 **ST.ANNE’S**

**COLLEGE OF ENGINEERING AND TECHNOLOGY**

(An ISO 9001:2015 Certified Institution)

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**QUESTION BANK**

**PERIOD:** JULY - NOV 2018 **BATCH**: 2015 – 2019

**BRANCH:** ECE **YEAR/SEM:** II/III

**SUB CODE/NAME:** EC8393 – FUNDAMENTALS OF DATA STRUCTURES IN C

**UNIT I - C PROGRAMMING BASICS**

**PART – A**

1. Define C program.[D]
2. What are the main steps of problem solving?[D] (April / May 2017)
3. Write the structure of C program. [D]Apr /May 2018
4. How will you execute a C program ?[D]
5. What is Compilation Process? [D](Nov/Dec 2015)
6. Define character set in C.[D]
7. What are the different data types available in C?[D] (Nov / Dec 2016)
8. What are Variables? Give Examples.[D] (May/June 2016)
9. What are various types of C operators?[D] (Jan 2014)
10. What is Conditional Operator? (Or) Give an example for ternary operator.[ID] (Nov/Dec 2014)
11. Define Special Operators.[D] Nov / Dec 2017
12. What are the decisions making statements?[ID]
13. Give the syntax for the ‘for’ loop statement.[D]
14. Differentiate between while and do while statement. [D](Jan 2013, Nov / Dec 2016, 2017)
15. Write a for loop statement to print number from 10 to 1. [ID](Jan 2014)
16. What is an Array? [D](May/June & Nov / Dec 2016)
17. What is main( ) function in ’C’ program.[ID]
18. What are the features of an array?[D] Nov / Dec 2017
19. Write example code to declare two dimensional arrays.[ID] (May/June 2014)
20. Define String. Give Examples.[D] (May/June 2016)
21. Give an example for initialization of string array.[D] (Nov/Dec 2014)
22. What is Quick Sort?[D]
23. What is Sequential Search?[ID] Nov / Dec 2017
24. What is Binary Search?[D] Nov / Dec 2017
25. Define Sorting.[D]
26. How will you pass arrays to pointers?[ID]
27. Mention the various standard string functions in C.[D]
28. Declare a character array of size 5 and assign vowels to it. [ID](Nov/Dec 2015)
29. What is break statement?[D]
30. What is goto statement?[D]

**PART – B**

**[First Half]**

 **STRUCTURE OF C PROGRAM**

 1. Discuss about the structure of C program in detail.[D]

 **COMPILATION AND LINKING PROGRAM PROCESS**

 2. Explain about the compilation and linking process[D]

 **CONSTANTS, VARIABLES AND DATA TYPES**

 3. What are Constants? Explain the various types of constants in C.[D] **(April/May 2015)**

 **DIFFERENT DATA TYPES IN C**

 4. Explain the various data types available in C with example. (Or) Discuss the basic data types in C. **[D](May/June 2016, 2018)**

 **OPERATORS AND EXPRESSION**

5.Explain the different types of operators available in C with example.[D] **(April/May 2015) (Nov/Dec 2015) (May/June 2016)**

 **MANAGING INPUT / OUTPUT FUNCTIONS IN C**

 6.Describe the various input and output statements in C with suitable examples[D]**(April / May 2017)**

 **DECISION MAKING**

 7.With an example program explain the various decision making statements available in C.[D] **(Nov / Dec 2017)**

 8.Explain in detail about various decision making structures available in C with illustrative examples.[D] **(Nov/Dec 2015)**

 **BRANCHING AND LOOPING**

 9.Describe the various looping statements used in C with suitable examples.[D] **(April/May 2015)**

10.Write about the need and types of branching statements in C language and discuss with examples. **[ID](Dec/Jan 2014)**

**[Second Half]**

 **ARRAY**

11.What is an array? Write a C program to arrange the given 10 numbers in ascending order using one dimensional array [D]**(Nov / Dec 2017)**

 **STRINGS**

12.Explain the concept of strings in detail.[D] **(April / May 2017, 2018)**

 13.Explain the various string handling functions in C.[D] **(April/May 2015)**

 **SORTING**

 14.Explain about sorting in detail with an example.[D]

 **SEARCHING TECHNIQUES**

 15.Briefly explain about various searching techniques in detail with an example[D]

 **MATRIX OPERATIONS**

 16.Write a C program to print the sum of two matrices. **[D](Dec/Jan 2014)**

 17.Write a C program to multiply two matrices[D].**(Nov/Dec 2014) (Nov/Dec 2015) (May/June 2016) (Nov / Dec 2016)**

 18.Write a C program to subtract two matrices and display the resultant matrix.[D] **(May/June 2014)**

**UNIT II - FUNCTIONS, POINTERS, STRUCTURES AND UNIONS**

**PART – A**

1. What is a Function?[D] (Nov / Dec 2014)
2. What are the types of function?[D] (Nov / Dec 2016)
3. Specify the advantages of function.[D] (May/June 2016)
4. What are the components of a function?[D] (April / May 2017)
5. What are the components of a function?[D] (April / May 2017)
6. What is Function Definition?[D] (Nov/Dec 2015)
7. What is meant by Function Call?[D]
8. What is Call by Reference? (Or) Define Pass by Reference. (Or) Define Pass by Address.[ID]
9. What is the difference between pass by value and pass by reference?[ID] (May/June 2014), Nov / Dec 2017
10. Define Recursion.[D] (May/June 2014, Apr / May 2018)
11. What is the use of Pointers? [D](Jan 2014), Nov / Dec 2016
12. Write down the features of pointer. What are the advantages of using pointers in a program?[D] Nov / Dec 2017
13. How will you declare a pointer? How pointer variable is initialized?[D] Apr / May 2018
14. What is an address operator and indirection operator?[ID] (Nov / Dec 2014) (Nov / Dec 2015)
15. How is pointer arithmetic done? [D](May/June 2016)
16. What is Dynamic Memory Allocation?[D] (April / May 2017)
17. What are the various dynamic memory allocation functions?[D] (April / May 2017)
18. What do you mean by structure?]D] (May/June, Nov / Dec 2016, 2017)
19. What are the advantages of using array?[D] Apr / May 2018
20. Differentiate between array and structure.[D] (Dec/Jan 2014)
21. State the importance of union. [D](May/June 2016)
22. What are Storage Classes?[D] (April / May, Nov / Dec 2017)
23. What are the storage classes available in C?[D] (April / May 2017)
24. Write a note on register storage class.[D] (Nov / Dec 2015)
25. Define Pre-processor directives in C.[D] (April / May 2015, 2018)
26. Write any two preprocessor directive in C. [D](Dec/Jan 2014)
27. What is the use of #define preprocessor?[D] (Nov/Dec 2014) (Nov / Dec 2015)
28. Define File Inclusion.[D]
29. Difference between Structure and Union.[D]
30. Write the rules for initialization of a structure.[D]

**PART – B**

**[First Half]**

**FUNCTION**

1. Explain different types of functions with suitable example.[D]

 2.Explain the following with suitable examples. (i) Function Declaration.[D]. **(Dec/Jan 2014)**

3. Explain different function prototypes.[D] **(Nov/Dec 2014)**

**PARAMETER PASSING METHODS**

 4. Explain in detail about call by value and call by reference.[D] **(Apr / May 2018)**

 5. Write a C program to swap the content of two variables using pointer.[D] **(Nov / Dec 2017)**

**RECURSION**

 6. What is recursion? Explain a recursive function with suitable example.[D] **(Nov/Dec 2015)**

**POINTERS**

 7. Discuss in detail about pointer with an example.[D]. **(April / May 2017)**

**POINTERS ARITHMETIC**

8. Explain in detail about pointers arithmetic with suitable example.[D]

9**.** Discuss in detail about Tower of Hanoi with a suitable illustration.[D]

**[Second Half]**

S**TRUCTURE**

 10. Explain in detail about the structure with an example.[D] **Apr / May 2018**

**STRUCTURE WITHIN STRUCTURE**

 11. Explain Structure within Structure (Structure Assignment / Nested Structure).[D] **Apr / May 2018**

 12. Write a C program to create a mark sheet for students using structure.[D] **Nov / Dec 2017**

 13. Write a C program to store the employee information using structure and search a particular employee using employee number.[ID]. **Nov / Dec 2017**

**UNION**

 14. Write short notes on union.[D]

**STORAGE CLASS**

15. Explain the concept of storage classes with suitable example.[D] **(April / May 2017, 2018)**

**PREPROCESSOR DIRECTIVES**

 16. Discuss about the preprocessor directives in C.[D] **Nov / Dec 2016**

**UNIT III - LINEAR DATA STRUCTURES**

**PART – A**

1. Give an example that shows how a stack is used by a computer system?[ID]
2. What do you understand by polish notation[ID]
3. What is a top pointer of a stack ?[D]
4. Write the postfix notation for – (A+B)\*C-(D-E)^F. [D]
5. Write any two applications of stack[D]. (Nov/Dec 2014)
6. Write the postfix notation for -\*-+abc/ef-g/hi [D].(Apr/May 2015)
7. What is meant by internal and external sorting ? [D] (Apr/May 2015)
8. State the applications linear and binary search techniques [D]. (Apr/May 2015)
9. Write the prefix for a\*b/c+d [D]. (Apr/May 2016)
10. Write any four applications of queues[D]. (Apr/May 2014)
11. What is a dequeue?[D] (Apr/May 2014)
12. What is stack and queue? [D] (Apr/May 2015)
13. What is a linked list?[D]
14. Differentiate between arrays and lists.[D]
15. Why is linked list used for polynomial arithmetic?[ID]
16. What is the advantage of linked list over arrays?[D]
17. What are the pitfalls encountered in singly linked list?[ID]
18. Give any three applications of linked list.[D]
19. State the properties of LIST abstract data type with suitable example.[D] (Apr/May 2014)
20. What is the basic purpose of header of the linked list ?[D]
21. Define dynamic memory.[D]
22. Write a routine to display all the elements in the linked list.[D].
23. What do the terms LIFO and FIFO means?[D]
24. What is the need for circular queue?[D]
25. How do you test for an empty queue?[D]
26. Write an algorithm used for checking the well formedness of parenthesis.[ID]
27. Write the role of stack in function call.[D]
28. List characteristics of stacks.[D]
29. What are the front and rear pointers of queue.[D].
30. What is the use of queue in operating system? [D]

**PART B**

**[First Half]**

**STACKS**

1. What is stack? Explain the operations of stack?[D] (Nov/Dec 2015)
2. Describe about the stack data structure and its operations.[D]
3. Explain about the implementation of stack using array[D](Apr/May 2014)
4. List out the applications of stack and explain any two.[ID]

**QUEUES**

1. What is queue? Explain the operations of queue[D]
2. Describe about the queue data structure and its operations.[D](Apr/May 2015)
3. Explain about the implementation of queue using array.[D]

**[Second Half]**

**LINKED LISTS**

1. Write a program for polynomial addition using linked list.[D]
2. Describe about the implementation of queue using linked list.[D](Nov/Dec 2016)

**EVALUATION OF EXPRESSIONS**

1. Write a procedure for evaluation the expression using stack and explain with example.[D](Apr/May 2017).
2. Explain about the implementation of linked list.[D]
3. Define array? How do you represent it?[D]

**UNIT IV – NON LINEAR DATA STRUCTURES**

**PART – A**

1. What is the difference between linear and non-linear data structures?[D]
2. Define binary tree.[D]
3. Give various implementation of tree.[D]
4. Which tree representation is mostly preferred by the developers- sequential or linked? Justify[ID]
5. List the applications of trees.[D]
6. In tree construction which is the suitable efficient data structure?[D]
7. What is meant by equivalent binary tree?[D]
8. Define complete binary tree.[D]
9. What is level of a tree?[D]
10. What are internal and external nodes in a tree?[D]
11. What is sibling node in a tree?[D]
12. What is forest?[D]
13. What is full binary tree?[D]
14. List out the traversal techniques used in tree.[D]
15. Which traversal results in elements in sorted order?[D]
16. How is binary tree represented using an array? [D]. (Nov/Dec 2015)
17. Construct an expression tree for the expression A+(B-C)\*D\*(E+F). [ID] (Apr/May 2006)
18. Define binary search tree.[D]. (Nov/Dec 2009).
19. List the operations defined on binary trees data types with a suitable example[ID] (Apr/May 2009)
20. Write an algorithm to declare nodes of a tree structure.[D]
21. Define binary tree and give binary tree node structure.[D]. (Nov/Dec 2012)
22. Define graph.[D]
23. What are the applications of graph?[D]
24. Define digraph.[D]
25. What is meant by minimum spanning tree?[D]
26. What is cycle in graph?[D]
27. What is complete graph?[D]
28. What is connected graph?[D]
29. What is meant by adjacency matrix?[D]
30. What do you mean by shortest path in a graph?[D]

**PART- B**

**[First Half]**

**BINARY TREES**

 1. Define binary tree. How do you represent the binary tree.[D]

**BINARY TREE REPRESENTATION AND TRAVERSALS**

 2. Explain about the binary tree traversals.[D]

**BINARY SEARCH TREES**

 3. Describe about the binary search tree and its operations.[D]

**APPLICATIONS OF TREES**

 4.What are the applications of tree.[D]

**[Second Half]**

**SET REPRESENTATIONS**

5. Define set. what are the operation scan be performed on set and explain.[D]

**UNION**

6. Write a c program for find operations using union[D]

**GRAPH AND ITS REPRESENTATIONS**

7. How do we represent the graph? Write a short on following:[D]

 i. Breadth first traversal

 ii. Depth first traversal

8. Explain about the graph traversal with example.[D]

**UNIT V – SEARCHING AND SORTING**

**PART – A**

1. Differentiate between internal and external sorting.[D]. (Nov/Dec 2014)
2. What is the time complexity of binary search? [D] .(Apr/May 2014)
3. List the sorting algorithms which uses logarithmic time complexity [ID].(Apr/May 2014)
4. Compare linear search and binary search[D]. (Nov/Dec 2015)
5. What is the time complexity of insertion sort?[D] (Apr/May 2016)
6. Sort the following numbers using insertion sort- 3,1,4,1,5,9,2,6,5 [D](Apr/May 2017)
7. Give any two applications of sorting.[D]
8. What do you understand by the term sorting?[D]
9. What is the need for sorting?[D]
10. What is the meaning of sort key?[D]
11. Name the slowest and fastest sorting technique.[D]
12. Explain the meaning of the term passes in context with sorting.[ID]
13. What is ascending and descending order?[D]
14. What is the basic principle behind the quick sort?[D]
15. Enlist four internal sorting techniques.[D]
16. What do you mean by heap?[D]
17. What are the two stages in which heap sort is conducted?[D]
18. What do you understand by the term searching?[D]
19. What are the advantages of binary search over the linear search?[D]
20. What is hashing? [D].(Apr/May 2016)
21. What is rehashing?[D](Nov/Dec 2015)
22. Define extending hashing [D](Nov/Dec 2014)
23. Give the significance of extendible hashing [D](Apr/May 2017)
24. What are the applications of hashing?[D]
25. What are the advantages of rehashing?[D]

**PART B**

**[First Half]**

**LINEAR SEARCH**

1. Write a C program for linear search and explain it.[D]

**BINARY SEARCH**

2. Write a C program for binary search and explain it.[D]

3. What is searching?Explain about the different searching techniques with example.[D]

**[Second Half]**

**BUBBLE SORT**

4. Explain about bubble sort and write a c program.[D]

**INSERTION SORT**

5. Explain about insertion sort and write a c program.[D]

**MERGE SORT**

6. Explain about merge sort and write a c program.[D]

**QUICK SORT**

7. Explain about quick sort and write a c program.[D]

**HASH TABLES**

8. Explain about the implementation of hash table[D]

9. Explain about the collision resolution techniques[D]