Chhattisgarh Swami Vivekanand Technical University
University Teaching Department
B.Tech (Honours) (Data Science/ Artificial Intelligence)
Class Test - I, July, 2022
Data Structure Using C (A000272(022))

Time Allowed: 2 hours

Maximum Marks: 40
Minimum Pass Marks: 14

Roll No- 3000J282J042

Note: *(i)* Each question contains four parts. Part (a) of each question is compulsory. Attempt any two parts from (b), (c), and (d) of each question.
(ii) The figure in the right-hand margin indicates marks.

I. (a) Define ADT. Introduce different types of ADT. [4]

(b) Define Stack ADT. Explain different operations on Stack. [8]

(c) Define Queue ADT. Explain different operations on Queue. [8]

(d) Write an algorithm for binary search with example. [8]

II. (a) Define Array. Explain about row major and column major representation of array in memory with example. [4]

(b) Can you apply binary search to the following list? If not, what needs to be done? Search an element 44 after the application of the required operation. [8]

List: 3, 44, 38, 4, 47, 15, 36, 26, 27, 2, 46, 4, 19, 50, 48

(c) Sort the following list using Bubble sort. [8]

List: 8, 40, 39, 15, 30, 26, 6, 12, 7, 13, 41, 34, 7, 33

(d) Sort the following list using Heap sort. [8]

List: 10, 1, 2, 9, 43, 14, 34, 22, 48, 38, 5, 48, 28, 46

Chhattisgarh Swami Vivekanand Technical University
University Teaching Department
B.Tech (Honours) (Data Science/ Artificial Intelligence)
Class Test - I, July, 2022
Digital Logic & Design (A000274(028))

Time Allowed: 2 hours | *Maximum Marks:* 40
Minimum Pass Marks: 14

Roll No- 3000128210412

Note: *(i)* Each question contains four parts. Part (a) of each question is compulsory. Attempt any two parts from (b), (c), and (d) of each question.
(ii) The figure in the right-hand margin indicates marks.

I. (a) Write down the basic properties of Boolean Algebra. [4]

(b) Minimize the following boolean function by K-Map and write down the minimized boolean expression (Function). [8]

$$F(A, B, C, D) = \Sigma m(0, 1, 2, 5, 7, 8, 9, 10, 13, 15)$$

(c) Simplify the following Boolean function and also determine which rule is being used in each step. [8]

$$AB + B(B + \overline{C}) + \overline{B}C$$

(d) What is DeMorgan's Theorem? Proof it by truth table and logic circuit [8]

II. (a) Describe Full adder with its Truth Table. [4]

(b) Explain the BCD adder with example. [8]

(c) Explain any one of the Multiplexer with truth table. [8]

(d) Explain Parallel adder in brief with suitable example. [8]

Chhattisgarh Swami Vivekanand Technical University
University Teaching Department
B.Tech (Honours) (Data Science/ Artificial Intelligence)
Class Test - I, July, 2022
Object Oriented Programming C++ (A000273 (022))

Time Allowed: 2 hours | *Maximum Marks:* 40
Minimum Pass Marks: 14

Roll No – 3000128210 42

Note: *(iii)* Each question contains four parts. Part (a) of each question is compulsory. Attempt any two parts from (b), (c), and (d) of each question.
(iv) The figure in the right-hand margin indicates marks.

I. (a) Explain different types of constructors in C++. [4]

(b) Explain briefly the characteristics of OOPS language and mention advantages of OOPS approach over functional/procedural programming. [8]

(c) What is meant by member access modifiers? Explain with one programming example. [8]

(d) Write about various operators and manipulators used in C++ with an example. [8]

II. (a) Write about standard C++ String class with their function names. [4]

(b) Define a class bank account with current and saving bank account as inherited classes. Class bank account should have following data members: account number, name, and balance amount and member functions: to initialize the value, to deposit and withdraw amount after checking the minimum balance. [8]

(c) WAP in C++ to implement array of objects, creating a class employee and accepting and displaying multiple datasets accepted by the user using array of objects. [8]

(d) Design three classes student, test and results, where a result is inherited from test and test is inherited from student class. Write possible functions to initialize the values. Also write a main function for execution by creating objects. [8]

Chhattisgarh Swami Vivekanand Technical University

University Teaching Department

B.Tech (Honours) CSE (Data Science/ Artificial Intelligence)

Class Test - I, July, 2022

Subject: Python for Data Science

Subject Code: (A000275(022))

Time Allowed: 2 hours

Maximum Marks: 40

Minimum Pass Marks: 14

Roll NO - 30001282104 2

Note: *(i)* Each question contains four parts. Part (a) of each question is compulsory. Attempt any two parts from (b), (c), and (d) of each question.

(ii) The figure in the right-hand margin indicates marks.

I (a) Name two mutable and immutable data types. [4]

Enlist three differences between List, Tuple, Set and Dictionary.

(b) Define Python library. Why Python Programming is most commonly used in Data Science? Explain in detail. [8]

(c) What is Type Conversion? Explain its types with the help of suitable program. [8]

(d) Write the output of the following code snippets: [8]

i)

```
for i in range(7,10):
  print("Python")
print("DS and AI")
```

ii)

```
x = {1:10, 2:20, 3:30}
x[2]=25
print(x)
```

iii)

```
a = [1, 2, 3, 4, 5]
sum = 0
for x in a:
  sum += x
print(sum)
```

iv)

```
a = (1, 2)
print(a * 3)
```

v)

```
a = ["A", "B", "C", "C"];
print(a[-3:-1])
```

vi)

```
sales = {'AI':10, 'DS':32, 'PY':12}
for x in sales:
   print(x)
```

vii)

```
def test(*argv):
  for arg in argv:
    print(arg, end = '@')
test('Jan', 'Feb', 'Mar', 'Apr')
```

viii)

```
dict1 = {'first' : 'sun', 'second' : 'mon'}
dict2 = {1: 3, 2: 4}
dict1.update(dict2)
print(dict1)
```

II (a) Write a short note on: [4]

i) __init_()

ii) Self parameter

iii) Data Hiding

iv) Finally keyword

(b) How a user-defined Module is created in Python? Briefly explain the various methods of using Modules with the help of suitable example. [8]

(c) Describe how an Exception is handled in Python. Give the description of any four methods each of File and Directory handling with suitable example. [8]

(d) Write the output of the following code: [8]

i)

```
class Employee:
  def __init__(self, name, age,salary):
    self.name = name
    self.age = age
    self.salary = 50000
E1 = Employee("John", 23, 50000)
print(E1.name)
print(E1.age)
print(E1.salary)
```

ii)

```
a=input("Enter sequence:")
b=a[::-1]
if a==b:
  print("palindrome")
else:
  print("Not a Palindrome")
```

iii)

```
a = ["red", "orange", "yellow"]
b = ["apple", "banana", "cherry"]
for x in a:
  for y in b:
    print(x, y)
```

iv)

```
def greet(**person):
  print('Hello', person['fn'], person['ln'])

greet(fn='Elon', ln='Musk')
greet(ln='Bezos', fn='Jeff', age=50)
greet(fn='Bill', ln='Gates', age=55)
```

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University Teaching Department, CSVTU, Bhilai (C.G.)
B.Tech (Honours) (Data Science/ Artificial Intelligence)
II SEMESTER
Class Test I, July, 2022
Engineering Mathematics-II(A000271(014))

Time Allowed: 2 hours

Maximum Marks: 40
Minimum Pass Marks: 14

Roll No - 3000108210042

Note: *(i)* Each question contains four parts. Part (a) of each question is compulsory. Attempt any two parts from (b), (c), and (d) of each question.
(ii) The figure in the right-hand margin indicates marks.

I. (a) Find the eigen value and eigen vector of matrix $A = \begin{bmatrix} 3 & 2 \\ -1 & 0 \end{bmatrix}$ [4]

(b) Solve the system of linear equations by Gauss Elimination method: [8]
$x + y + z = 6; \quad x - y + z = 2; \quad 2x + y - z = 1.$

(c)Define Vector space over field F with its properties & examples. [8]

(d)Explain linear transformation with properties. [8]
Prove that $T: \mathbb{R}^n \to \mathbb{R}^n$, such that
$T(a_1, a_2, \ldots\ldots, a_n) = (0, a_1, \ldots\ldots, a_{n-1})$ is linear transformation.

II. (a)Evaluate the double integral : $\int_0^{\pi/2} \int_{\pi/2}^{\pi} \cos(x+y)\,dy\,dx$ [4]

(b)Evaluate the double integral : $\int_0^1 \int_0^{\sqrt{1+x^2}} \frac{dx\,dy}{1+x^2+y^2}$ [8]

(c)Evaluate the triple integral : $\int_0^2 \int_0^x \int_0^{x+y} e^x (y + 2z)\,dx\,dy\,dz$ [8]

(d)Prove that by using change of order of integration: [8]
$\int_0^{2a} \int_{x^2/4a}^{3a-x} f(x,y)\,dx\,dy = \int_0^a \int_0^{\sqrt{4ay}} f(x,y)\,dy\,dx + \int_a^{3a} \int_0^{3a-y} f(x,y)\,dy\,dx.$