Chhattisgarh Swami Vivekanand Technical University

University Teaching Department

B.Tech (Honours)

Class Test - II, September, 2022

Data Structure using C (A000272(022))

Time Allowed: 2 hours

Maximum Marks: 40
Minimum Pass Marks: 14

Roll No- 300012821042

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) Represent the following polynomials using linked list representation. [4]
$5x^2 + 6x + 9$ and $8x + 2$. Represent the addition of polynomials using linked list representation.

(b) Explain insertion and deletion of node at the beginning of a singly linked list. [8]

(c) Explain insertion and deletion of node at the end of a singly linked list. [8]

(d) Explain insertion and deletion of node at the beginning of a doubly linked list. [8]

II. (a) Evaluate the following expression: [4]
(i) 2 3 4 * +
(ii) 3 4 * 2 5 * +

(b) Explain quick sort with example. Also, discuss the selection of pivot element and its effect on time complexity. [8]

(c) Convert the following infix expression to postfix expression: [8]
K + L - M*N + (O^P) * W/U/V

(d) Convert the following infix expression to prefix expression: [8]
K + L - M*N + (O^P) * W/U/V

Chhattisgarh Swami Vivekanand Technical University

University Teaching Department

CSE (Artificial Intelligence/Data science)

Class Test - II, Sept. , 2022

Digital Logic & Design <A000274 (028)>

Time Allowed: 2 hours | *Maximum Marks:* 40

Minimum Pass Marks: 14

Roll No - 3000128210Y2

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) What is DTL? Explain with truth table. [4]

(b)Explain the digital ICs characteristics in following terms-

1. Noise margin
2. Figure of merit [8]

(c)Explain the TTL NAND gate in brief with truth table. [8]

(d)Explain the Tristate TTL in brief with truth table [8]

II. (a)Explain SR flip Flop with truth table [4]

(b) Explain the PISO Shift register with timing diagram [8]

(c)Explain the JK flip flop in detail and what is race around condition? [8]

(d)Design the any asynchronous counter/ripple with application. [8]

Chhattisgarh Swami Vivekanand Technical University

University Teaching Department

(A000271(014))

B.Tech (Honours)

CT-II

(Data Science/ Artificial Intelligence)

Engineering Mathematics-II

Time Allowed: **2hours** ***Maximum Marks:*** **40**

Minimum Pass Marks: **14**

Roll No - 300012821042

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) **Include suitable header file in all your program.**

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

I. (a) Solve $\frac{dy}{dx} + (cotx)y = 2cosx$ [4]

(b) Explain homogeneous linear differential equation with constants coefficients with example and solve $\frac{d^2y}{dx^2} - 4y = cos^2x$. [8]

(c) Solve $(D^2 - 2D + 1)y = x^2e^{3x}$. [8]

(d) Solve by variation of parameters : [8]
$(D^2 + 4)y = 4tan2x$.

II. (a) Solve : $(D^2 + 2DD' + D'^2)z = e^{2x+3y}$. [4]

(b) Write application of Wave equation and Heat equation. Solve PDE [8]
$(D^2 - DD' - 6D'^2)z = xy$.

(c) Write property of Laplace Transformation. Find (any two) [8]
(1) $L\{\sinh(at)\}$ (2) $L\{tcost\}$ (3) $L\{\sin(\sqrt{t})\}$

(d) State that Convolution theorem and find (any two) [8]
(a) $L^{-1}\left\{\frac{P+2}{P^2-4P+13}\right\}$ (b) $L^{-1}\left\{\frac{1}{(P+1)^2}\right\}$ (c) $L^{-1}\left\{\frac{1}{P^2-6P+10}\right\}$

Chhattisgarh Swami Vivekanand Technical University

University Teaching Department

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

Class Test - II, September, 2022

Object Oriented Programming - A000273 (022)

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

Roll No 3000128210 42

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 operator overloading. Name the operators which cannot overload. [4]

(b) WAP in C++ to overload unary plus and minus operator. [8]

(c) Write the concept of dynamic memory allocation with one programming. [8]

(d) Why friend function is used in C++, Explain with proper illustration. [8]

II. (a) Explain exception handling with their keywords. [4]

(b) Write the concept of function overriding with one example. [8]

(c) Write about template function and template class with an example. [8]

(d) Why we use abstract class? Explain with suitable example. [8]

Chhattisgarh Swami Vivekanand Technical University
University Teaching Department
B.Tech. (Honours) CSE (Data Science/ Artificial Intelligence)
Class Test –II -September, 2022
Subject: Python for Data Science (A000275 (022))

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

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) Assume the two arrays given below: [4]

```
[1 2 3]      [[1 2 3]
             [4 5 6]
             [7 8 9]]
```

Using NumPy, write a code for the following operations:
i) Creation of the above two NumPy arrays.
ii) Apply intersect1d( ) and cumsum( ) on them.

(b) What is the use of Boolean Indexing? Explain various functions available for NumPy array creation. [8]

(c) Using suitable code, create a 2D and 3D NumPy array and perform arithmetic operations between them. [8]

(d) Write a short note on: [8]
1. String Manipulation Functions
2. Plotting using Pandas

II (a) Briefly discuss the methods available in Pandas to handle the missing data and duplicate values in a DataFrame. [4]

(b) Explain 1D, 2D and 3D NumPy array slicing with the help of suitable example. [8]

(c) Assume the data given below: [8]

	Name	Score	Attempts	Qualify
a	James	35.0	3	Yes
b	Emily	19.0	2	No
c	Michael	38.0	3	Yes
d	Mathew	20.5	1	Yes
e	Laura	13.5	1	No
f	Kevin	NaN	2	No
g	Jonas	36.0	1	Yes

Using Pandas, write a code for the following operations:
i) Creating a DataFrame for these data.
ii) Change the new column name 'Score' to 'CT marks'
iii) Drop the row with 'NaN' value.
iv) Sort the 'Score' column in descending order.

(d) Explain rank( ). Write a code using Pandas to add five new columns to the data given in the above question and store the values obtained by five different ranking methods in these new columns. [8]

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