(8 pages) **Reg. No. :** .....

Code No. : 6182 **Sub. Code : WCAM 21**

M.C.A. (CBCS) DEGREE EXAMINATION,
APRIL 2024.

Second Semester

Computer Application —Core

DATA STRUCTURES AND ALGORITHMS

(For those who joined in July 2023 onwards)

Time : Three hours Maximum : 75 marks

PART A — (15 × 1 = 15 marks)

Answer ALL questions.

Choose the correct answer:

1. An_____ is a mechanism for separating the properties of an object and restricting the focus to those relevant in the current context.
   (a) abstraction
   (b) construction
   (c) primitive
   (d) programming

2. ADT stands for
   (a) Actual Data Type
   (b) Actual Date Type
   (c) Abstract Data Type
   (d) Actual Date Type

3. Which of the following using the keyed approach to access a specific record?
   (a) Bag (b) Map
   (c) Array (d) user Defined

4. What is called the process of evaluating the performance of an algorithm?
   (a) complexity analysis
   (b) performance analysis
   (c) evaluating
   (d) Algorithm analysis

5. The process of solving problems by subdividing a larger problem into smaller known as
   (a) iteration (b) analysis
   (c) Recursion (d) Insertion

6. A sequential searching algorithm that checks every element of the array until the desired element is found called _____

(a) Linear recursion

(b) Binary recursion

(c) Multiple Recursion

(d) Asymptotic analysis

7. Which of the following protocol used by stacks?

(a) FILO (b) FIFO

(c) LOFI (d) LIFO

8. Which structure is used for roundrobin

(a) Doubly linked list

(b) Circularly Linked List

(c) singly linked list

(d) Queue

9. A free in which each node can have many children or nodes called

(a) Binary tree

(b) heaps

(c) linked list

(d) General Tree

10. Which of the following removes and returns the front item from the queue, which is the item with the highest priority.

(a) enqueue()

(b) dequeue()

(c) is Empty()

(d) PriorityQueue()

11. If the elements "A", "B", "C" and "D" are placed in a queue and are deleted one at a time, in what order will they be removed?

(a) DCBA (b) DCAB

(c) ABCD (d) ABDC

12. What is the purpose of the map ( ) function in Python?

(a) To apply a function to every item in an iterable and return a list of the results

(b) To filter elements of a sequence based on a given function

(c) To reduce an iterable into a single cumulative value

(d) To return a subset of elements from an iterable based on a condition

13. Which of the following statement about binary tree is CORRECT?

(a) A binary tree cannot be both complete and full

(b) Every full binary tree is also a complete binary tree

(c) Every binary tree is either complete or full

(d) Every complete binary tree is also a fullbinary tree

14. Partition and exchange sort is

(a) Bubble (b) Insertion

(c) selection (d) Merge

15. Sorting is_____

(a) Process of re-arranging a given set of objects in a specific order.

(b) To facilitate the later search for members of the sorted set.

(c) Is a relevant and essential activity, particularly in data processing

(d) All of these

PART B — (5 × 4 = 20 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

16. (a) Define abstract data type.

Or

(b) Write about Array Abstract Data Type.

17. (a) What is asymptotic analysis? Describe.

Or

(b) How the Linear recursions work? Define that.

18. (a) Write a short note on circularly linked list.

Or

(b) Define tree structure with example.

19. (a) Give notes on priority queue.

Or

(b) Differentiate HashMaps and Hash Tables

20. (a) Define binary search tree? What are the properties of binary search tree.

Or

(b) Discuss about Merge sort with example.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)
Each answer should not exceed 600 words.

21. (a) Explain about bags.

Or

(b) Explain two dimensional arrays.

22. (a) Explain multiple recursions.

Or

(b) What do you mean by experimental studies of algorithm analysis? Explain.

23. (a) Explain the implementation of stack using python and linked list.

Or

(b) What is binary tree? Explain its properties.

24. (a) Explain bounded and unbounded priority queue implementation.

Or

(b) Explain the process of hashing.

25. (a) Explain quick sort.

Or

(b) Describe in detail about minimum spanning tree with example.

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