Time: 2 ½ Hrs **Marks: 75 Marks**

N.B.

1) All questions are compulsory.
2) Figures to the right indicate marks.
3) Illustrations, in-depth answers and diagrams will be appreciated.
4) Mixing of sub-questions is not allowed.
5) Each question carries 5 Marks.

Q. 1Attempt the following. (Any FOUR) (Each of 5Marks) (20M)

A. Explain in detail python file functions for reading, writing, positioning, and seeking within file contents?
B. Explain different techniques for reading files such as Read and ReadLines.
C. Explain how to create a directory, how to change a directory and how to remove a directory in python.
D. What is the use of Iterator? Explain with example.
E. Explain the followings:
   1) Try 2) Except 3) Finally
F. What is regular expression? Explain with example.

Q. 2 Attempt the following. (Any FOUR) (Each of 5Marks) (20M)

A. Explain GUI in python and state its advantages and disadvantages.
B. What is grid layout? Give suitable example.
C. What are the different types of messagebox available in message widget of tkinter module?
D. With the help of proper example explain radiobutton widget in tkinter module.
E. Write a python GUI that contains three Radio buttons for colors “Red”, “Green”, and “Blue”. Display selected color on a label.
F. Write a python Canvas program to draw Circle, Polygon and Arc with effects.

Q. 3 Attempt the following. (Any FOUR) (Each of 5Marks) (20M)

A. What is mysql connector? How to access and connect with database using mysql connector? Give and Explain steps with example.
B. Write a python program to insert a value in database table emp with following attribute emp_id number, emp_name string, emp_sal number.
C. How to execute different types of statements on a database table? Explain with examples.
D. Differentiate between socket. connect() and socket.bind().
E. What is cursor? Explain it with example.
F. Explain URL with example.

Q. 4 Attempt the following. (Any THREE) (Each of 5Marks) (15M)

A. How to apply font on tkinter widgets? Explain with examples.
B. With the help of proper example explain listbox widget in tkinter.
C. Write a python program to write the data into the file.
D. Explain in brief following exceptions:
   1)Exception 2) ZeroDivisionError 3) ValueError 4) Nameerror
E. Write a python program to send email.
F. Explain Exception handling.

B.Sci.(CS) (Sem- II) July-2023

Linux

Q.P.Code: 00000234

Time: 2 ½ Hrs **Marks: 75 Marks**

N.B.
1) All questions are compulsory.
2) Figures to the right indicate marks.
3) Illustrations, in-depth answers and diagrams will be appreciated.
4) Mixing of sub-questions is not allowed.
5) Each question carries 5 Marks.

Q.1 **Attempt any four of the following:** **20 Marks**

a) Explain the importance of Linux in web servers.

b) Define what are different operating systems in the market. Explain Linux operating System in detail.

c) Write a short note on Architecture of Linux systems.

d) What is the Linux File System? Explain.

e) Write difference between CUI and GUI? Compare and contrast.

f) Explain various types of Linux File System.

Q.2 **Attempt any four of the following:** **20 Marks**

a) List and explain multimedia applications.

b) Write a short note on following TEXT EDITORS:
1. Graphics editors
2. Emacs

c) List down all shells available for the LINUX system. Explain any three in detail.

d) Describe default Shell Environment Variables.

e) Describe File System architecture.

f) Write a short note on man pages, GNU info help command.

Q.3 **Attempt any four of the following:** **20 Marks**

a) Write any five privileges of administrator.

b) What is the purpose of commands:- ssh, ping, hostname, telnet, route. Give a suitable example.

c) Define regular expressions. What is the purpose of the following regular expression characters:- ^ , $, * , ?

d) Write a shell script to read a month number from the user and display corresponding month name

e) Write a note on FTP.

f) Explain the purpose of HOME, PS2, PS1, SHELL, USER shell variables.

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

a) Explain Linux structure in detail.

b) How to create a username and password? Explain in detail.

c) Write a short note on Network Management.

d) List down any five basic commands used in linux.

e) What are the uses of root users in Linux systems? Give the purpose of sudo command.

f) Write a shell script to accept 2 numbers from the user and one operator. Based on the operator entered, perform addition, subtraction, multiplication and division.

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B.Sci.(CS) (Sem-II) July-2023

Calculus

Q.P.Code:00000241

Time: 2 ½ Hrs **Marks: 75 Marks**

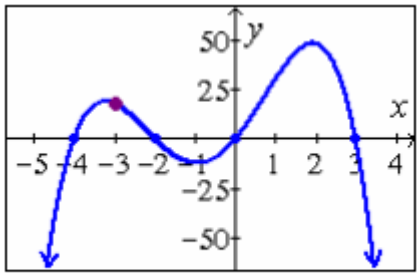
N.B.
1) All questions are compulsory.
2) Figures to the right indicate marks.
3) Illustrations, in-depth answers and diagrams will be appreciated.
4) Mixing of sub-questions is not allowed.
5) Each question carries 5 Marks.

Q.1 **Attempt any four of the following:** **20**

a) Find the continuity of $f(x) = \frac{x^2 - 49}{x - 7}$ in [0,7]

b) Define left hand and right hand derivative of function with example.

c) Write an algebraic rule for the polynomial function p graphed following figure.



The graph of $y = p(x)$

Note that the graph passes through the point (3, 18).

d) Suppose p is a polynomial function that satisfies the following conditions:
The graph of p has exactly three turning points : (2.5,5), (0,2),(2.5,5) and
The graph of p has exactly two inflection points: (1, 0) and (1, 0). Sketch a graph of p based upon this information.
How many real zeros does p have?

e) List and explain Drawbacks of the Newton-Raphson Method.

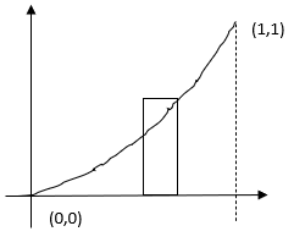
f) Use Newton's method to determine an approximation to the solution to $x^3 - 5x - 11 = 0$ that lies in[2,3].Find the approximation to four decimal places.

Q.2 **Attempt any four of the following:** **20**

a) If $f(x) = x^2$, Find the area on the interval [1,5].

b) Find the area of the region bounded above by y = x + 6, bounded below by $y = x^2$,and bounded on the sides by the lines x = 0 and x = 2.

c) Find the area of the region bounded by the graph $f(x) = x^3$, the x-axis and the vertical lines x=0 and x=1, as shown in below figure:



d) Discuss the continuity of the function f(x) = $\sqrt{4-x^2}$.

e) Divide 100 into two parts such that sum of their square is minimum.

f) Using Newtons method find the approximate root for the equation f(x)=x-cosx

Q.3 **Attempt any four of the following:** **20**

a) Find the equation for the tangent plane and parametric equation for the normal line to the surface z = x^2 y at the point (2,1,4).

b) Solve the differential equation x (x+y) dy - y^2 dx = 0

c) Locate all relative extrema and saddle point of
f(x,y) = $2x^3 + xy^2 + 5x^2 + y^2$.

d) Find the second order derivatives of f(x,y)= $x^2y^3 + x^4y$.

e) Find The gradient of the function f(x, y) = $x+y^2$.

f) If z = x^2y , x = t^2 and y =t^3 , use chain rule to find $\frac{dx}{dt}$.

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

a) If f(x) =4x + 1 x<=2
= x^2 + 5 x > 2, at x = 2, then find f is differentiable or not?

b) Suppose that,f(x)= x^3-$6x^2$-15x+2 Use the information to sketch a graph of f(x).

c) Answer the following:
i) Find the interval in which the function f(x) = x2 is decreasing.
ii) Give the definition of : The Indefinite Integral Antiderivatives

d) For the function f(x,y)=xy^2 + exp(x^2y), show $\frac{\delta^2 f}{\delta x \delta y} = \frac{\delta^2 f}{\delta x \delta y}$. Justify your answer

e) Find the area of the region bounded above by y = x + 6, bounded below by y = x^2, and bounded on the sides by the lines x = 0 and x = 2.

f) Find the relative extrema of f(x) = 4xy-x4-y4 using both first and second derivative test.

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B.Sci.(CS) (Sem- II) July-2023

Programming with C

Q.P.Code: 0000226

[Time:2.30 Hrs] **[Marks:75]**

Please check whether you have got the right question paper.

N.B:
1. All question is compulsory.
2. Figures to the right indicate full marks.
3. Students answering in the regional language should refer in case of doubt to the main text of the paper in English.

Q.1 Attempt **any four** of the following. 20

A. What are header files? Explain its use also list out the header files used in C
B. Write short note on interpreters
C. Explain hierarchy of datatypes in C
D. Explain the precedence of operator
E. Write a note on nested if else statement
F. State the difference between expression and statement

Q.2 Attempt **any four** of the following. 20

A. What is an array? Explain the types of arrays?
B. Explain the difference between array, list and tuple?
C. Explain the different format specifiers in C
D. Write a short note on:
   i. getchar() & putchar()
   ii. puts() & gets()
E. Write a c program to convert string lower case to upper and vice versa.
F. Compare the C string and python string

Q.3 Attempt **any four** of the following. 20

A. What do you mean by Referencing and Dereferencing?
B. Write a short note on Pointer to Multidimensional Arrays.
C. How to implement calloc()?
D. Write a short note on realloc().
E. How to declare variable of a structure?
F. Explain Union Using normal variable VS Union Using pointer variable

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

A. Write short note of formatted input and output functions
B. Differentiate between while and do while loop
C. What is an array of pointers?
D. What is a function? Explain with an example?
E. Why do we need to deallocate the dynamic memory?
F. Explain following functions with examples getw(), putw(), fread(), fwrite(), fseek()

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B.Sci.(CS) (Sem-II) July-2023

Statistical Methods and Testing of Hypothesis

QP00000246

[Marks:75]

Please check whether you have got the right question paper.

N.B:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Students answering in the regional language should refer in case of doubt to the main text of the paper in English.

Q1. Attempt *any four* of the following **(20M)**

A. A coin is tossed three times, let the random variable X denotes number of heads, find the probability distribution and find E(X) and V(X).

B. The discrete random variable X has following p.m.f. P(X)

X	4	5	6	7	8
P(X)	0.06	0.15	0.25	0.31	0.23

Obtain mean and variance.

C. A box contains 7 red and 3 blue balls. Two balls are selected at random obtain expectation and variance of number of blue balls selected in sample

D. A basket contains 20 good oranges and 80 bad oranges. 3 oranges are drawn at random from this basket. Find probability that out of 3.
(i) exactly 2 are good (ii) at least 2 are good (iii) at most 2 are good oranges
(Solve using binomial distribution**)**

E. State properties of chi square distribution

F. Write a note on binomial distribution

Q2. Attempt *any four* of the following **(20M)**

A. The mean lifetime of 100 fluorescent light bulbs produced by a company is computed to be 1570 hours with a standard deviation of 120 hours. If μ is the mean lifetime of all the blubs produced by company, test the hypothesis μ=1600 hrs against the alternative hypothesis μ! =1600 hrs using 5% level of significance

B. Two random samples drawn from two normal populations are:
sample1:20,16,26,27,22,23,18,24,19,25
sample2:27,33,42,35,32,34,38,28,41,43,30,37
obtain the estimates of the variance of the populations and test 10% level of significance

C. A coin was tossed 400 times and the head turned up 216 times. Test the hypothesis that the coin is unbiased

D. What do you mean by testing of hypothesis?

E. Write a detailed note on one-tailed and two-tailed tests.

F. Explain null hypothesis and alternative hypothesis**.**

Q3. Attempt *any four* of the following. **(20M)**

A. Distinguish between parametric test and non-parametric tests.

B. Following data represents marks scored by students (marks out of 60)
54,32,41,22,31,46,43,44,39,35,21,52,21,55,23,48,28,27,51,36,27,40,38,35,48
Past experience shows that 50% of students scored marks 45 or above.

Use sign test to whether group is inferior to previous group**.**

C. The percentiles of 15 students from a coaching class at an MBA entrance test are listed below 64,65,55,59,100,72,73,76,84,69,92,74,82,70,90. Use Wilcoxon signed-ranked test at 5% l.o.s to test whether average percentile score of students from this class is 72

D. Explain run test.

E. Write a note on Wilcoxon signed rank test

F. Explain Kruskal-Walis test.

Q4. Attempt *any three* of the following. (15M)

A. The time to pass through a queue to begin self-service at a cafeteria has been found to be N (15,9). Find the probability that an arriving customer waits between 14 and 17 minutes**.**

B. Define continuous random variable. Give some examples.

C. Explain procedure of two-way ANOVA**.**

D. For a standard normal variable Z, find the area
(i) to the left of Z=1.39 (ii)to the left of Z=-1.2 (iii) to the right of Z=1.6
(iv) to the right of Z=-1.6 (v)between Z=0 and Z=2.

E. Distinguish between one-way classification and two-way classification.

F. Define raw moments and central moments**.**

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B.Sc.(CS) (Sem-II) July-2023

Data Structures

Q.P. Code:00000238

[Time:2.30 Hrs] **[Marks:75]**

Please check whether you have got the right question paper.

N.B:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Students answering in the regional language should refer in case of doubt to the main text of the paper in English.

Q.1 Attempt **any four** of the following. 20

A. Define ADT (Abstract Data Type). Mention the features of ADT. What are the benefits of ADT?
B. Explain the various operations of the list ADT with examples
C. Explain different operation performed on List.
D. Complete the Set ADT by implementing intersect() and difference().
E. Prove or show why the worst case time-complexity for the insert() and remove() list operations is O(n).
F. What do you mean by Searching? Explain Sequential search and Binary search with help of example

Q.2 Attempt **any four** of the following. 20

A. What is a Linked List? Explain Singly Linked List with different operations
B. Write a short note on
   a. Linked List Iterators
   b. Application-Polynomials
C. What is a Stack? Explain Stack with different operations
D. Explain the implementation of Stack using Linked List
E. What is Queue? Explain Bounded queue with different operations.
F. What is Bounded Priority Queue?

Q.3 Attempt **any four** of the following. 20

A. Explain Linear Recursive with example.
B. Explain Mutual Recursion with example.
C. Explain quadratic probing
D. Differentiate between Separate Chaining and Open Addressing

E. Explain Quick Sort with example
F. Write a short note on Heap and its types

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

A. What is MultiArray Abstract Data Type?
B. Define Time Complexity
C. Explain Memory Representation of a doubly linked list.
D. Write a short note on :
   a. linked Queue
   b. Circular Queue
E. How does recursion work?
F. What are types of Hash Function?

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B.Sci.(CS) (Sem-II) July-2023

Green Technologies

Q.P. Code:00000250

[Time:2.30 Hrs]	**[Marks:75]**
Please check whether you have got the right question paper.	
N.B:	1. All question are compulsory. 2. Figures to the right indicate full marks. 3. Students answering in the regional language should refer in case of doubt to the main text of the paper in English.

Q.1		Attempt **any four** of the following. A. How can software impact the environment and the energy consumption of computing systems? B. Describe the 3Rs of green IT. C. What is meant by 'green washing'? Explain with examples D. How would you design the manufacturing process of a product (say, a mobile phone) while also considering its environmental impact during manufacturing? E. How do processor C-states save energy? F. What are the quality attributes of software?	20
Q.2		Attempt **any four** of the following. A. Discuss on the implications for energy efficiency for the data centre facility infrastructure B. Write a note on virtualization C. What are the different metrics associated with data centre? D. What are the energy management techniques for hard disks? E. Discuss different steps in developing a green IT strategy F. Write a note on metrics and measurements in green strategies.	20
Q.3		Attempt **any four** of the following. A. What are multi-level models? B. What is LCA? Explain the four stages of LCA C. Describe the strengths and weaknesses of the G-readiness framework. D. What are the driving factors for the development of green and sustainable IT? E. How can companies implement sustainable IT services development practices? F. What are the major categories of information systems within an organization? Provide example of greening enterprise activities at each	20

		level.	
Q.4		Attempt **any three** of the following. A. Give a few examples to illustrate how context awareness leads to 'smarter' devices B. What are the attributes relevant to assessing sustainability performance? C. Write a note on system level energy management. D. Enlist the objectives of green network protocols. E. Discuss the maturity of SICT capabilities. F. Discuss different strategies and approaches for green IT and their managerial implications	15