Computer Science – First Year
March 2022
Question Paper & Answer Key

Answer any 5 questions from 1 to 7. Each carry 1 score. (5×1=5)

1. Who is known as the Father of Computer Science as well as Artificial Intelligence?

   A: Alan Turing.

2. Write an example for free and open Source Software.

   A: GNU Linux/ GIMP/Mozilla Firefox/Open Office.org etc.

3. Write the ternary operator in C++.

   A: Conditional operator/?:

4. In C++ ..... character is known as the string terminator.

   A: Null character (\0)

5. The process of calling a function by itself is known as.....

   A: Recursion

6. To include a mathematical built in functions in a C++ program, we should include..... header file.

   A: cmath

7. Write the name of a network protocol.

   A: TCP/IP/HTTP/FTP/SMTP/POP/SSL/SFTP/HTTPS/ SNMP/UDP/ICMP

Answer any 9 questions from 8 to 19. Each carries 2 scores. (9x2=18)

8. $(507)_8 = (.....)_2 = (.....)_{16}$.

   A: $(507)_8 = (101\ 000\ 111)_2 = (0101\ 0000\ 0111)_{16}$

9. Differentiate between RAM and ROM.

RAM	ROM
It is faster than ROM	Slower
It stores OS, programs and data	It stores boot programs
It allows reading and writing	Allows reading only
It is volatile	Non-volatile

10. Write the names of registers inside the CPU.

    A: Accumulator, Memory Address Register (MAR), Memory Buffer Register (MBR), Instruction Register (IR), Program Counter (PC)

11. What are the major functions of an operating system?

    A: Process management, Memory management, File management, Device management.

12. Distinguish between Syntax error and Logical Error.

    A: Syntax errors occur when the rules (syntax) of the language are not followed. For example, not using semicolon at the end of a statement is a syntax error. Logical errors occur when the programmer makes a logical mistake. For example, placing * instead of + is a logical error.

13. Differentiate between character and string literals.

A: A single character enclosed in single quotes is known as character literals. E.g. 'a'

A sequence of one or more characters enclosed in double quotes is known as string literals. E.g. "Hello".

14. Write a short note on any two jump statements used in C++.

A: Any two from

return: **-** It is used to transfer the control, to the calling program.

goto: It can transfer the control to anywhere in a program.

break: A break statement takes the control out of the immediate enclosing loop.

Continue:- A continue statement is used to skip one execution of a loop.

exit( ): **-** The *exit()* function terminates the program.

15. Compare switch and if else if ladder statements used in C++.

A: Any two points

Switch	**else if ladder**
Evaluates condition with equality operator only	Evaluate any relational or logical expression
Case constants must be an integer or character	Condition may include a range and float values
When no match is found, then default is executed.	When no match is found, else block is executed
break statement is required for exit from switch	Program control automatically goes out

Efficient when same variable is compared against a set of values	More flexible and versatile compared to switch.

16. Write C++ statement to declare an array which can store 5 integer values and explain about the memory allocation of the array.

A: int num[5];

20 bytes of memory will be allocated for this array since integer takes 4 bytes of memory.

17. Differentiate between linear and binary search algorithms.

Linear search method	**Binary search method**
The elements need not be in any order	The elements should be in sorted order
Slow	Fast
May need to visit all the elements	Never visited all the elements
Suitable for small array	Suitable for large array

18. Briefly explain about any two string built in function in C++.

A: Any two from

strlen() :- This is used to find the length of a string.

strcpy():- This is used to copy one string in to another.

strcat():- This is used to append one string in to another.

strcmp():- This is used to compare two strings.

strcmpi():- This is also used to compare two strings by ignoring cases.

19. Write a short note about the following C++ statement:

int sum(int,int);

A: This statement is a function prototype. It is a declaration of a function that specifies function name, return type and number and type of parameters. It is necessary if the function is defined after main ( ) function.

Answer any 9 questions from 20 to 32. Each carries 3 scores. (9 x 3 = 27)

20. Compare First and Second Generations of Computers.

Criteria	**Generation**	
	First	**Second**
Technology	Vacuum Tube	Transistor
Operating System	None	None
Language	Machine	Assembly
Period	1940-56	1956-64

21. Find the 1's Compliment and 2's Compliment form of $(-78)_{10}$.

A: $78_{10} = 1001110_2$.

Using 8 bits, $78_{10} = 01001110_2$.

-78 in 1's complement = 10110001

-78 in 2's complement = 10110001+1 = 10110010

22. What is e-Waste? Briefly explain about any two e-Waste disposal methods.

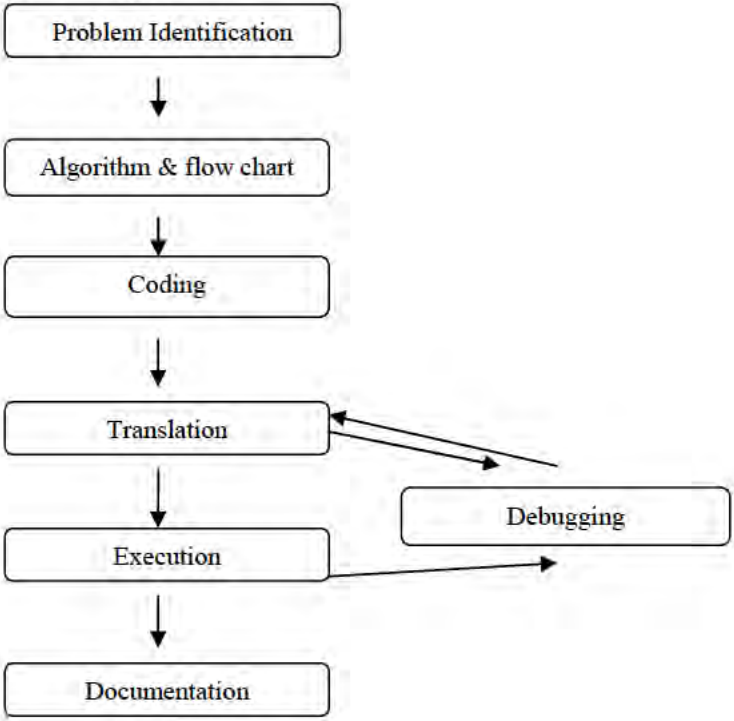
A: E-waste refers to electronic products nearing the end of their 'useful life'. It can be discarded electrical or electronic devices.

(Any two)

1. **Reuse: -** It refers to second-hand use.
2. **Incineration: -** In this the waste is burned at high temperature.
3. **Recycling: -** It is the process of making new products from old products.
4. **Land filling :-** In this method the waste material is buried in soil.

23. What are the different phases in programming?

The phases in programming are



24. Identify the invalid identifiers from the following and write reason for that:

A20be, if, 5sum, adm_no, student age, classno

A: if – It is a keyword.

5sum – started with a number.

Student age – White space is used.

25. Briefly explain about the structure of a C++ Program.

A: The basic structure of a C++ program is

```
#include <iostream>
using namespace std;
int main ( )
{
   Statements;
        ;
        ;
   return 0;
}
```

First line contains a preprocessor directive and a header file. Preprocessor directives are lines included in a program that begin with the symbol #, which are instructions to process some programs before compilation. iostream is a header file. Every program contains the function main(). Programs starts and ends within the main function.

26. Write C++ code fragments to print the numbers from 1 to 10 using an exit or entry controlled loop.

A: for(int i=1; i<=10; i++)

cout<< i << "\t";

27. Write the steps to sort the following numbers stored in an array using bubble sort algorithm: 3, 7, 1, 2, 6

1. Compare the first pair 3 and 7, no change since 7 is higher.

3	7	1	2	6

2. Then compare the next pair, 7 and 1. Swap as 1 and 7.

3	1	7	2	6

3. Compare 7 and 2. Swap as 2 and 7.

3	1	2	7	6

4. Compare 7 and 6. Swap as 6 and 7.

3	1	2	6	7

5. Compare 3 and 1. Swap as 1 and 3.

1	3	2	6	7

6. Compare 3 and 2. Swap as 2 and 3

1	2	3	6	7

28. Explain about any three stream functions used in C++.

A: Any three from

a. get()

This can accept a character or a string through keyboard. For accepting string array needs to be given as argument.

cin.get (ch); // This accepts a character to the variable ch

b. getline()

This accepts a string through keyboard. The delimiter (end character) will be Enter key. It can have one, two or three arguments. Third argument is to set any other delimiter character.

E.g. cin.getline (str, 10, 'z') ; // This accepts a string of max 10 characters or up to the letter 'z'.

c. put()

This is used to display a character to the monitor.

E.g. char ch = 'K'

cout.put (ch); // Displays 'K' to the monitor

d. write()

This is used to display a string to the monitor. It can give one or two arguments. First argument is a character array and the second argument can specify how many characters to be displayed.

E.g. char str[50] = "This is to check the stream function" ;

cout.write (str, 16) ; //This will display "This is to check"

29. Distinguish between Call by value and Call by reference methods.

Call by value method	Call by reference method
Ordinary variables are used as formal parameters.	Reference variables are used as formal parameters

Actual parameters may be constants, variables.	Actual parameters will be variables only.
The changes made in the formal arguments do not reflect in actual arguments.	The changes made in the formal arguments to reflect in actual arguments.
Exclusive memory allocation is required for the formal arguments.	Memory of actual arguments is shared by formal arguments.
Arguments are declared as ordinary variables in the function definition	The ampersand symbol (&) is used before arguments in the function definition

30. Prepare a short note about the following:

(a) Optical fiber cable

(b) NIC

(c) Gateway

A: (a) Optical fiber cable: - Optical fibers are thin glass fibers through which data is transmitted as light signals. It has a glass rod at the center, a cladding to reflect light, a coating, strengthening fibers and outer jacket.

(b) NIC: - Network Interface Card is the hardware interface between a computer and a network. It can be a separate circuit board or integrated with the motherboard. NIC can transfer data at a speed of 1 Gbps.

(c) Gateway: - Gateway is used to interconnect two different networks having different protocols. Its operations are similar to a router. It can find the best path for packets reach to the destination.

31. What are the major classifications of Social Media?

A: The classifications of social media are Internet forums, Social blogs, Micro blogs, Wikis, Social networks and Content communities.

32. Write a short note about:

(a) Fibre to Home (FTTH)

(b) Phishing

(c) Android Operating system

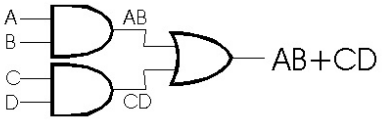
A: (a)FTTH: - Fiber to the home uses optical fibers from ISP to homes. This is accepted worldwide for high speed connection to the home.

(b) Phishing: - It is the process of stealing information (spoofing) by creating duplicate websites which looks almost exactly as the original web site.

(c) Android Operating system: - Android is a Linux based open source operating system designed for touch screen devices. It is the most widely used mobile operating system today. The applications in android are known as apps. Its latest versions are Android 10 and Android 11.

Answer any 2 questions from 33 to 36. Each carries 5 scores. (2x5=10)

33. (a) Draw the logic circuit for the Boolean expression A.B+ C.D



(b) Find the Dual of the Boolean expression A + 0 = A (2)

A: A.1 = A

34. (a) What are the advantages of flow charts ? (2)

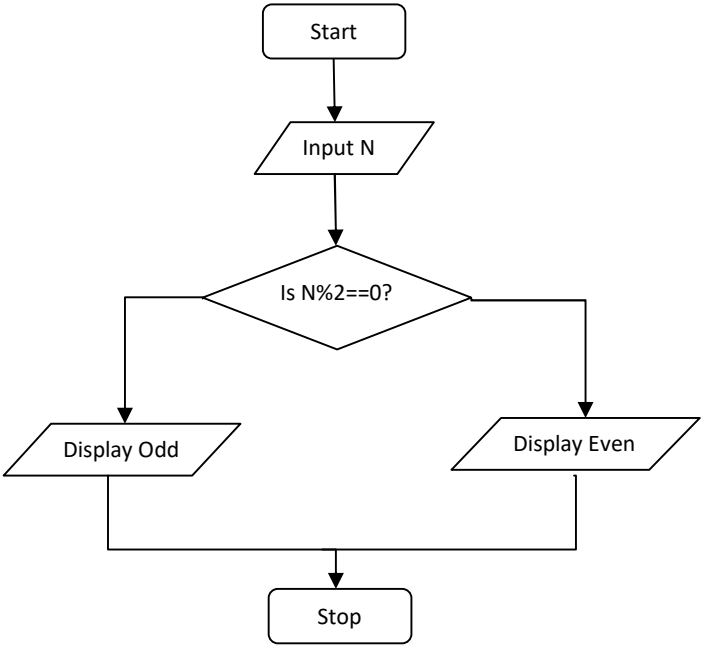
A: Better communication :- program logic can be explained easily

Effective analysis: - Analyzing the program is easy

Effective synthesis: - Synthesis is easy

Efficient coding: - Coding is easy if a flowchart is prepared.

(b) Draw a flowchart to check whether the number is even or odd.



35. (a) Briefly explain about the Fundamental data types used in C++. (3)

A: Fundamental data types are int, char, float, double and void.

int: -The keyword *int* is used to represent integer numbers. Compiler allocates 4 bytes of memory for *int* data type.

char: - The keyword *char* is used to represent a character. Compiler allocates 1 byte of memory for char.

float: - The keyword *float* is used to represent floating point numbers (numbers with fractional part). Compiler allocates 4 bytes of memory for float.

double: - The keyword *double* is used to represent large precision fractional numbers. Compiler allocates 8 bytes of memory for *double.*

void: - The keyword *void* is used to represent empty data. Compiler does not allocate any bytes for void.

(b) What are the data type modifiers in C++? (2)

A: Important type modifiers are **signed, unsigned, short** and **long**.

Since *int* has four bytes of memory, *long int* has 8 bytes of memory and *short int* has 2 bytes of memory. (Memory allocation is compiler dependent).

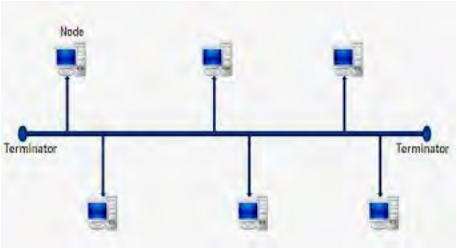
36. Write the names of 4 topologies and explain about two topologies.

A: The way in which the nodes are connected to form a network is called a topology. Four topologies are bus, star, ring and mesh.

(Any two)

1. Bus

In bus topology, all the nodes are connected to a main cable called bus. A small device called terminator is attached at each end of the bus. Characteristics of a bus are



- Easy to install
- Requires less cable length
- Inexpensive
- Failure of bus leads to network break down

2. Star

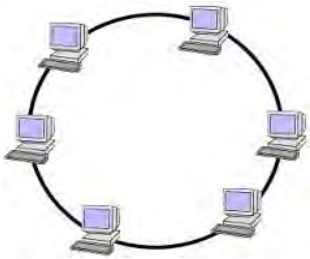
In star topology each node is directly connected to a hub or switch. The message is passing to the hub and it broadcast the message. Its characteristics are

- More efficient compared to bus
- Easy to install
- Requires more cable length
- Failure of node does not affect the network

- Easy to expand

3. Ring

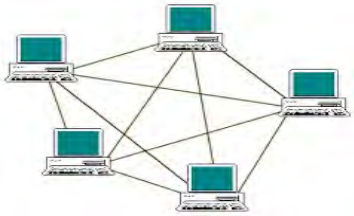
In ring topology all nodes are connected to a cable ring. Data travels only in one direction. Its characteristics are



- Requires less cable length
- Inexpensive
- Failure of a node leads to network break down
- Addition of nodes is difficult
- No signal amplification is required

4. Mesh

In mesh topology every node is connected to all other nodes. So there are multiple path between nodes. Its characteristics are



- Most reliable network topology
- Network will not fail, when one path fails
- Requires more cable length
- Expensive and difficult to manage

Note:- Only requested points to be written for the examination.