Total No. of Questions : 126 **Test Name: Mock_DSA_19082017**

SITRC

SE Computer Examination , Aug 2017

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Time : 30 Min **Passing Marks : 51** **Maximum Marks : 128**

1. **The time complexity of following code is** (1)

```
int Fiboncci (int num)
{
if(num<=1)
return num;
return Fibonacci(num-2) + Fibonacci(num-1);
}
```

A) O(n)
B) $O(n^2)$
C) $O(2^n)$
D) $O(n^3)$

2. **In flow chart 'Diamond' is used to represent _____.** (1)

A) Decision
B) Processing
C) Input
D) Start

3. Two main measures for efficiency of algorithm are___ (1)

A) Processorand memory
B) Complexity and capacity
C) Data and space
D) Time and space

4. _____ is the graphical representation of an algorithm (1)

A) Program
B) pseudocode
C) flowchart
D) graph

5. Which of the following options is first step in problem solving? (1)

A) Understanding the problem
B) Identifying the problem
C) Evaluating the problem
D) Collection of knowledgebase

6. Full form of ADT is: (1)

A) Advanced data type
B) Array data type
C) Abstract data type

7. Which of the following is not an algorithm of greedy design strategy? (1)

A) Prim's Minimal Spanning Tree Algorithm
B) Dijkstra's Algorithm
C) Kruskal's Minimal Spanning Tree Algorithm
D) Binary Search

8. What is the first step to solve the problem? (1)

A) Identify the problem
B) Understand the problem
C) Solve the problem directly
D) None of the above

9. Term Data Structure refers to _____ and interrelationship between them (1)

A) . None of these
B) Organization of data element
C) Coding Standards
D) Programming Language Statement

10. The recurrence relation for Fibonacci series is (1)

A) $T(n) = 2T(n - 2) + 2$
B) $T(n) = T(n - 1) + T(n - 2)$
C) $T(n) = 2T(n/2) + 1$
D) $T(n) = 2T(n - 1) + 1$

11. The recurrence relation capturing the optimal time of the Tower of Hanoi problem with n discs is (1)

A) $T(n) = 2T(n - 2) + 2$
B) $T(n) = 2T(n - 1) + n$
C) $T(n) = 2T(n/2) + 1$
D) $T(n) = 2T(n - 1) + 1$

12. Which one of the following algorithmic approach tries to achieve localized optimum solution? (1)

A) Greedy Approach
B) Divide and Conquer Approach
C) Dynamic Approach
D) Trial and Error Approach

13. which of the following does not exist in the algorithms complexity? (1)

A) Best case
B) worst case
C) average case
D) null case

14. Which of the following is/are true: (1)

A) calloc() allocates the memory and also initializes the allocates memory to zero, while memory allocated using malloc() has random data.
B) malloc() and memset() can be used to get the same effect as calloc().
C) calloc() takes two arguments, but malloc takes only 1 argument
D) **Both malloc() and calloc() return 'void *' pointer**
E) All of the above

15. **Characteristic roots of the following recurrence relation are ----------** (1)
$a_r - 9\, a_{r-1} + 20\, a_{r-2} = 2\, r$

A) 4,3
B) 5,4
C) 4,4
D) None of the Above

16. An algorithm is made up of 2 modules M1 and M2. If the order of M1 is f(n) and M2 is g(n), then the order of the algorithm is: (1)

A) Max(f(n),g(n))
B) Min(f(n),g(n))
C) f(n)*g(n)
D) f(n)+g(n)

17. What is a pseudocode? (1)

A) An informal way of writing a program
B) An informal way of analyzing a program
C) A efficient way of analyzing a system
D) Non of the above

18. In flow chart 'Rectangle' is used to represent _____. (1)

A) Decision
B) Processing
C) Input
D) Start

19. Abstract data type means ----- (1)

A) Separation of physical representation of data from its logical level
B) Collection of data
C) A logical picture of data type of various data elements and just specification of operations
D) Just specification of operations

20. List is _____ data structure. (1)

A) static
B) dynamic
C) persistent
D) ephemeral

21. Which of the following is not the part of ADT description? (1)

A) Data
B) Operations
C) Both of the above
D) None of the above

22. The following symbol denotes_____. (1)

A) Processing
B) Input output
C) Start or end
D) Decision

23. Which of the following case does not exist incomplexity theory (1)

A) Best case
B) Worst case
C) Average case
D) Null case

24. Big-Omega is _____. (1)

A) Asymptotic Lower Bound
B) Frequency Count
C) Asymptotic Upper Bound
D) Rate of growth of a function

25. What is the first step to solve the problem? (1)

A) Identify the problem
B) Understand the problem
C) Solve the problem directly
D) None of the above

26. What is time complexity of binary search which uses divide and conquer strategy? (1)

A) O(n.log(n))
B) O(log(n))
C) O(n)
D) $O(n^2)$

27. _____ of an algorithm is defined as the total time required by the algorithm to run to completion. (1)

A) Space Complexity
B) Time Complexity
C) Analysis
D) Asymptotic Analysis

28. If algorithm A has running time 7n^2 +2n + 3 and algorithm B has running time 2n^2, then _____ (1)

A) Both have same asymptotic time complexity
B) B is asymptotically greater
C) A is asymptotically greater
D) None of the above

29. **The generating function for the sequence 1, a, a^2, a^3, ….. is ----------** (1)

A) 1/1-z
B) 1/1-az
C) 1/1+az
D) None

30. **The function f(n) is _____ of g(n) iff there exists a positive real constant c and a positive integer n_0 such that $f(n) \geq c.g(n)$ for all $n > n_0$. This is denoted as f(n) = O(g(n)).** (1)

A) Big O
B) Big Omega
C) Big Theta
D) None of these

31. Time complexity of an algorithm depends upon_____ . (1)

A) Size of input
B) Speed of Computer
C) Frequency Count
D) Both A and B

32. **The time complexity of following code is int Fun (int num)** (1)

```
{
if(num<=1)
return num;
return Fun(n/2);
}
```

A) O(n)

B) O(logn)

C) $O(2^n)$

D) $O(n^3)$

33. there are four different algorithms A1, A2, A3, A4 to solve the given problem with the order log(n), (nlog), log(logn), n/logn respectively .which is the best algorithm? (1)

A) A1

B) A2

C) A3

D) A4

34. Which one of the following is not a derived data type? (1)

A) Integer

B) Structure

C) Character

D) Both A and C

35. In best case analysis of an algorithm, _____ of an algorithm is calculated. (1)

A) Big O

B) Big Omega

C) Big Theta

D) None of these

36. **Consider the function $f(n)= 5 n^3 + 5 n^2 + 1$, Give its time complexity** (1)

A) $O(n^2)$

B) $O(n^3)$

C) $O(n^4)$

D) Both B & C

37. Flowchart is a ..... (1)

A) Stepwise analysis of program

B) Graphical representation of an algorithms

C) A way of writing code

D) None of the above

38. Which of the following is not an algorithm of divide and conquer design strategy? (1)

A) Dijkstra's algorithm
B) Merge Sort
C) Quick Sort
D) Binary Search

39. What is the value of following recurrence. (1)
T(n) = 4T(n/2) + C

A) $\Theta(n)$
B) $\Theta(nLogn)$
C) $\Theta(n^2)$
D) $\Theta(\log n)$

40. The PAC stands for ---- (1)

A) Program Analysis Code
B) Problem Algorithmic Code
C) Problem Access Code
D) Problem Analysis Chart

41. Consider the following code & obtain the time complexity (1)
While(n >0)
n=n/2;

A) O(log n)
B) $O(n^2)$
C) O(n)
D) O(n log n)

42. When determining the efficiency of algorithm, the space factor is measured by _____. (1)

A) Counting the maximum memory needed by the algorithm
B) Counting the minimum memory needed by the algorithm
C) Counting the average memory needed by the algorithm
D) Counting the maximum disk space needed by the algorithm

43. **The following symbol denotes_____.** (1)

A) Off page connector
B) Input output
C) Start or end
D) Decision

44. In data structure, data may be of __ types (1)

A) 3 B) 2

C) 4 D) 1

45. **If there exists 2 functions f(n) and g(n), and positive constants c1, c2 and n_0 such that c1.g(n) <= f(n) <=c2.g(n) for every integer n >= n_0 then we say that -----.** (1)

A) F(n)=O(g(n)) B) F(n)=Ω(g(n))

C) F(n)=□(g(n)) D) F(n)=o(g(n))

46. The complexity of multiplying two matrices of order m*n and n*p is: (1)

A) mnp B) mp

C) mn D) np

47. Which one of the following is the Static Data Structure? (1)

A) Stack B) Linked List

C) Queue D) Array

48. **The following symbol denotes_____.** (1)

A) Processing B) Input output

C) Start or end D) Process module

49. The complexity of linearsearchalgorithm is (1)

A) O(n) B) O(logn)

C) O(n2) D) O(nlogn)

50. _____ of an algorithm is total space required by the algorithm with respect to the input size. (1)

A) Space Complexity B) Time Complexity

C) Memory Allocation D) Asymptotic Analysis

51. Time complexity depends on (1)

A) The machine we are executing on
B) Time required by each machine
C) Machine language instruction set
D) All of these

52. Which of the following are the characteristic of an algorithm? (1)

A) Input/Output
B) Definiteness
C) Finiteness
D) Effectiveness
E) All the Above

53. ADT is called as Abstract because (1)

A) It is completely independent data type
B) It is collection of different data types
C) None of these
D) Implementation Details are hidden

54. Which of the following is true about the characteristics of abstract data types? (1)
i) It exports a type.

ii) It exports a set of operations

A) True, False
B) False, True
C) True, True
D) False, False

55. There are 4 different algorithms A1, A2, A3, A4 to solve the given problem with the order log n, n log n, log (log n), n/log n respectively. Which is the best algorithm? (1)

A) A1
B) A2
C) A3
D) A4

56. What is time complexity of fun()? (1)

```
int fun(int n)
{
int count = 0;
for (int i = n; i > 0; i /= 2)
for (int j = 0; j < i; j++)
count += 1;
return count;
}
```

A) O(n.log(n))
B) O(log(n))
C) O(n.n)
D) O(log(n).log(n))

57. _____ is a way to organized data in such a way that it can be used efficiently. (1)

A) Data Structure
B) Data Type
C) Data Set
D) All of the above

58. Which of the following is an algorithm designed tools? (1)

A) DFD
B) Flowchart
C) Program
D) None of the above

59. **The following symbol denotes_____.** (1)

A) Processing
B) Input output
C) Start or end
D) Decision

60. Frequency count means.... (1)

A) A count that denotes how many times particular program is executed
B) A count that denotes how many times particular statement is executed
C) A count that denotes how many statements are in the algorithm
D) None of the above

61. **Specify the time complexity of following code fragment in terms of big oh notation:** (1)

```
i=1;
while(i<n)
{ sum=sum+i;
i=i*2;
}
```

A) O(n2)
B) O(n)
C) O(log n)
D) O(1)

62. **…… is not the component of data structure** (1)

A) Operations
B) Storage Structures
C) Algorithms
D) None of above

63. Which statement is false? (1)

A) Pseudocode is very similar to algorithms.

B) Pseudo code usually includes some syntax of the language.

C) Pseudo codes can be compiled.

D) Pseudocode is the combination of English statements with programming methodology.

64. Which of the following data structures are indexed structures? (1)

A) Linear arrays

B) Linked lists

C) both of above

D) none of above

65. Determine frequency count of following statements: (1)

```
for ( i=1; i<=n; i++ )
for ( j=1; j<=n; j++ )
X=X+1;
```

A) $2n^2 + 2n + 1$

B) $2n^2 + n + 1$

C) $n^3 + 3n + 1$

D) $n^2 + n$

66. _____ is defined as a data declaration packaged together with the operations that are meaningful for the data type. (1)

A) Pseudocode

B) Data structure

C) Data Set

D) Abstract data type

67. A ----- is graphic representation of how a process works showing the sequence of steps. (1)

A) Algorithm

B) Flowchart

C) Pseudo code

D) Source code

68. An algorithm is _____. (1)

A) a piece of code to be executed.

B) a step by step procedure to solve problem.

C) a loosely written code to make final code.

D) All of these

69. **Arrange the following functions in increasing asymptotic form:** (1)

$F1(n)=n^n$

$F2(n)=n!$

$F3(n)=2^n$

$F4(n)=(10^{10})^{100}$

A) F1,F2,F3,F4

B) F4,F3,F2,F1

C) F3,F2,F4,F1

D) F2,F3,F4,F1

70. The space factor when determining the efficiency of algorithm is measured by---- (1)

A) Counting the maximum memory needed by the algorithm

B) Counting the minimum memory needed by the algorithm

C) Counting the average memory needed by the algorithm

D) Counting the maximum disc space needed by the algorithm

71. Examples of O(n2) algorithms are -----. (1)

A) Addition of 2 matrices.

B) Multiplying 2 numbers by performing two successive additions

C) Both A and B

D) None

72. The worst case time required to search an element in a sorted array of size n is ----- (1)

A) O(1)

B) O(log n)

C) O(n)

D) O(n log n)

73. Time complexity refers to (1)

A) Complexities involved in calculation of execution time of a program

B) Amount of time a program needs to run to completion

C) Complexities involved with input time of a program

D) None of these

74. What does it mean when we say that an algorithm X is asymptotically more efficient than Y? (1)

A) X will be a better choice for all inputs

B) Y will be a better choice for small inputs

C) X will be a better choice for all inputs except large inputs

D) X will be a better choice for all inputs except small inputs

75. Determine the frequency count for the following (1)
1. for(i=1; i<=n; i++)
2. for(j=1; j<=n; j++)
3. x=x + 1;

A) 1. n 2.n^2 3. n^2

B) 1. n+1 2.n^2 3. n^2

C) 1. n+1 2. n(n+ 1) 3. n^2

D) 1. n+1 2. $n(n+1)^2$ 3. n^2

76. **The following symbol denotes____** (1)

A) Processing

B) input output

C) start and end

D) process Module

77. **…….. level is where the model becomes compatible executable code** (1)

A) Abstract level

B) Application level

C) Implementation level

D) All of the above

78. The complexity of multiplying two matrices of order m*n and n*p is _____ (1)

A) mnp

B) mn

C) mp

D) np

79. Which one of the following is not a algorithm design strategy? (1)

A) Recursive

B) Non-linear

C) Backtracking

D) Dynamic Programming

80. An algorithm is made up of three segments with time complexities as f1(n), f2(n) & f3(n) respectively. Then time complexity of algorithm is (1)

A) f1(n) + f2(n) + f3(n)

B) Max(f1(n), f2(n), f3(n))

C) Min(f1(n), f2(n), f3(n))

D) f1(n) f2(n) f3(n))

81. Two main measures for the efficiency of an algorithm are (1)

A) Processor and memory b. c. d.
B) Complexity and capacity
C) Time and space
D) Data and space

82. **The frequency count of the following code is** (1)

```
for(i=0;i<m;i++)
{
for(j=0; j<n;j++)
{
c[i][j] = a[i][j] + b[i][j];
}
}
```

A) m+mn+mn
B) m+n+mn
C) $m+n^2+mn$
D) (m+1)+m(n+1)+mn

83. Two main measures for the efficiency of an algorithm are: (1)

A) Processor and memory
B) Complexity and capacity
C) Time and space
D) Data and space

84. the step by step instruction required to solve the problem is called____ (1)

A) plan
B) list
C) Configuration
D) Algorithm

85. **Find the characteristic roots of the recurrence relation** (1)
$2a_n + a_{n-1} - a_{n-2} = 6$

A) 1, – ½
B) -1, -1/2
C) –1, ½
D) None

86. In practice -----is used to define tight upper bound on growth of function f(n). (1)

A) Big oh
B) Big omega
C) Big theta
D) Bog beta

87. What is the solution to the recurrence T(n) = T(n/2) + n (1)

A) O (n)
B) O (log n)
C) O (n. log n)
D) O (n^2)

88. An algorithm that calls itself directly or indirectly is known as (1)

A) Recursion
B) Traversal
C) Searching
D) Polish Notation

89. Consider the following statements: (1)
Finiteness and definiteness are properties of an algorithm
Effectiveness is a property of an algorithm
Pseudo code is written in English but resembles a program

A) (i) and (ii) are correct
B) Only (i) is correct
C) Only (ii) is correct
D) (i), (ii) and (iii) are correct

90. big oh notation is defind for____ (1)

A) searching
B) optimality
C) time and space complexity
D) none of these

91. **T** **he symbol a) and b) denotes**_____, _____ (1)

respectively.

A) Input output, Processing
B) Decision, Processing
C) Start or end, Processing
D) Input output, Decision

92. **The following symbol denotes**____ (1)

A) off page connector
B) input output
C) start and end
D) Decision

93. Big-Oh is _____. (1)

A) Asymptotic Lower Bound
B) Frequency Count
C) Asymptotic Upper Bound
D) Rate of growth of a function

94. The time complexity of binary search is _____ (1)

A) O(n)
B) O(logn)
C) O(nlogn)
D) $O(n^2)$

95. Which of the following asymptotic notation is the worst among all? (1)

A) O(n + 9378)
B) $O(n^3)$
C) O(log n)
D) O(n log n)

96. The circle symbol _____ is used to connect the two sections on same page. (1)

A) processing
B) input output
C) off-page connectors
D) on-page connectors

97. The concept of order of Big O is important because: (1)

A) It can be used to decide the best algorithm that solves a given problem
B) It determines the maximum size of the problem that can be solved in a given system, in a given amount of time.
C) It is lower bound of the growth rate of the algorithm
D) None of the above

98. Which statement is true? (1)

A) If a dynamic-programmingproblemsatisfies the optimal-substructure property, then a locally optimalsolutionis globally optimal.
B) If a greedy choice property satisfies the optimal-substructure property, then a locally optimalsolutionis globally optimal.
C) Both of above
D) None of above

99. The complexity of Binarysearchalgorithm is (1)

A) O(n) B) O(logn)

C) O(n^2) D) O(nlogn)

100. Which one of the following is not an algorithm design tool? (1)

A) Pseudocode B) Flowchart

C) Divide and Conquer D) Only A and B

101. **In flow chart 'parallelogram' is used to represent _____.** (1)

A) Decision B) Processing

C) Input and Output D) Start

102. **Consider the following algorithm:** (1)
factorial (n){ return 1 if (n=1) else return (n * factorial (n-1)) }
Recurrence relation for given algorithm is:

A) T(n)=n.T(n-1) + 1 B) T(n)=T(n-1) + 1

C) T(n)=T(n(n-1)) + 1 D) T(n)=T(n-1) + n

103. Mathematical Model that can have set of operations that can be performed on that model is called as _____. (1)

A) Abstract Data Type B) None of these

C) Composite Data Type D) Primitive Data Type

104. **Find the degree of recurrence relation** (1)
$a_n = a^2_{n-1} + a_{n-2} * a_{n-3} * a_{n-4}$

A) 2 B) 3

C) 4 D) 1

105. There are 4 different algorithms A1, A2, A3, A4 with order log(n), log(log n), n log (n), n/log(n) respectively. Which is the best algorithm? (1)

A) A1 B) A2

C) A3 D) A4

106. The time factor when determining the efficiency of algorithm is measured by: (1)

A) Counting microseconds B) Counting the number of key operations

C) Counting the number of statements D) Counting the kilobytes of algorithm

107. If running time of an algorithm is given by T(n) = T(n-1) + T(n-2) + T(n-3), if n>3 otherwise T(n)=n, what should be relation between T(1), T(2), T(3) where algorithm order become constant: (1)

A) T(1)=T(2)=T(3) B) T(1)+T(2)=2T(1)

C) T(1)-T(3)=T(2) D) T(1)+T(2)=T(3)

108. _____is the last step in solving the problem (1)

A) Understanding the problem B) Identifying the problem

C) Evaluating the solution D) None of these

109. **Consider the recurrence relation $a_n = a_{n-1} + 2\,a_{n-2}$ with $a_9 = 3$ & $a_{10} = 5$. Find a_7.** (1)

A) 1 B) 3

C) 5 D) None

110. _____is a step-by-step procedure for calculation (1)

A) Data structure B) Abstract Data Type

C) Primitive Data Type D) Algorithm

11 1. Data is nothing but _____. (1)

A) Bunch of Information
B) Piece of Information
C) Programming Statement
D) None of these

11 2. Which if the following is/are the levels of implementation of data structure (1)

A) Abstract level
B) Application level
C) Implementation level
D) All of the above

11 3. Which of the following is an algorithm designed tools? (1)

A) DFD
B) Program
C) Pesudocode
D) None of the above

11 4. Which of the following is not the characteristic of an algorithm? (1)

A) Error
B) Definiteness
C) Finiteness
D) Effectiveness

11 5. The field of computers that deals with heuristic types of problem is ----- (1)

A) Algorithmic science
B) Artificial intelligence
C) Problem solving science
D) Algorithmic problem solving

11 6. Q 81. The time complexity of binary search is: (1)

A) O(n)
B) O(logn)
C) O(nlogn)
D) O(n2)

11 7. The abstract data type (ADT) specifies _____ (1)

A) The components and structural relationship
B) The list of operations that are allowed to be performed
C) Both a and b
D) None of these

118. The time factor when determining the efficiency of algorithms is measured by_____ (1)

A) counting Second
B) counting the kilobytes of algorithms
C) counting key operation
D) counting the number of statement

119. In worst case analysis of an algorithm, _____ of an algorithm is calculated. (1)

A) Big O
B) Big Omega
C) Big Theta
D) None of these

120. **Calculate time complexity of the following code:** (1)

```
int fun(int n)
{ if(n<=1)
return (1);
else
return ( fun(n/2) );
}
```

A) O(n)
B) $O(n^2)$
C) O(log n)
D) O(n log n)

121. Solutions which have series of actions are called as ----- (1)

A) Heuristic solutions
B) Algorithmic solutions
C) Artificial solutions
D) Direct solutions

122. Which of the following data structure is non linear type? (1)

A) Strings
B) Lists
C) Stacks
D) Graph

123. Big oh notation is defined for ----- (1)

A) searching
B) Time complexity
C) Space complexity
D) Both B & C

124. The space factor when determining the efficiency of algorithm is measured by (1)

A) Counting the maximum memory needed by the algorithm

B) Counting the minimum memory needed by the algorithm

C) Counting the average memory needed by the algorithm

D) Counting the maximum disk space needed by the algorithm

125. **Total Frequency count of the given program is :** (2)

```
void Test()
{
int sum;
sum = 22;
printf("%d",sum);
}
```

A) 1

B) 2

C) 0

D) None of the above

126. **Total Frequency count of the given program is :** (2)

```
void Test()
{
int i;
for(i=1;i<=n;i++)
{
a = a + 10;
}
}
```

A) 1

B) 3n+2

C) n*n

D) n*n*n