

[4]

OR iii. Write algorithm for insertion and deletion in single link list and circular link list. **6**

Q.6 Attempt any two:

i. What is DFS and BFS graph traversal scheme? Explain it with an example. **5**

ii. Implement the concept of Quick Sort step by step on the following data: **5**

42 23 74 11 65 58 94 36 99 87

iii. Write a program which implement binary search algorithm. **5**

Total No. of Questions: 6

Total No. of Printed Pages:4

Enrollment No.....



Faculty of Science
End Sem (Even) Examination May-2018

CA3CO07 Data Structure

Programme: BCA

Branch/Specialisation: Computer Application

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

- Q.1 i. Which of the following statement is false? **1**
- (a) Arrays are dense lists and static data structure
 - (b) Data elements in linked list need not be stored in adjacent space in memory
 - (c) Pointers store the next data element of a list
 - (d) Linked lists are collection of the nodes that contain information part and next pointer
- ii. Worst case of an algorithm is represented by: **1**
- (a) Sigma notation
 - (b) Polish notation
 - (c) Big oh notation
 - (d) Omega notation
- iii. Given the base address of an array B[3300, 3400, 3500,4100] as 1020 and size of each element is 2 bytes in the memory. Find the address of B[3700] **1**
- (a) 1828
 - (b) 1770
 - (c) 1880
 - (d) None of these
- iv. Predict the output of the following code **1**
- ```
int main()
{
int a[][] = {{1,2},{3,4}};
int i, j;
for (i = 0; i < 2; i++)
for (j = 0; j < 2; j++)
printf("%d ", a[i][j]);
return 0;
}
```

P.T.O

[2]

- (a) 1 2 3 4  
(b) Compiler Error in line " int a[][] = {{1,2},{3,4}};"  
(c) 4 garbage values  
(d) 4 3 2 1
- v. Convert the infix expressions into its equivalent postfix expressions **1**  
(A + B ^D)/(E - F)+G  
(a) (A B D ^+ E F - / G +) (b) (A B D +^ E F - / G +)  
(c) (A B D ^ + E F/- G +) (d) None of these
- vi. A queue of characters currently contained A, B, C, and D. What would be the contents of queue after the following operation DELETE, ADD W, ADD X, DELETE, ADD Y **1**  
(a) A,B,C,W,Y (b) C,D,W,X,Y  
(c) W,Y,X,C,D (d) A,B,C,D,W
- vii. Consider the following definition in c programming language **1**  
struct node  
{  
int data;  
struct node \* next;  
}  
typedef struct node NODE;  
NODE \*ptr;  
Which of the following c code is used to create new node?  
(a) ptr = (NODE\*)malloc(sizeof(NODE));  
(b) ptr = (NODE\*)malloc(NODE);  
(c) ptr = (NODE\*)malloc(sizeof(NODE\*));  
(d) ptr = (NODE)malloc(sizeof(NODE));
- viii. Why we need to a binary tree which is height balanced? **1**  
(a) To avoid formation of skew trees (b) To save memory  
(c) To attain faster memory access (d) To simplify storing
- ix. What is a hash table? **1**  
(a) A structure that maps values to keys  
(b) A structure that maps keys to values  
(c) A structure used for storage  
(d) A structure used to implement stack and queue

[3]

- x. A person wants to visit some places. He starts from a vertex and then wants to visit every vertex till it finishes from one vertex, backtracks and then explore other vertex from same vertex. What algorithm he should use? **1**  
(a) Depth First Search (b) Breadth First Search  
(c) Prim's algorithm (d) None of these
- Q.2 i. Elaborate all Data Structure Operation. **2**  
ii. What do you mean by algorithm complexity? Define space and time complexity. **3**  
iii. What do you mean by Data Structure? Define all its type in Detail. **5**  
OR iv. Describe Asymptotic Notations. Also Explain BigOh, Omega and Theta Notations. **5**
- Q.3 i. Define character string. Write its operations. **2**  
ii. Describe Multidimensional Array with an example? **3**  
iii. Write a Program to input an array, Stores the Squares of these elements in an array and print it Using C. **5**  
OR iv. Write a Program to find Sum of Digit using recursion. **5**
- Q.4 i. Convert Following Expression into Prefix and Postfix Expression **3**  
 $a+(b+c*(d+e))+f/g$   
ii. Write a Program for the implementation of push, pop and peek operations on stack. **7**  
OR iii. Implement Circular Queue with operations enqueue, dequeue and traverse using C? **7**
- Q.5 i. Define AVL Tree and B-tree with example. **4**  
ii. Draw Tree step by step based on below traversal order **6**  
(a) Preorder 10 5 4 1 8 30 40  
Inorder 1 4 5 8 10 30 40  
(b) Preorder: L,K,A,J,B,C,I,H,E,D,F,G  
Postorder: A,B,C,J,K,I,D,E,F,G,H,L.

P.T.O.

## Marking Scheme

### CA3CO07 Data Structure

- Q.1 i. Which of the following statement is false? **1**  
 (c) Pointers store the next data element of a list
- ii. Worst case of an algorithm is represented by: **1**  
 (c) Big oh notation
- iii. Given the base address of an array B[3300.....4100] as 1020 and size of each element is 2 bytes in the memory. Find the address of B[3700] **1**  
 (d) None of these
- iv. Predict the output of the following code **1**
- ```
int main()
{
int a[][] = {{1,2},{3,4}};
int i, j;
for (i = 0; i < 2; i++)
for (j = 0; j < 2; j++)
printf("%d ", a[i][j]);
return 0;
}
```
- (b) Compiler Error in line " int a[][] = {{1,2},{3,4}};"
- v. Convert the infix expressions into its equivalent postfix expressions **1**
 $(A + B ^{(D)} / (E - F) + G$
 (a) $(A B D ^{+} E F - / G +)$
- vi. A queue of characters currently contained a,b,c,d. What would be the contents of queue after the following operation DELETE, ADD W, ADD X, DELETE, ADD Y **1**
 (b) C,D,W,X,Y
- vii. Consider the following definition in c programming language **1**
- ```
struct node
{
int data;
struct node * next;
}
typedef struct node NODE;
NODE *ptr;
```

- Which of the following c code is used to create new node?  
 (a) `ptr = (NODE*)malloc(sizeof(NODE));`
- viii. Why we need to a binary tree which is height balanced? **1**  
 (a) To avoid formation of skew trees
- ix. What is a hash table? **1**  
 (b) A structure that maps keys to values
- x. A person wants to visit some places. He starts from a vertex and then wants to visit every vertex till it finishes from one vertex, backtracks and then explore other vertex from same vertex. What algorithm he should use? **1**  
 (a) Depth First Search
- Q.2 i. Elaborate Data Structure Operation. **2**  
 For Each operation 0.5 (0.5 mark \* 4)
- ii. Explain Algorithm Complexity with its type? **3**
- |                  |        |
|------------------|--------|
| Definition       | 1 mark |
| Time Complexity  | 1 mark |
| Space Complexity | 1 mark |
- iii. What Do you Mean by Data Structure? Define all its type in Detail. **5**
- |                           |         |
|---------------------------|---------|
| Data Structure Definition | 1 mark  |
| Primitive                 | 2 marks |
| Non Primitive             | 2 marks |
- OR iv. Describe Asymptotic Notations. Also Explain BigOh, Omega and Theta Notations. **5**
- |                      |         |
|----------------------|---------|
| Asymptotic Notations | 2 marks |
| BigOh Notation       | 1 mark  |
| Omega Notation       | 1 mark  |
| Theta Notation       | 1 mark  |
- Q.3 i. Define character string. Write its operations. **2**
- |            |        |
|------------|--------|
| Definition | 1 mark |
| Operation  | 1 mark |
- ii. Describe Multidimensional Array with an example? **3**
- |            |         |
|------------|---------|
| Definition | 2 marks |
| Example    | 1 mark  |

