

Booklet Serial No.

003177

Test Booklet Series

TEST BOOKLET - 2022

PROGRAMMER

(19)



Time Allowed: Two Hours

Maximum Marks: 100

INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES **NOT** HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
 2. Please note that it is the candidate's responsibility to encode and fill in the Roll Number and Test Booklet Series Code A, B, C or D carefully and without any omission or discrepancy at the appropriate places in the OMR Response Sheet. Any omission/discrepancy will render the Response Sheet liable for rejection.
 3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. **DO NOT** write anything else on the Test Booklet.
-
4. This Test booklet contains **100** items (questions). Each item comprises of four responses (answers). You will select the response which you want to mark on the Response sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each item.
 5. You have to mark all your responses **ONLY** on the separate Response Sheet provided. See directions in the Response Sheet.
 6. All items carry equal marks.
 7. Before you proceed to mark in the Response sheet the response to various items in the Test Booklet you have to fill in some particulars in the Response Sheet as per instructions sent to you with your Admission Certificate.
 8. After you have completed filling in all your responses on the Response Sheet and the examination has concluded, you should hand over to the Invigilator **only the Response Sheet**. You are permitted to take away with you the Test Booklet and Candidate's Copy of the Response Sheet.
 9. Sheets for rough work are appended in the Test Booklet at the end.
 10. **Penalty for wrong answers:**
THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY THE CANDIDATE.
 - (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **0.25** of the marks assigned to that question will be deducted as penalty.
 - (ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above for that question.
 - (iii) If a question is left blank, i.e., no answer is given by the candidate, there will be no **penalty** for that question.

SEAL

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1. Given the statement,
Maruti.engine.bolts 25 ;
Which of the following is true?
 A) Structure bolts are nested within a structure engine
 B) Structure engine is nested within structure bolts
 C) Structure Maruti is nested within the structure engine
 D) Structure Maruti is nested within structure bolts

2. An expression contains relational, assignment, and arithmetic operators. In the absence of parentheses, the order of evaluation will be:
 A) Assignment, relational, arithmetic
 B) Arithmetic, relational, assignment
 C) Relational, arithmetic, assignment
 D) Assignment, arithmetic, relational

3. The 'break' statement is used to exit from:
 A) An if statement
 B) A for loop
 C) A program
 D) The main() function

4. In a file containing the line "I am a boy\r\n" then on reading this line into the array str using fgets(). What will str contain?
 A) "I am a boy\r\n\0"
 B) "I am a boy\r\0"
 C) "I am a boy\n\0"
 D) "I am a boy"

5.

```
main () {
  int i = 4, j = 2 ;
  junk (&i, j);
  printf( "\n% d %d", i, j);
}
junk (int *i, int j ) { *i = *i * *i ; j * j ; }
```


 A) 162
 B) 164
 C) 4 4
 D) 4 2

6. `int main()`

```
{  
    int i;  
    int a[ ] = {2, 4, 6, 8, 10};  
    change(a, 5);  
    for (i=0; i<=4; i++)  
        printf("%d, ", a[i]);  
    return 0;  
}
```

`void change(int *b, int n)`

```
{  
    int i;  
    for (i = 0; i < n; i++)  
        *(b+1) = *(b+i)+5;  
}
```

A) 7, 9, 11, 13, 15

B) 2, 15, 6, 8, 10

C) 2 4 6 8 10

D) 3, 1, -1, -3, -5

7. What will be the output of the following C code?

```
#include <stdio.h>
```

```
union stu
```

```
{
```

```
    int ival;
```

```
    float fval;
```

```
};
```

```
void main()
```

```
{
```

```
    union stu r;
```

```
    r.ival = 5;
```

```
    printf("%d", r.ival);
```

```
}
```

A) 9

B) Compile time error

C) 16

D) 5

8. What will be the output of the following C code?

```
#include <stdio.h>
int main( )
{
    int i = 97, *p = &i;
    foo(&i);
    printf("%d", *p);
}
void foo(int *p)
{
    int j = 2;
    p = &j;
    printf("%d", *p);
}
```

- A) 2 97
- B) 2 2
- C) Compile time error
- D) Segmentation fault/code crash

9. Which function will you choose to join two words?

- A) Strcpy()
- B) Strcat()
- C) Strncon()
- D) Memcon()

10. What will be the output of the following C code?

```
#include <stdio.h>
void main()
{
    int x = 5;
    if (x < 1)
        printf("hello");
    if (x = 5)
        printf("hi");
    else
        printf("no");
}
```

- A) hi
- B) hello
- C) no
- D) error

11. What will be the output of the following C code?

```
#include <stdio.h>

void main ( )
{
    int x = 0;
    if (x == 0)
        printf("hi");
    else
        printf("how are u");
        printf("hello");
}
```

- A) hi
- B) how are you
- C) hello
- D) hihello

12. In a three-tier architecture, the intermediate layer between database and client server is classified as

- A) Functional sever
- B) Transcation server
- C) Application server
- D) Disk server

13. Which of the following is a single-valued attribute?

- A) Register number
- B) Address
- C) SUBJECT - TAKEN
- D) Reference

14. In which of the following is a single entity instance of one type related to many entity instances of another type?

- A) One-to-One Relationship
- B) One-to-Many Relationship
- C) Many-to-Many Relationship
- D) Composite Relationship

15. What is a snapshot of the data in the database at a given instant time called?
- A) Data base instance
 - B) Database scheme
 - C) Database snap
 - D) Snap of database
16. In relational Database schemas, the transition constraints are also known as
- A) Static Constraints
 - B) Dynamic Constraints
 - C) Implicit Constraints
 - D) Explicit constraints
17. Which of the following is not a restriction for a table to be a relation?
- A) The cells of the table must contain a single value
 - B) All of the entries in any column must be of the same kind
 - C) The columns must be ordered
 - D) No two rows in a table may be identical
18. Which of the following is not a type of Normal Form?
- A) 1NF
 - B) 2NF
 - C) 3NF
 - D) 10NF
19. The ability to query data, as well as insert, delete, and alter tuples, is offered by _____
- A) TCL (Transaction Control Language)
 - B) DCL (Data Control Language)
 - C) DDL (Data Definition Language)
 - D) DML (Data Manipulation Language)
20. Data integrity means:
- A) Providing first access to stored data
 - B) Ensuring correctness and consistency of data
 - C) Providing data sharing
 - D) None of the above

21. Examine the structure of the EMPLOYEES and DEPARTMENTS tables:

EMPLOYEES

EMPLOYEE_ID NUMBER DEPARTMENT_ID NUMBER MANAGER_ID NUMBER
LAST_NAME VARCHAR2(25)

DEPARTMENTS

DEPARTMENT_ID NUMBER MANAGER_ID NUMBER DEPARTMENT_NAME
VARCHAR2(35)
LOCATION_ID NUMBER

You want to create a report displaying employee last names, department names, and locations. Which query should you use to create an equi-join?

- A) SELECT last_name, department_name, location_id FROM employees, departments;
- B) SELECT employees.last_name, departments.department_name, departments.location_id FROM employees e, departments D WHERE e.department_id=d.department_id;
- C) SELECT e.last_name, d.department_name, d.location_id FROM employees e, departments D WHERE manager_id=manager_id;
- D) SELECT e.last_name, d.department_name, d.location_id FROM employees e, departments D WHERE e.department_id=d.department_id;
22. When we update any tuple in the relation which Authorization on a relation allows a user to?
- A) Select authorization
- B) Update authorization
- C) Grant authorization
- D) Define authorization
23. Which of the following scheduling algorithms could result in starvation?
- A) Priority
- B) Round Robin
- C) FCFS
- D) Shortest job first
24. On a system with 2^{24} bytes of memory and fixed partitions, all of size 65,536 bytes what is the minimum number of bits needed in an entry in the process table to record the partition to which a process has been allocated?
- A) 2^{16}
- B) 2^8
- C) 2^4
- D) 2^{32}
25. A sequential access file has fixed size 15-byte records. Assuming the first record is record 1, the first byte of record 5 will be at what logical location?
- A) 65
- B) 69
- C) 67
- D) 61

26. On a system using a disk cache, the mean access time is dependent on the mean cache access time, the mean disk access time, and the hit rate. For the following, what is the mean access time?
- a) Cache:1 ms; disk:100 ms; hit rate:25%
 - b) Cache:1 ms; disk:100 ms; hit rate:50%
 - A) $a=75.25$, $b=50.50$
 - B) $a=70.25$, $b=55.50$
 - C) $a=75.25$, $b=55.50$
 - D) $a=70.25$, $b=50.50$
27. _____ are used to keep track of both real and virtual memory.
- A) I/O tables
 - B) Memory tables
 - C) File tables
 - D) Process tables
28. The Circular Wait Condition Can Be Prevented By
- A) Defining a linear ordering of resource types
 - B) Using thread
 - C) Using pipes
 - D) All of the mentioned
29. Why is it not possible to enforce memory protection at compile time?
- A) Without proper permission, the program in one process cannot be able to reference memory location for reading or writing of another process.
 - B) Relocation of a process increases the complexity of satisfying the protection requirement.
 - C) Predicting the location of a program in the main memory is very difficult, it is not possible to check the absolute address at compile time to give proper protection.
 - D) All the above
30. What is the difference between a page and a frame?
- A) A page is a part of a process, while a frame is a part of memory.
 - B) A page is a part of a memory, while a frame is a part of a process.
 - C) Both A and B
 - D) None of the above

31. Consider the following four processes with the arrival time and length of CPU burst given in milliseconds:

Process	Arrival Time	Burst Time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

The average waiting time for preemptive SJF scheduling algorithm is _____

- A) 6.5 ms
 - B) 7.5 ms
 - C) 6.75 ms
 - D) 9.0 ms
32. The types of file systems in the Solaris example is _____
- A) Tmpfs
 - B) Objfs
 - C) Ctfs
 - D) All the above
33. The wait-for graph is a deadlock detection algorithm that is applicable when
- A) All resources have a single instance
 - B) All resources have multiple instances
 - C) All resources have a single 7 multiple instances
 - D) All of the mentioned
34. Consider the following arithmetic infix expression Q
- $$Q: A + (B * C - (D/E \uparrow F) * G) * H$$
- A) $ABC * DEF \uparrow / G * - H * +$
 - B) $/G * - H * + ABC * DEF \uparrow$
 - C) $ABC \uparrow / G * - H * + * DEF$
 - D) $DEF \uparrow / G * - H * + ABC *$
35. We want to evaluate the following parenthesis free arithmetic expression:
- $$2 \uparrow 3 + 5 * 2 \uparrow 2 - 12 / 6$$
- A) 20
 - B) 26
 - C) 19
 - D) 32

36. The maximum number of nodes in a binary tree of height h is _____
- A) $2^{h+1} - 1$
 - B) 2^h
 - C) $2^{h+2} - 1$
 - D) 2^{h+1}
37. What is an external sorting algorithm?
- A) The algorithm that uses tape or disk during the sort
 - B) The algorithm that uses main memory during the sort
 - C) The algorithm that involves swapping
 - D) The algorithm that is considered 'in place'
38. What is the worst-case complexity of bubble sort?
- A) $O(n \log n)$
 - B) $O(\log n)$
 - C) $O(n)$
 - D) $O(n^2)$
39. Suppose we have an $O(n)$ time algorithm that finds the median of an unsorted array. Now consider a QuickSort implementation where we first find the median using the above algorithm, then use the median as a pivot. What will be the worst-case time complexity of this modified QuickSort?
- A) $O(n^2 \log n)$
 - B) $O(n^2)$
 - C) $O(n \log n \log n)$
 - D) $O(n \log n)$
40. Why is the insertion sort most efficient when the original data are almost sorted in order?
- A) when the sorted portion of the array, has to move any elements at all.
 - B) when its inserting elements into the sorted portion of the array, it barely has to move any elements at all.
 - C) Both A and B
 - D) None of these

41. Suppose a circular queue of capacity $(n - 1)$ elements is implemented with an array of n elements. Assume that the insertion and deletion operations are carried out using REAR and FRONT as array index variables, respectively. Initially, $\text{REAR} = \text{FRONT} = 0$. The conditions to detect queue full and queue empty are
- Full: $(\text{REAR} + 1) \bmod n = \text{FRONT}$, empty: $\text{REAR} = \text{FRONT}$
 - Full: $(\text{REAR} + 1) \bmod n = \text{FRONT}$, empty: $(\text{FRONT} + 1) \bmod n = \text{REAR}$
 - Full: $\text{REAR} = \text{FRONT}$, empty: $(\text{REAR} + 1) \bmod n = \text{FRONT}$
 - Full: $(\text{FRONT} + 1) \bmod n = \text{REAR}$, empty: $\text{REAR} = \text{FRONT}$
42. A program P reads in 500 integers in the range $[0..100]$ representing the scores of 500 students. It then prints the frequency of each score above 50. What would be the best way for P to store the frequencies?
- An array of 50 numbers
 - An array of 100 numbers
 - An array of 500 numbers
 - A dynamically allocated array of 550 numbers
43. Each program module contains its own list of variables called _____
- Global variable
 - Local variable
 - Static variable
 - Dynamic variable
44. Consider an implementation of an unsorted singly linked list. Suppose it has its representation with a head pointer only. Given the representation, which of the following operation can be implemented in $O(1)$ time?
- Insertion at the front of the linked list
 - Insertion at the end of the linked list
 - Deletion of the front node of the linked list
 - Deletion of the last node of the linked list
- I and II
 - I and III
 - I, II and III
 - I, II and IV
45. In C++ the execution is always begins at _____
- main()
 - Declaration()
 - Sub function()
 - Class()

46. In a dynamic initialization, the initial value of an object may be provided during _____ time.
- A) Compile
 - B) Run
 - C) Both A & B
 - D) None
47. In C++ Size operator is followed in syntax is _____
- A) (Size of:)
 - B) (sizeof)
 - C) (SIZEOF)
 - D) (&Sizeof)
48. In C++ does not permit an int value to be automatically converted to an _____ value.
- A) Class
 - B) Float
 - C) Enum
 - D) long int
49. A _____ is used to destroy the object that have been created by a _____
- A) Destructor, Constructor
 - B) Constructor, Destructor
 - C) Inheritance, Dynamic binding
 - D) Dynamic binding, Inheritance
50. The mechanism of deriving a class from another derived class is known as _____
- A) Hierarchical inheritance
 - B) Multilevel inheritance
 - C) Single inheritance
 - D) Hybrid inheritance

51. The first argument argc represents the number of arguments in the command line known as _____
- A) argument vector
 - B) command-line arguments
 - C) counter
 - D) argument counter
52. All inline functions must be defined _____ they are called.
- A) After
 - B) Before
 - C) Middle
 - D) None
53. When we use the same function in both the base and derived classes, the function in base class is declared virtual using the keyword _____ preceding its normal declaration.
- A) virtual
 - B) pointer
 - C) C.int
 - D) Static
54. The important application of the pointer is to return the object it points to, the following invoke object statement will be _____
- A) return();
 - B) return *this;
 - C) return(this)
 - D) return &this;
55. The _____ sets the specified flags and leaves others unchanged.
- A) setf()
 - B) setw()
 - C) flag()
 - D) precision()

56. Arrange the following activities to form a general software engineering process model.

1. Manufacture
 2. Maintain
 3. Test
 4. Install
 5. Design
 6. Specification
- A) 6, 5, 1, 3, 4, 2
B) 1, 2, 4, 3, 6, 5
C) 6, 1, 4, 2, 3, 5
D) 1, 6, 5, 2, 3, 4

57. Define Agile scrum methodology.

- A) project management that emphasizes incremental progress
B) project management that emphasizes decremental progress
C) project management that emphasizes neutral progress
D) project management that emphasizes no progress

58. According to ISO 9001, inspection and testing come under which management responsibility?

- A) Process control
B) Document control
C) Control of nonconforming products
D) Servicing

59. Software Configuration Management can be administered in several ways. These include

- A) A single software configuration management team for the whole organization
B) A separate configuration management team for each project
C) Software Configuration Management distributed among the project members
D) All of the mentioned

60. _____ is an example of an RSL language content

- A) Data
B) Initial Value
C) Both A and B
D) None of the above

61. What is Cyclomatic complexity?
- A) Black box testing
 - B) White box testing
 - C) Yellow box testing
 - D) Green box testing
62. A software company needs to develop a project that is estimated as 1000 function points and is planning to use C++ as the programming language whose approximate lines of codes per function point are accepted as 50. Considering $a=1.4$ as the multiplicative factor, $d=0.33$ as an exponential factor for the basic COCOMO duration equation, approximately how long does the project take to complete?
- A) 11.2 months
 - B) 12.2 months
 - C) 13.2 months
 - D) 10.2 months
63. Assume the following regarding the development of a software system P: estimated lines of codes of p:33,480 LOC, Average productivity for p:620 LOC per person month, number of software developers:6, Average salary of a software developer:50,000 per month. If E, D, and C are estimated development effort (in person months), estimated development time (in months), and estimated development cost (in lac) respectively, then E, D, and C are _____
- A) 48,8,2
 - B) 54,9,27
 - C) 60,10,30
 - D) 42,7,21
64. A legacy software system has 940 modules. The latest release required that 90 of these modules were removed. Compute the software maturity index for the system.
- A) 0.849
 - B) 0.524
 - C) 0.725
 - D) 0.923
65. The algorithm often took too long to converge the count to infinity problem, and it was replaced by an entirely new algorithm called _____
- A) Packets
 - B) Link state routing
 - C) Distance vector routing.
 - D) IPV6

66. DNS is defined in _____
- A) RFCs 1034 & 1035
 - B) RFCs 1036 & 1037
 - C) RFCs 1086 & 1087
 - D) RFCs 1038 & 1039
67. The first class of encryption algorithm used same key for decryption & encryption called _____
- A) Symmetric-Key Algorithm
 - B) Assymmetric-Key Algorithm
 - C) Cipher Key Algorithm
 - D) A and B
68. The cipher was widely adopted by the industry for use in security products called _____
- A) DES-Data Encryption Standard
 - B) AES-Advanced Encryption Standard
 - C) Both DES & AES
 - D) None
69. The Public key and private key consist of _____
- A) (c,n) & (P,n)
 - B) (e,n) & (d,n)
 - C) (c,e) & (d,e)
 - D) (e,n) & (e,p)
70. When HTTP is used over SSL, it is called _____
- A) Secure HTTP
 - B) Unsecure HTTP
 - C) SSLHTTP
 - D) sHTTP

71. The _____ is an architectural framework for accessing linked documents spread out over millions of machines on the internet.
- A) World Wide Web
 - B) OSI
 - C) Three-tier architecture
 - D) World Web
72. The OSI model is the extension of _____
- A) Open Systems Interconnection.
 - B) Open Systems Intraconnection
 - C) Open Server Interconnection
 - D) Open service Interconnection
73. A _____ can call a constructor method defined by its superclass.
- A) Super Class
 - B) Abstract class
 - C) Subclass
 - D) None of the class
74. A _____ bridge that communicate with an existing driver.
- A) JDBC
 - B) ODBC
 - C) JDBC-ODBC
 - D) None
75. The _____ statement defines namespace in which classes are stored.
- A) Package
 - B) Inheritance
 - C) Hierarchy
 - D) Access Protection

76. If a class implements more than one interface, then the interfaces are separated with a _____
- A) Semi colon
 - B) Colon
 - C) Double colon
 - D) Comma
77. Which define the interface to the stack independently of the details of the implementation.
- A) Push()
 - B) Pop()
 - C) Push() and Pop()
 - D) None of the above
78. _____ encapsulate a thread of execution.
- A) Runnable
 - B) Thread
 - C) Stop
 - D) Interface
79. The easiest way to create a thread is to create a class that implements the _____ interface.
- A) Runnable
 - B) Thread
 - C) Start()
 - D) Main()
80. The four abstract classes built in Java stream-based I/O is
- A) InputStream, OutputStream, Reader, Writer
 - B) Reader, Writer, File, Accept
 - C) Inputfile, Outputfile, exit, main
 - D) None of the above

81. Another useful file utility methods are
- A) mkdir()
 - B) makedirs()
 - C) nikdir() and makedirs()
 - D) Files()
82. The _____ statement is optional, if we omit the execution will continue on the next case.
- A) Break
 - B) Continue
 - C) Switch
 - D) Default
83. _____ is both a TCP/IP application and a protocol for connecting a local computer to a remote computer.
- A) TELNET
 - B) FTP
 - C) TCP
 - D) UDP
84. _____ uses IP to deliver packets to the upper layer applications and provides a reliable stream of data among computers on the network.
- A) TELNET
 - B) HTTP
 - C) FTP
 - D) TCP/IP
85. There is a unique _____ for any hypertext item on the net.
- A) URL
 - B) http
 - C) Hyperspace
 - D) None.
86. In Http service by default uses port _____ the gopher service uses port
- A) 70,0
 - B) 50,80
 - C) 80,70
 - D) 10,70

87. The Scheme for this pathname type of URL is _____
- A) http
 - B) SMTP
 - C) FTP
 - D) URLs
88. In order to keep all the files straight, each person is given a specific directory called _____
- A) URL
 - B) Page directory
 - C) Home directory
 - D) Event Directory
89. The thirdway to connect to the internet with windows through _____
- A) MAN
 - B) LAN
 - C) WAN
 - D) Both A & B
90. Which servers run to allow them to respond to client request for information is
- A) IIS
 - B) Web clients
 - C) Web server
 - D) Browser
91. Web clients run special software called a _____
- A) Browser
 - B) Client
 - C) Server
 - D) HTML
92. The architecture that provides the foundation for managed execution in the .NET Framework is known as _____
- A) Common Execution System (CES)
 - B) Common type system (CTS)
 - C) .NET Execution
 - D) Common Run Enivronment (CRE)
93. Which of the following extension is used to represent the Windows Scripting source file?
- A) .WSF
 - B) .VBS
 - C) .netS
 - D) .SF

94. A procedure-level variable is declared using _____ keyword.
- A) Private
 - B) Public
 - C) Dim
 - D) Static
95. The Visual Basic .NET language defines _____ fundamental data types
- A) 10
 - B) 12
 - C) 7
 - D) 8
96. Unary Plus and Unary Minus can also be considered _____ operators in VB.
- A) Arithmetic
 - B) Relational
 - C) Assignment
 - D) Concatenation
97. The Keyword to be used for Array Parameter in VB is _____
- A) ParamArray
 - B) ByVal
 - C) Optional
 - D) ArrayParam
98. _____ is a counter-controlled loop.
- A) For..next loop
 - B) Do..while loop
 - C) While loop
 - D) If statement
99. The CLR is based on _____ model exception –handling
- A) Termination
 - B) Resumption
 - C) Termination and Resumption
 - D) Skip
100. _____ can access data from relational and non-relational databases.
- A) OLEDB
 - B) Jet database engine
 - C) ODBC
 - D) None of these

ROUGH WORK

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