** D.Y. PATIL COLLEGE OF ENGINEERING & TECHNOLOGY**

**Set-:II**

**Q. Paper Code:**

**KASABA BAWADA KOLHAPUR-416006**

**(An Autonomous Institute)**

**S. Y. B. Tech-CSE-AIML(Semester-III)**

**END SEMESTER EXAMINATION, OCT./NOV.- 2021-22**

COURSE NAME: Data Structures COURSE CODE: 201AIMLL204

Seat No :

**Day and Date: …….day, …/…/2022**

**Time: ----- to ------ Max. Marks- 50**

**OBJECTIVE**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit 1 |  | 3 questions of 2 marks each | 6 marks | 20 marks | 40% |
| Unit 2 |  | 3 questions of 2 marks each | 6 marks |
| Unit 3 |  | 4 questions of 2 marks each | 8 marks |
| Unit 4 |  | 5 questions of 2 marks each | 10 marks | 30 marks | 60% |
| Unit 5 |  | 5 questions of 2 marks each | 10 marks |
| Unit 6 |  | 5 questions of 2 marks each | 10 marks |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | |  | Correct  Option |
| Q. 1) | Which of the following is the level of implementation of data structure? | | D |
| A) Abstract | B) Application |
| C)Implementation | D)All of the above |
| Q. 2) | Which of the following is true about the characteristics of Abstract data type  I) It exports a type  II)It exports a set of operations | | C |
| A) True, False | B) False, True |
| C)True, True | D)False, False |
| Q.3) | \_\_\_\_\_\_\_is not the component of data structure | | D |
| A) Operations | B) Storage structure |
| C)Algorithm | D)None of the above |
| Q. 4) | The easiest sorting is ........ | | D |
| A) quick sort | B) shell sort |
| C) heap sort | D) selection sort |
| Q. 5) | Finding the location of a given item in a collection of items is called ...... | | C |
| A) Discovering | B) Finding |
| C) Searching | D) Mining |
| Q. 6) | The time complexity of quick sort is ........ | | D |
| A) O(n) | B) O(logn) |
| C) O(n2) | D) O(n logn) |
| Q. 7) | In a stack, if a user tries to remove an element from an empty stack, the situation is called: | | A |
| A) Underflow | B) Empty collection |
| C) Overflow | D) Garbage collection |
| Q. 8) | A queue in which elements get added in empty area in the front of a queue is called \_\_\_\_\_. | | B |
| A) full queue | B) circular queue |
| C) rounded queue | D) rotated queue |
| Q. 9) | Which of the following is an application of stack? | | D |
| A) Finding factorial | B) Reversing of a string |
| C) Infix to postfix | D) All of the above |
| Q. 10) | A linear collection of data elements where the linear node is given by means of pointer is called? | |  |  |
| A) linked list | B) node list  A |
| C) primitive list | D) None of these |
| Q. 11) | In the worst case, the number of comparisons needed to search a singly linked list of length n for a given element is | | D |
| A) log 2 n | B)  n/2 |
| C) log 2 n – 1 | D)  n |
| Q.12) | In circular linked list, insertion of node requires modification of? | | B |
| A) One pointer | B) Two pointer |
| C) Three pointer | D)None |
| Q. 13) | Linked lists are not suitable to for the implementation of? | | D |
| A) Insertion sort | B) Radix sort |
| C) Polynomial manipulation | D) Binary search |
| Q. 14) | How do you calculate the pointer difference in a memory efficient double linked list? | | B |
| A) head xor tail | B) pointer to previous node xor pointer to next node |
| C) pointer to previous node – pointer to next node | D) pointer to next node – pointer to previous node |
| Q. 15) | Which of the following is not an advantage of trees? | | D |
| A) Hierarchical structure | B) Faster search |
| C) Router algorithms | D) Undo/Redo operations in a notepad |
| Q. 16) | In a full binary tree if number of internal nodes is I, then number of leaves L are? | | B |
| A)  L = 2\*I | B)  L = I + 1 |
| C) L = I – 1 | D) L = 2\*I – 1 |
| Q. 17) | What is the average case time complexity for finding the height of the binary tree? | | D |
| A) h = O(loglogn) | B) h = O(nlogn) |
| C) h = O(n) | D) h = O (log n) |
| Q. 18) | Which of the following is incorrect with respect to binary trees? | | D |
| A) Let T be a binary tree. For every k ≥ 0, there are no more than 2k nodes in level k | B) Let T be a binary tree with λ levels. Then T has no more than 2λ – 1 nodes |
| C) Let T be a binary tree with N nodes. Then the number of levels is at least ceil(log (N + 1)) | D) Let T be a binary tree with N nodes. Then the number of levels is at least floor(log (N + 1)) |
| Q. 19) | When in order traversing a tree resulted E A C K F H D B G; the preorder traversal would return | | B |
| A) FAEKCDBHG | B) FAEKCDHGB |
| C) EAFKHDCBG | D) FEAKDCHBG |
| Q. 20) | When converting binary tree into extended binary tree, all the original nodes in binary tree are | | A |
| A) internal nodes on extended tree | B) external nodes on extended tree |
| C) vanished on extended tree | D) None of above |
| Q.21) | What is the number of edges present in a complete graph having n vertices? | | B |
| A) (n\*(n+1))/2 | B) (n\*(n-1))/2 |
| C) n | D)  Information given is insufficient |
| Q. 22) | A connected planar graph having 6 vertices, 7 edges contains \_\_\_\_\_\_\_\_\_\_\_\_\_ regions. | | B |
| A)15 | B)3 |
| C)1 | D)11 |
| Q. 23) | Which of the following properties does a simple graph not hold? | | A |
| A) Must be connected | B) Must be unweighted |
| C) Must have no loops or multiple edges | D) Must have no multiple edges |
| Q. 24) | For a given graph G having v vertices and e edges which is connected and has no cycles, which of the following statements is true? | | B |
| A)  v=e | B) v = e+1 |
| C) v + 1 = e | D) v = e-1 |
| Q. 25) | Which of the following ways can be used to represent a graph? | | C |
| A) Adjacency List and Adjacency Matrix | B)  Incidence Matrix |
| C) Adjacency List, Adjacency Matrix as well as Incidence Matrix | D) No way to represent |

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**END SEMESTER EXAMINATION, OCT./NOV..- 2021-22**

COURSE NAME: Data Structures COURSE CODE: 201AIMLL204

**Answer Key (Objective Questions)**

1. D
2. C
3. D
4. D
5. C
6. D
7. A
8. B
9. D
10. A
11. D
12. B
13. D
14. B
15. D
16. B
17. D
18. D
19. B
20. A
21. B
22. B
23. A
24. B
25. C

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**Time: ----- to ------ Max. Marks- 50**

***Instructions:***

1. *All Questions are compulsory.*
2. *Figure to the right indicate full marks.*
3. *Give suitable general Instructions*
4. *Any other Course Specific Instructions.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **BT** | **CO’s** | **Q. No.** |  | | **Marks** | **Weightage** |
|  |  | **Q.1** | **Attempt the following** | | **20** | **40%** |
| **L6** | **CO1** | **a** | Discuss types of Data Structure with example | Unit: 1,2 & 3 | **07 M** |
| **L2** | **CO2** | **b** | Illustrate insertion sort algorithm and give steps of insertion Sort for sorting the following list in ascending order.  List: 4,3,2,10,12,1,5,6 also find total number of comparison made | **07 M** |
| **L2** | **CO3** | **c** | Explain queue in detail with its operations and condition. | **06 M** |
|  | | | | | |  |
|  |  | **Q.2** | **Attempt the following**  **\*\* Optional question shall be given to either sub-question ‘a’ or sub-question ‘b’** | | **15** | **60%** |
| **L2** | **CO4** | **a** | Illustrate operations of linked list? Explain any two. | Unit: 4,5 & 6 | **07 M** |
| **L6** | **CO1** | **b** | Discuss binary tree with its types.  **OR**  Discuss storage representation of graph using matrix and linked list for directed, undirected graph with at least 06 vertices. | **08 M** |
|  | | | | | |
|  |  | **Q.3** | **Attempt the following**  **\*\* Optional question shall be given to either sub-question ‘a’ or sub-question ‘b’** | | **15** |
| **L2** | **CO4** | **a** | Explain use of sparse matrix over simple matrix & representation of sparse matrix using linked list.  **OR**  Explain B-Tree with its operations in detail. | Unit: 4, 5 & 6 | **08 M** |
| **L6** | **CO4** | **b** | Discuss graph data structure using following terminology with example:  - Adjacency matrix  - Path  - Bridge | **07 M** |
|  | | | | | |

**\*\*\*This is a Question Paper sample Template\*\*\***

**You are requested to ensure that,**

1. The title block of the question paper is as per format
2. The course name is correctly mentioned with correct course code as per S. Y. B. Tech/B.Arch syllabus structure.
3. The name of the examination is correctly mentioned
4. The instructions are appropriate and do not violate the present rules
5. Model answer script should be separate sheet.
6. **Faculty should strictly follow the guidelines/instruction (attached with this format) while setting the question paper.**
7. **Use Times New Roman, 12 Bold, for main question and Times New Roman, 12, for Sub question.**

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**Answer key (Subjective Questions)**

**Question 1**

**A) Discuss types of Data Structure with example 7M**

**Ans:**

List of Types -1M

1. Linear and Nonlinear. Explanation and Example-2M
2. Static and Dynamic. Explanation and Example-2M
3. Homogenous and Non-Homogenous. Explanation and Example-2M

**B) Illustrate insertion sort algorithm and give steps of insertion Sort for sorting the following list in ascending order.**

**List: 4,3,2,10,12,1,5,6 also find total number of comparison made 7M**

**Ans:**

|  |
| --- |
| Definition & algorithm:02M  Example:04M  Total no.of comparison:01M |

**c) Explain queue in detail with its operations and condition 6M**

**Ans:**

|  |
| --- |
| Concept of Queue:02M  Insert operaton:02M  Delete operation:02M |

**Question 2 a) Illustrate operations of linked list? Explain any two. 7M**

**Ans:**

|  |
| --- |
| Enlist operations of linked list:01M  Out of Insert, search, delete, traverse, any two operations in detail with example:06M |

**b) Discuss binary tree with its types. 8M**

**Ans:** Concept with example of binary tree:02M

Types: Full, complete, perfect and balanced binary tree with example:06M

**OR**

**b) Discuss storage representation of graph using matrix and linked list for directed, undirected graph with at least 06 vertices. 8M**

**Ans:** Concept of graph representation of matrix using directed and undirected graph with example:04M

Concept of graph representation of linked list using directed and undirected graph with example:04M

**Question 3 a) Explain use of sparse matrix over simple matrix & representation of sparse matrix using linked list 8M**

**Ans:** Concept of sparse matrix:02M

Use of sparse matrix over simple matrix:02M

Example:04M

**OR**

**a) Describe B-Tree with its operations in detail. 8M**

Ans:

Concept of B-Tree:02M

Search operation:02M

Insert operation:02M

Delete operation:02M

**b) Discuss graph data structure using following terminology with example: 7M**

- Adjacency matrix

- Path

- Bridge

**Ans:**

Concept of graph:01M

Each terminology with example:02M