

01 Computer Science-2020

Full Marks : 70

(Time: 3 Hours)

Pass Marks : 23

All-questions are compulsory.
Figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

Section - A

Multiple Choice Questions :

1. Choose the correct answer from the following : $1 \times 16 = 16$

- (a) C++ is developed by
(i) Dennis Ritchie (ii) Ken Thompson
(iii) Martin Richard (iv) Bjarne Stroustrup.

Ans. (iv)

- (b) String Terminator character is
(i) '\0' (ii) '\n'
(iii) '\b' (iv) none of these.

Ans. (iv)

- (c) DBMS stands for
(i) Database Management System
(ii) Database Manual System
(iii) Define Management Solution
(iv) none of these

Ans. (i)

- (d) The smallest individual unit in
(i) Semicolon (ii) Data type
(iii) Token (iv) Keyword

Ans. (iii)

- (e) The process of finding the location of the particular element in the array is called.
(i) Traversal (ii) Searching
(iii) Sorting (iv) none of these

Ans. (ii)

- (f) The Boolean expression $A \cdot (B + C) = AB + AC$ is
(i) Associative law (ii) Commutative law
(iii) Absorption law (iv) Distributive law.

Ans. (iv)

- (g) Destructor name is preceded by
(i) ! (ii) #
(iii) \$ (iv) ~

Ans. (iv)

- (h) The term 'attribute' refers to a
(i) Table (ii) Row
(iii) Column (iv) Relation

Ans. (iv)

- (i) Main is a/an
(i) Object (ii) Function
(iii) Literal (iv) none of these

Ans. (ii)

- (j) F stream class is used for
(i) Input operation (ii) Output operation
(iii) Input/Output operation
(iv) none of these

Ans. (iii)

- (k) A set of logical operators is
(i) + - * / % (ii) ? :
(iii) > < > = < = (iv) None of these

Ans. (iii)

- (l) Pointer is a
(i) variable that holds address of other variable
(ii) Pointer name is preceded by *
(iii) void pointer is a pointer which can hold the address of any data type
(iv) All of these.

Ans. (iv)

- (m) STACK follows
(i) GIGO Technique (ii) FIFO Technique
(iii) LIFO Technique (iv) none of these.

Ans. (iii)

- (n) When several classes inherit the properties of same common class it is called.
(i) Single inheritance (ii) Multiple inheritance
(iii) Hierarchical inheritance (iv) None of these.

Ans. (i)

- (o) People standing in a line is an example of
(i) STACK (ii) QUEUE
(iii) ARRAY (iv) Linked list

Ans. (i)

- p) is a Browser
(i) C++ (ii) Firefox
(iii) Telnet (iv) Cookies

Ans. (ii)

Section - B

Very Short Answer Questions : $2 \times 9 = 18$

2. Write the differences between Data and Information.
Ans. Data is raw, unorganized facts that need to be processed whereas when data is processed, organized in a given context so as to be useful, it is called information.
3. What is Token? What are the names of different types of Token?

Ans. Token is the smallest individual unit of a program.

Types of Tokens :

- (i) Data Type (ii) Identifiers
(iii) Constants (iv) Operators

4. Write the differences between Unary operator and Ternary operator.

Ans. Unary operator are those operator which works on single operand while ternary operator are those operators which works on three operands. Examples of unary operator is $-$, $++$, etc and Example of ternary operator is $?$:

5. Give the output of the following :

```
#
void main()
{
int x;
for (x=1; x<= 12; x* =2)
cout<<x<<endl;
}
```

Ans. 1
2
4
8

6. What is function? Write the types of function.

Ans. A function is a block of code which only runs when it is called. It used to perform certain actions and they are important for reusing code.

Type of Function :

- (i) Built in function
- (ii) User-defined function

7. Explain the concept of Encapsulation.

Ans. Encapsulation :

The wrapping of member variables and information in a single unit is called encapsulation. By use the encapsulation, data abstraction and data hiding can be achieved. Encapsulation is also defined as the binding together of data and function that manipulate them.

8. Explain the concepts of minterm and maxterm.

Ans. **Minterm** : A minterm is a boolean expression resulting in L for the output of a single cell and OS for all other cells in K-map.

It in used for represent sum of product (Sop) in K-map.

Maxterm : A maxterm is a boolean expression resulting in O for the output of a single cell and is for all other cells in K-map.

It is used for represent product of sum (POS) in K-map.

9. Define :-

- (a) Hub, (b) Repeater.
- (a) हब (b) रिपिटर को परिभाषित करें।

Ans. (a) **Hub** : A hub, also called network hub, is a connection point for devices in a network. It is commonly used to connect segments of a LAN.

(b) **Repeater** : A repeater operates at the physical layer. Its job to regenerate the signal over the same network before the signal becomes too weak or corrupted so as to extend the length to which signal can be transmitted over the same network.

10. What is Inheritance?

Ans. **Inheritance** : It is the process in which one or more sub classes inherit to properties of one or more base classes. It provides the reusability of code. Sub classes are those class inherit the properties. Base class are those class whose properties is inherited.

Section - C

Long Answer Questions :

11. Write a program in C++ to find the sum of any five odd numbers. 3

```
Ans. # include < istream.h>
# include < conio.h>
Void main ()
{
int S = 0, i, ;
for (i = 1 ; i < 10m i + z)
S = s + i ;
}
cout<<"Sum = " <<S;
```

2. What is Inline function? Write its advantages and disadvantages. 3

Ans. **Inline function** : C++ provides an inline functions to reduce the function call overhead.

Inline function is a function that is expanded in line when it called.

If a function is inline the compiler places a copy of the code of that function at each point where the function is called at compile time.

Advantages :

- It does not require function calling overhead.
- It also save overhead of return call from a function.

Disadvantages :

- It causes compilation overhead
- If may increases function size.

13. Define Datatype, Explain different types of datatype with examples. 3

Ans. **Datatype** : Data type define the type of data that a variable can hold. It is used in declaration to restrict the type of data to b stored.

Types of Data Types :

(i) **Primitive or Basic Data Type** : These data types are builtain or preclefined data types and can be used directly by the user to declare variables

Ex. : int, char, flout, etc.

(ii) **Derieved Data Types** : The data type that are derived from the primitive or built-in data type are known as derieved data type.

Ex : Array, pointer, etc.

(iii) **User-defined data Type** : These data types which are defined by user itself are known as user defined data type

Ex. : class, structure.

14. Write an algorithm of Bubble sort or Binary search.3

Ans. Bubble Sort Algorithm :

Procedure (At J, L, U, SIZE)

1. Repeat Step 2 Until 0 to size-1
2. Repeat step 3 Until L to (U-L)
3. If the current number is greater than next number the swap them.
4. Stop.

15. What is array in C++? Explain its types. 3

Ans. Array : Array is the derived data type which other the variables in a contiguous memory .

syntax: data-type array-name [size];

Types of Array :

(i) **One dimensional Array** : It is a group of elements having the same data type and same name.

Syntax : Data-type array name (size);

(ii) **Multidimensional array** :

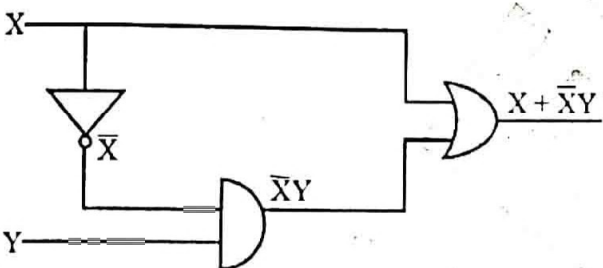
It is also called arrays of arrays. For example, a bi-dimensional array can be imagined as a 2-D table made of element all of them hold same of elements.

Syntax : datatype array name [size 1] [size 2] [size N];

16. Draw the circuit diagram and truth table of $X + \bar{X}Y$.3

$X + \bar{X}Y$ का सर्किट डायग्राम और सत्य सारिणी प्रस्तुत करें।

Ans. Circuit Diagram of $X + \bar{X}Y$:



Truth Table :

X	Y	\bar{X}	$\bar{X}Y$	$X + \bar{X}Y$
0	0	1	0	0
0	1	1	1	1
1	0	0	0	1
1	1	0	0	1

17. Define single inheritance and explain with suitable example. 3

Ans. Single Inheritance :

When only one sub class inherit the properties of one base class is called single inheritance

Ex. : class A

```
{
    Int x;
Public:
    A() { x = 10; }
    Void show x ();
```

```
{ cout << x << endl; }
}
class B : public A
{
    int y;
    public B :
        B () { y = 20; }
        Void show Y ()
        { (out << y << endl; ; }
}
```

18. What is guided media ? Explain. 3

Ans. Guided Media : It is defined as the physical Medium through which the signals are transmitted. It is also known as bound media.

A signal travelling along any of these media is directed and contained by the physical limits of the medium. Twisted-pair & coaxial cable use metallic conductors that accept and transport signals in the form of electric current. Optic fibre is a cable that accepts and transports signals in the form of light.

19. Obtain postfix notation for the following infix notation manually. 4

- a) $A + C - D * B$
- b) $(A + B) * C + D / E - F$.

Ans. (a) $A + C - D * B$

Infix expression	Stack	Postfix
A		A
+	+	
C		AC
-	+ -	AC +
D		AC + D
*	-	AC + D *
B		AC + DB

Required postfix expression - $AC + DB - *$

(d) $(A + B) * C + D / E - F$

Infix	Stack	Postfix
((
A	(A
+	(+	A +
B	(+	AB
)	(+)	AB +
*	* +	AB + *
C	* +	AB + C
+	* + +	AB + C +
D	+ +	AB + C + D
/	+ /	AB + C + D /
E	+ /	AB + C + DE
-	+ / -	AB + C + DE -
F	-	AB + C + DE - F

Required pastfix expression - $AB + C * DE / + F -$

20. What is logic gate? Explain fundamental logic gates with circuit diagram and truth table. 4

Ans. Logic Gate : It is the basic building block of any digital circuit. It is an electric circuit having one or more than one input and only one output. The relationship between the input and the output is based on a certain logic based on this logic gates are named AND, Or or NOT gates.

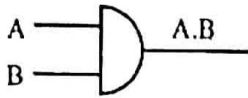
Fundamental Logic gates :

(i) **AND Gates :**

A circuit which perform an AND operation is known as AND gate.

Symbol - . (dot)

Logic Gate :-



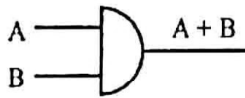
Truth Table :

A	B	A.B
0	0	0
0	1	0
1	0	0
1	1	1

(ii) **OR Gate :** A circuit which performed an OR operation is called OR gate.

Symbol : + (plus)

Logic Gate :-



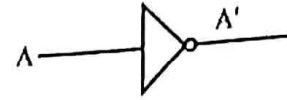
Truth Table :

A	B	A+B
0	0	0
0	1	1
1	0	1
1	1	1

(iii) **NOT Gate :** It perform complement operation. It is also known as inverter.

Symbol : -- or ' (prime)

Logic Gate :-



Truth Table :

A	Y
0	1
1	0

21. Write short notes on the following:

- (a) DDL (b) DBMS
(c) Tautology (d) Server

Ans. (a) DDL : Data Definition Language (DDL) actually consists of the SQL commands that can be used to define the database schema. It simply deals with description of the database schema and is used to create and modify the structure of data-base objects in the database.

(b) **DBMS :** Database Management System is a software for storing and retrieving users data while considering appropriate security measures. It consists of a group of programs which manipulate the database.

(c) **Tautology :** A tautology is sort of like circular logic compressed into one statment, so that the statement is technically true but still meaningless. It is a propositional formula that is true under any possible Boolean valuation of its propositional variables.

(d) **Server :** A server is a type of computer on a network that manages network resources. It is designed to process requests and delivers data to another computer over the internet or a local network.