

B.Sc. (Hons.) 2nd Semester Examination- 2023

Sub.- Computer Science

Paper - Data Structure

Paper Code - BCACC3T

C M S
3

Time - 2 hours

Full Marks - 40

(The figure in the margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable)

Group- A

Answer any five questions

 $5 \times 2 = 10$

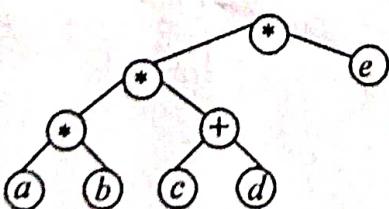
1. What are the postfix and prefix forms of the following expression? $A+B^*(C-D)/(P-R)$
2. What is a threaded binary tree?
3. What is non linear data structure?
4. Write the advantages of double linked list.
5. What is the advantage of Linked list over array?
6. What is asymptotic lower bound?
7. Differentiate between tree and graph.
8. What is ADT?

Group- B

Answer any four questions

 $4 \times 5 = 20$

9. Give the prefix, infix and postfix expressions corresponding to the tree as shown below :



10. Show the steps of quick sort on the following set of elements:
25, 57, 48, 37, 12, 92, 86, 33 Assume the first element of the

list to be the pivot element.

11. Comparison between Linear Search and Binary Search.

12. Write one application of binary search tree in detail.

13. Explain how to implement a stack as linked list.

14. Why do we need asymptotic notation? Explain θ notation.

Group- C

Answer any one questions

$1 \times 10 = 10$

15. What is the difference between a heap and a binary tree?

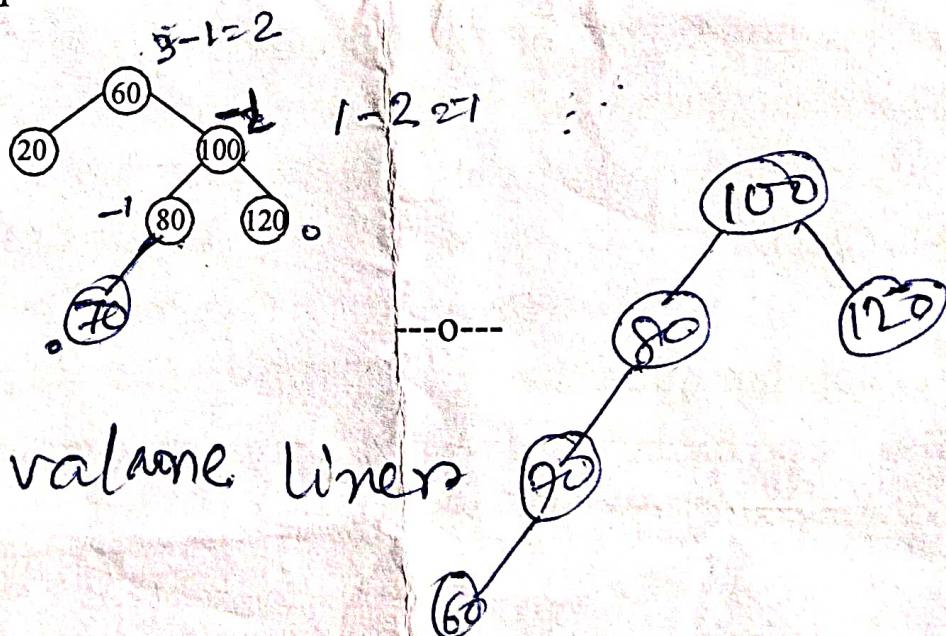
Insert the following keys into a B-tree of order 3 and draw the final tree :

10, 24, 23, 11, 31, 16, 26, 35, 29, 20, 46, 28, 13, 27, 33, 21.

16. What is AVL tree? Insert 70 in the following AVL tree show it stepwise.

$3+7=10$

AVL



Anand's valence lines

B.A 2nd Semester Examination- 2023
Sub.- English Communication
Paper Code - AECCEL 1(TH)

M. M. M. 3

Full Marks - 40

Time - 2 hours

(The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable)

1. Choose the correct alternatives from any Ten questions:

$$1 \times 10 = 10$$

- a) Listening is an act of participation in communication.

i) active, ii) passive
iii) inactive iv) unproductive

b) Which of the following has derived their names from the definite number of user involved in the communicative act.

i) Verbal and non-verbal communication
ii) Inter-personal communication and group discussion
iii) Monologue and dialogue
iv) Intra-personal communication and mass communication.

c) In general, where do people use the colloquial form of language?

i) In email ii) In informal and casual conversations
iii) In academic meetings and conferences
iv) In the corporate arena.

- d) Which of the following is never a planned act of communication?
- i) Traffic signal lights ii) Honking by a car
 - iii) Whistle of the referee in a football match
 - iv) Cracking sound of the thunderbolts.
- e) Looking quickly over a book to get a superficial idea of the content is called
- i) Intensive Reading ii) Extensive Reading
 - iii) Skimming iv) Scanning
- f) Of the four language skills, the receptive skills are;
- i) Reading and Speaking ii) Reading and Listening
 - iii) Writing and Speaking iv) Writing and Listening.
- g) Darkness (lack of visibility) can be a barrier in non-verbal communication. People consider errors as pardonable more in the written form than in the spoken.
- i) Both the observations are wrong
 - ii) None of the observations is wrong.
 - iii) The first observation is correct but the second wrong
 - iv) The second observation is correct but the first wrong.
- h) Mapping Method, Cornell Method, Charting Method etc. are the methods of
- i) note-making
 - ii) paraphrasing
 - iii) precis-writing
 - iv) public-speaking.
- i) Written communication should ideally be
- i) Brief and clear
 - ii) written at length using ornamental language,

- iii) Written in florid language using factually correct material,
- iv) Written using grammatically complex forms.
- j) News cast on television is a form of
 - i) mass communication
 - ii) intrapersonal communication
 - iii) interpersonal communication
 - iv) monologue.
- k) Arrange the four observations in the correct order :
 - [A] To use lies is one such that is very common
 - [B] Once detected, it can cost anyone the job itself
 - [C] But the interviewers are smart enough to find it out
 - [D] At the interview, candidates make many mistakes.

Which of the following would be the most appropriate sequence?

- i) [D] → [B] → [C] → [A]
- ii) [D] → [A] → [B] → [C]
- iii) [D] → [B] → [A] → [C]
- iv) [D] → [A] → [C] → [B]
- l) During an oral presentation is the stage where you tell the audience the aim of your presentation.
 - i) Background ii) Introduction
 - iii) Conclusion iv) Valediction

2. Answer any Four questions:

$5 \times 4 = 20$

- i) What are some common barriers to effective communication? Give examples.
- ii) Differentiate between Group Discussion and Public Speech.

- iii) What is silence? Does it play any role in communication?
- iv) Write on the seven 7 Cs of communication.
- v) Write brief notes on any two:
 - a) Communication channels,
 - b) Miscommunication
 - c) Print media and communication
 - d) Use of computer in our communication
 - e) Body language.
- vi) Write a newspaper report on any one of the following topics:
 - a) Celebration of Rabindra Jayanti on your campus.
 - b) Recent technological progress in the era you live in and its impact on communication system.

3. Answer any One question:

$10 \times 1 = 10$

- a) Suppose you are going to appear in a walk-in-interview for a job of an office assistant. Prepare a recent CV to submit for the same.
- b) Evaluate the advantages and disadvantages of using social media as communication tools.
- c) Write an application to the Principal of your college drawing attention to the scarcity of drinking-water facilities in some building of the campus.
- d) Write an application to the Principal of your college requesting him for fees concession.

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G never forget your help Sir

BCA 2nd Semester Examination- 2023

Sub.- BCA

Paper Code - BCAGE2T

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Full Marks - 40

Time - 2 hours

(The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable)

Answer any Five questions: **$2 \times 5 = 10$**

1. State the condition for Convergence of Iteration method.
2. What is the objective of Simpson $\frac{1}{3}$ rule?
3. What is Gauss elimination method?
4. Explain Truncated Error with example.

5. Find the absolute, relative and percentage errors where original value is $2/3$ and calculated value is 6666.

6. What is Error Propagation in a difference table.

7. What is interpolation?

8. Prove that $\left(\frac{\Delta^2}{E}\right)x^3 = 6x$, if the spacing be 1

Answer any Four questions: **$4 \times 5 = 20$**

9. State the condition for the convergence of Gauss Seidel iteration method for solving a system of linear euqation.

10. Construct the polynomial $f(x)$ with the help of Lagrange metho from the given table.

x	0	1	3
$f(x)$	1	2	5

$$y_3 = \frac{f_0 + 4f_1 + 2f_2}{3}$$

11. Prove that

a) $\Delta(f(x) + g(x)) = \Delta f(x) + \Delta g(x)$

b) If c is a constant then $\Delta c f(x) = c \Delta f(x)$

12. Obtain a root of the following equation using bisection

method $x^3 + 2x^2 - x + 7 = 0$

13. Find $f(5.5)$ from the following table.

x	1	2	3	4	5	6	7	8
$f(x)$	1	8	27	64	125	216	343	512

Answer any One question:

1 × 10 = 10

14. Write the short note:

4 × 2½

- i) Euler's method
- ii) Runge-Kutta method
- iii) Trapezoidal rule
- iv) Matrix inversion

15. Explain Euler method in detail. Calculate

$\int_0^3 1/(1+x^2) dx$ where $n=6$ by Simpson's 1/3 formula.

6+4

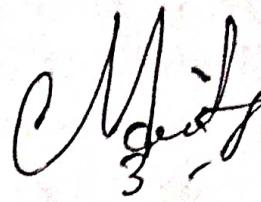
$$m = n - 0 - 0 \\ 9 - 3 -$$

$$(x-1)(x-3) \\ = m - 3n - n + 3 \\ = m - 4n + 3$$

$$\begin{aligned} & \quad \text{---} \\ & (x-3)(x-3) \\ & = m - 3n - 3n + 3 \end{aligned}$$

$$\begin{aligned} & (0-1)(0-3) \quad m = 6n \\ & \quad 0 + 3 \quad n^2 - 6n + 9 \\ & (1-0)(1-3) \\ & \quad 2 \quad 1 - 3 - 6 + 9 \\ & \quad -2 \end{aligned}$$

B.Sc 2nd Semester Examination, 2023
Sub.- BCA
Paper Code - BCACC4T


Full Marks - 60**Time - 3 hours**

(The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable)

Group-A

1. Answer any Ten question $2 \times 10 = 20$

- a) If $A = \{1, 2, 3, 4\}$, then find the power set of A.
- b) Give an example of an infinite set S and a mapping $f : S \rightarrow S$ such that f is injective but not surjective.
- c) What are the main differences between Boolean algebra and algebra of real numbers?
- d) Define group.
- e) Define divisors of zero in a ring.
- f) Define inverse of a mapping with an example.
- g) Write the differences between permutation and combination.
- h) Define integral domain.
- i) Show that in a group $(G, *)$ each element has only one inverse.
- j) How many ways are there to select 5 players from a ten member tennis team to make a trip to a match at another school?
- k) Define abelian group with an example.
- l) What is the coefficient of x^5y^7 in $(x-2y)^{12}$?
- m) Find the generating function for the sequence $\{1, 0, -1, 0, 1, 0, -1, 0, 1, \dots\}$
- n) If $n_{C_x} = 56$ and $n_{P_x} = 336$, find n and x .

- o) Define linear recurrence relation with constant coefficients.

2. Answer any four questions : $5 \times 4 = 20$

- a) Using Mathematical induction prove that $6^{n+2} + 7^{2n+1}$ is divisible by 43 for all $n \in N$
- b) Solve the recurrence relation $a_n - 4a_{n-1} + 4a_{n-2} = n + 4^n$.
- c) Define bijective mapping. "A mapping $f: A \rightarrow B$ is invertible if f is a bijection" - prove it.
- d) A relation ρ is defined on \mathbb{Z} by $x\rho y$ iff $x^2 - y^2$ is divisible by 5, $x, y \in \mathbb{Z}$. Prove that ρ is an equivalence relation on \mathbb{Z} .
- e) Define Tautology and contradiction. Examine the statement $(p \rightarrow \neg q) \wedge (q \rightarrow r) \rightarrow (p \wedge r)$ is a contingency.
- f) consider the divide relation on set $S = \{1, 2, 3, 4, 6, 9\}$. Draw the Hasse diagram for each relation. Find all minimal and maximal elements, greatest and least elements.

3. Answer any two questions : $10 \times 2 = 20$

- a) i) Let $S = \{1, \omega, \omega^2\}$ where $\omega^3 = 1$, prove that S is an abelian group with respect to multiplication. 5

ii) Using principle of mathematical induction show that for all $n \in \mathbb{N}$, $3.6 + 6.9 + 9.12 + \dots + 3n(3n+1)(n+2)$. 4

iii) Define lattice. 1

- b) i) Show that the mapping $f: \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = 2x + 3, x \in \mathbb{R}$ is a bijection Determine f^{-1} . 5

ii) Draw karnaugh map and simplify the Boolean expression $AB\bar{C}\bar{D} + A\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}CD + A\bar{B}\bar{C}D + \bar{A}\bar{B}\bar{C}D$. 3

- iii) Write down the axioms of Boolean Algebra. 2
 c) i) For any three arbitrary sets A, B, C Prove that

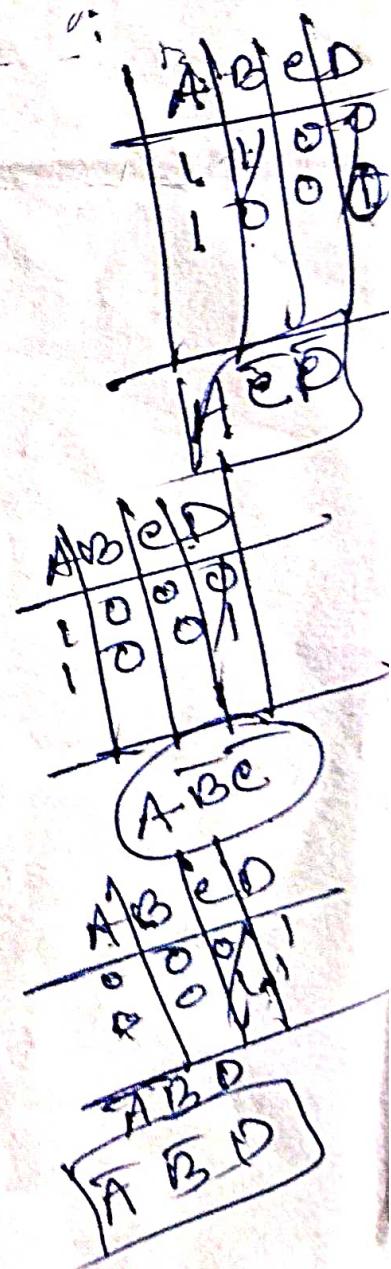
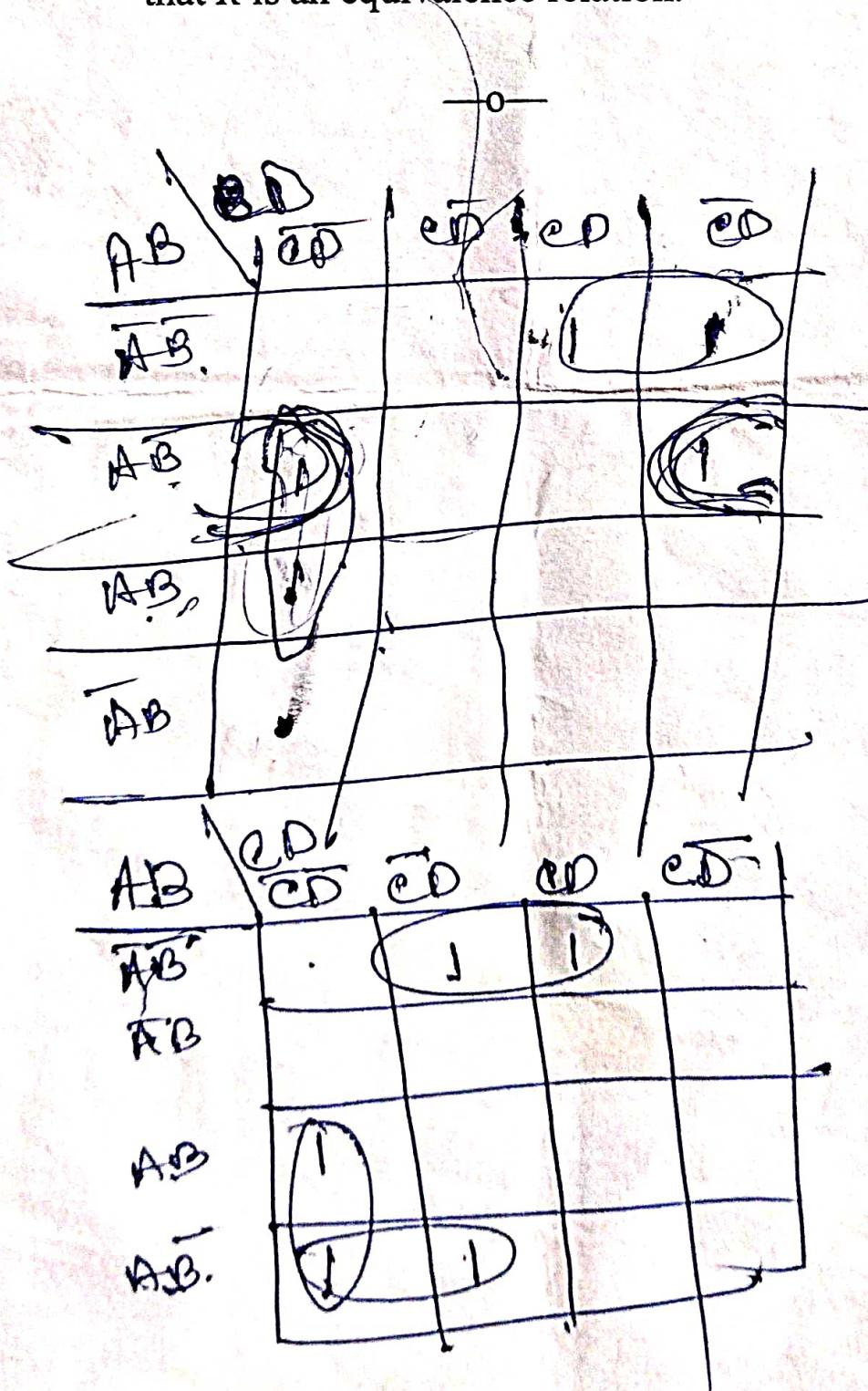
$$A - (B \cup C) = (A - B) \cap (A - C) \text{ and}$$

$$(A \cap B) \cap (A - B) = \emptyset$$

ii) If R be a relation in the set of integers Z defined by

$R = \{(x, y) : x, y \in Z, (x - y) \text{ is divisible by } 5\}$. Prove

that R is an equivalence relation.



Panskura Banamali College (Autonomous)

B.C.A(H) 2nd Semester Internal Examination -2023

Sub: BCA Paper: GE2

Paper Name: Numerical Analysis

F. M. : 30 Time :2 Hours

1. Answer any five questions [Out of eight questions]: $5*2=10$

- a) Write down the difference between forward difference and backward difference?
 - b) What is Interpolation?
 - c) What is Extrapolation?
 - d) What is Error?
 - e) What is Approximate Error?
 - f) What is Round off Error?
 - g) What is Relative Error?
 - h) What is convergence?
2. Answer any four questions [out of four questions] : $4*5=20$
- a) Explain Newton Rapson method in detail?
 - b) Explain geometrical interpretation of Newton Rapson method?
 - c) Explain Newton Rapson method in detail?
 - d) Explain Newton Lagrange method in detail?
 - e) Construct the polynomial $f(x)$ by the help of Lagrange method from the given table.

X	0	1	3
f(x)	1	2	5

f) Find $y(0.2)$ for $y' = x - 2y$, $y(0) = 1$, with step length 0.1 using Euler method. Noted $y' = (dy/dx) = f(x,y)$.

PANSKURA BANAMALI COLLEGE

(Autonomous)

B.Sc. (2nd Sem.) Continuous Internal Assessment (CIA) Examination-2023

3
Paper code: AECC (EL)

Paper name: English Communication

Full Marks: 10

Time: 0 hr. 30 mnts.

*Answer the Question 1 or 2 in your own words as much as practicable.
Word limit for any 2 mark question should be approximately 50 words,
and for any 5 mark question 150 words.*

1. Answer any FIVE questions out of the following:

$2 \times 5 = 10$

(a) Briefly define any two:

non-verbal communication, group discussion, monologue, dialogue.

(b) Provide any two examples of formal communication.

(c) One sentence has been broken into a few parts (each part put in one square bracket). Rewrite and put these parts in proper order to restore the meaningful sentence (you may need to add punctuation marks):

[our policy makers] [as their first language] [though very few Indians]
[as an associate official language] [have recognized it] [speak English]

(d) Refer to some skills required for essential communication.

(e) What might two potential outcomes of miscommunication be?

(f) State whether the following sentences are true (T) or false (F):

- i. Written form of communication is older than the spoken form. [T/F]
- ii. Listening is least important in communication. [T/F]
- iii. An infant cannot communicate at all. [T/F]
- iv. English is the link language or *lingua franca* in today's world. [T/F]

(g) Briefly write about silence as a form of communication.

(h) Briefly define mass communication. Name two popular media of it.

OR

2. Answer any TWO questions out of the following:

$5 \times 2 = 10$

(a) What skills must one develop for an interview?

(b) How does human communication differ from animal communication?

(c) Write a paragraph about the Summer of West Bengal-2023.

OR

Write a paragraph about the impact of science on modern communication.

PANSKURA BANAMALI COLLEGE (AUTONOMOUS)

B.Sc.(Hons.) 2nd Internal Assessment, 2023

2nd Semester

Paper :- BCACC4T

Full Marks: 20

Time: 1 hour.

1. Answer any two questions :

Ques 3 $2 \times 5 = 10$

- a) Using principle of mathematical induction, show that for all $n \in \mathbb{N}$, $4^{2n+1} + 3^{n+2}$ is divisible by 13.
- b) Let $S = \{1, \omega, \omega^2\}$ where $\omega^3 = 1$, prove that S is an abelian group with respect to multiplication.
- c) Out of 250 candidates who failed in an examination, it was revealed that 128 failed in mathematics, 87 in physics and 134 in computer, 31 failed in both mathematics and physics, 54 failed in both computer and mathematics, 30 failed in both computer and physics. Find how many candidates failed in all the three subjects; in mathematics but not in physics; in computer but not in mathematics.
- d) Solve the recurrence relation $a_n = a_{n-1} + 2a_{n-2}$, $n \geq 2$, $a_0 = 0$, $a_1 = 1$.

2. Answer any one question :

Ques 1 $1 \times 10 = 10$

- a) i) How many ways are there to select 5 players from a ten member tennis team to make a trip to a match at another school? 3
ii) If $n_{C_x} = 56$ and $n_{P_x} = 336$, find n and x . 3
iii) What is the coefficient of x^5y^7 in $(3x + 2y)^{12}$? 2
iv) Define linear recurrence relation with constant coefficients. 2
- b) i) Using principle of mathematical induction show that for all $n \in \mathbb{N}$, $3.6 + 6.9 + 9.12 + \dots + 3n(3n + 3) = 3n(n + 1)(n + 2)$. 5
ii) Use generating function to solve the recurrence relation $a_n - 9a_{n-1} + 20a_{n-2} = 0$, $a_0 = -3$, $a_1 = -10$. 5

Ques 3

$$3.6 + 6.9 + 9.12 + \dots + 3n(3n + 3) = 3n(n + 1)(n + 2)$$
$$3(1)(2)(3) + 3(2)(3)(4) + 3(3)(4)(5) + \dots + 3(n)(n+1)(n+2)$$
$$3(1)(2)(3) + 3(2)(3)(4) + 3(3)(4)(5) + \dots + 3(n)(n+1)(n+2)$$
$$3(1)(2)(3) + 3(2)(3)(4) + 3(3)(4)(5) + \dots + 3(n)(n+1)(n+2)$$
$$3(1)(2)(3) + 3(2)(3)(4) + 3(3)(4)(5) + \dots + 3(n)(n+1)(n+2)$$

Ques 1 $1 \times 10 = 10$

Mahadeb Maity

**PANSKURA BANAMALI COLLEGE
(AUTONOMOUS)**

1st Internal Assessment 2023

Class: BCA Semester: 2nd Paper: CC3T

Sub : Data Structure

Time – 30 Min. F.M. 10

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Answer any five 5x2=10

1. What is function?
2. What is array?
3. What is Stack? Why it is known as LIFO?
4. Define ADT (Abstract Data Type).
5. _____ means organization of data.
It has well defined _____ and _____.
6. What are the functions of DS?
7. What are the advantages of queue?
8. What is Graph?

**PANSKURA BANAMALI COLLEGE
(AUTONOMOUS)**

2nd Internal Assessment 2023

**Class: BCA Semester: 2nd Paper: CC3T
Sub : Data Structure**

Time - 60 Min. F.M. 20

Answer any five 5x2=10

1. What is Data Structure?
2. What is Graph?
3. What is Stack? Why it is known as LIFO?
4. Difference between BFS and DFS.
5. What is parallel edge and Self-loop?
6. What are the functions of DS?
7. What are the advantages of queue?
8. What is Tree?
9. Write down the difference between Enqueue and Dequeue

Answer any two 2x5=10

1. A two-dimensional array defined as a[4.. 7, -1.. 3] requires 2 bytes of storage space for each element. If the array is stored in row-major form, then calculate the address of element at location a[6, 2]. Give that the base address is 100. (5)
2. What is problem analysis? Explain it. (1+4)
3. Write down the Algorithm of Insert Beginning in Doubly Linked List. (5)
4. Design Binary Tree from the following traversal:

Preorder : A B D G C E H I F

In order : D G B A H E I C F (5)