

Part III
COMPUTER SCIENCE

Maximum: 60 Scores

Time: 2 Hours

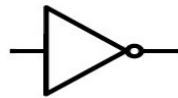
Cool off time: 20 Minutes

FY-M4

Answer Key

Part A

1. ASCII stands for
American Standard Code for Information Interchange (1 Score)
2. The following figure is a gate.



- NOT gate (1 Score)
3. Windows 10 and Ubuntu are example for
Operating System (1 Score)
 4. A character is inserted automatically at the end of a string.
Null character/\0 (1 Score)
 5. The function which is used to find the length of a string is
strlen() - (1 Score)
 6. The hardware interface between a computer and a network is
NIC / Network Interface Card (1 Score)
 7. is a software used to access the web pages in the World Wide Web
Browser (1 Score)

Part B

8. What are the features of an analytical engine?
It was programmable using punched cardsThe Engine had a 'Store' (memory) where numbers and intermediate results could be held, and a separate 'Mill' (processor) where the arithmetic processing was performed. Charles Babbage developed Analytical engine in 1833. (2 Scores - 1 score for one point)
9. Explain hacking.
Hacking is a technical effort to compromise the security of a network. It is performed with good intention (white hats - ethical hacking) or bad intention (black hats) - (2 Scores)
10. Write some advantages of e-mail.

Speed: - E-mail is delivered instantly to any location across the globe. E-mail can be sent to multiple users

Easy to use: - Organizing, saving and processing e-mails are very easy

Attaching is possible: - Pictures, files, documents etc. can be attached with e-mail

Environment friendly: - E-mails do not use paper and it save trees

Cost-effective: - Sending e-mail is inexpensive

Anywhere anytime availability: - E-mails are available from anywhere at any time.

(2 Scores – Any two points with explanation or any four points)

11. Explain IP address.

IP address is a unique 4 part numeric address assigned to each node on a network for identification.

IP addresses are represented as dotted decimal number. E.g. 192.168.1.1 (2 Scores – Any two points or example)

12. Write the difference between hub and switch.

Hub	Switch
Passive inexpensive device	Intelligent device
Transmit data to all other computers connected to it	Transmit data to the intended node only
Increase network traffic	Reduces network traffic
Reduces bandwidth	Increases bandwidth

(2 Scores – Any two points)



13. Match the following

pow() – iostream

strcpy() - cmath

toupper() – cstring

get() – ctype

Matching header files

pow () – cmath

strcpy() – cstring

toupper() – ctype

get() - iostream

(2 scores. ½ for each correct match)

14. Write the difference between formal and actual arguments.

The variables used in the function definition are known as formal arguments. Variables or constants used in the function call are known as actual arguments. (2 Scores)

15. What do you mean by function prototype?

Function prototype is a declaration of a function that specifies function name, return type and number and type of parameters. Function prototype is necessary if the function is defined after main(). E.g. int sum (int , int) (2 Scores – 1 score for 1 point. 2 scores for example)

16. How many bytes of memory is necessary to store the string 'Covid' in an array?

6 bytes. 1 byte is for null character (2 scores)

17. What do you mean by array traversal?

Accessing each elements of an array at least once is known as traversal of the array. (2 Scores)

18. Write differences between break and continue.

<i>break</i>	<i>continue</i>
Used with switch or loops	Used only with loops
Takes the control outside the loop	Does not take control out of loop
Causes to terminate the loop	Skips one iteration of the loop

(2 Scores. Any two points)

19. What are the keywords used for a switch statement in C++?

switch, case, break, default ($\frac{1}{2} \times 4 = 2$ Scores)

20. What do you mean by an input statement? Write an example for input statement.

An input statement contains the extraction operator (>>) and the keyword *cin*. The syntax is
`cin >> variable1 ;`

E.g. `cin >> a ;` (1 score for explanation or >> operator and 1 score for syntax or example)

21. What is type promotion?

C++ converts lower data type to higher type automatically for some operations. This is also known as type promotion.

E.g. `int n = 1;`

`char c = 'A';`

`cout << n + c; //Here c is automatically converted to int for addition.`

(2 Scores – 2 scores for explanation. Or 2 scores for example)

22. What do you mean by a string in C++? Write an example for a string.

A sequence of one or more characters enclosed in double quotes in known as string literals.

E.g. "Hello", "123", "C++"

(2 Scores – 1 score for explanation, 1 score for example)

23. What is a keyword in C++? Write an example for a keyword.

Keywords are reserved words. It is also known as pre-defined words. Keywords have special meaning and it cannot be changed.

E.g. break, if, do, while, case, return etc.

(2 Scores. 1 score for definition. 1 score for any one example)

24. What are the advantages of a flowchart?

- 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.

(2 scores for any two advantages)

25. Write the difference between interpreter and compiler.

a. Interpreter

Interpreter converts High level program to machine language line by line. If there is an error in one line, it reports the error and stops execution. E.g. The programming language BASIC is interpreted.

b. Compiler

Compiler converts high level program to machine language. It compiles the entire program and reports, the list of errors. E.g. The programming language C++ has many compilers

(2 Scores for 2 points)

26. Draw the truth table for AND operation.

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

(2 Scores)



27. Convert the decimal number 40 to binary.

2	40	
2	20	0
2	10	0
2	5	0
2	2	1
	1	0

$$40_{10} = 101000_2$$

(2 Scores)

Part C

28. Write the differences in technology in different generations of computers.

Criteria	Generation				
	First	Second	Third	Fourth	Fifth
Technology	Vacuum Tube	Transistor	IC	Microprocessor	Artificial Intelligence

(3 Scores for explanation or classifying the correct technologies)

29. Find the 2's complement of -55 using 8 bits.

2	55	
2	27	1
2	13	1
2	6	1
2	3	0
	1	1

(3 Scores)

1 score for binary = 110111

To 8 bits - 00110111

1 score for 1's complement = 11001000

1 score 1's complement + 1 = 11001001

30. $10110110101_2 = \dots\dots\dots 10$

$$2^0 + 2^2 + 2^4 + 2^5 + 2^7 + 2^8 + 2^{10} = 1+4+16+32+128+256+1024 = 1461$$

(3 scores – 1 score for correct method)

31. Explain any three ports in a computer.

1. USB port

USB (Universal Serial Bus) is a connection that provides high speed data communication between devices. It is used for short distance communication. It is capable of supplying electric power to devices. It is used to connect devices like keyboard, mouse, printer, flash drive etc.

2. LAN port

LAN (Local Area Network) port is used for a wired network connection. RJ45 is a standard connector for LAN connection.

3. PS/2 port

PS/2 (Personal System/2) ports are developed by IBM for connecting keyboard and mouse. This port is slow.

4. Audio port

Audio ports are used to connect audio devices like speaker, microphone etc. Three common audio ports are line-in, line-out and mic-in.

5. VGA Port

VGA (Video Graphics Array) port is used to connect a monitor or projector to a computer. It has 15 pins displayed in three rows.

6. HDMI port

HDMI (High Definition Multimedia Interface) is a digital connection capable of transmitting high definition video and multi-channel audio over a single cable.

(3 Scores for any 3 ports)

32. Explain different E-waste disposal methods.

E-waste disposal methods

1. Reuse

It refers to second-hand use or usage after the equipment is modified. Used equipments are passed to relatives or exchanging for money or passed on to charity institutes.

2. Incineration

It is a complete combustion process. The waste is burned in specially designed incinerators at a high temperature in the range of 900 to 1000 degree Celsius.

3. Recycling

It is the process of making new products from old products. Monitors, keyboards, hard drivers, CDs, mobiles, printers, CPUs, memory chips etc. can be recycled.

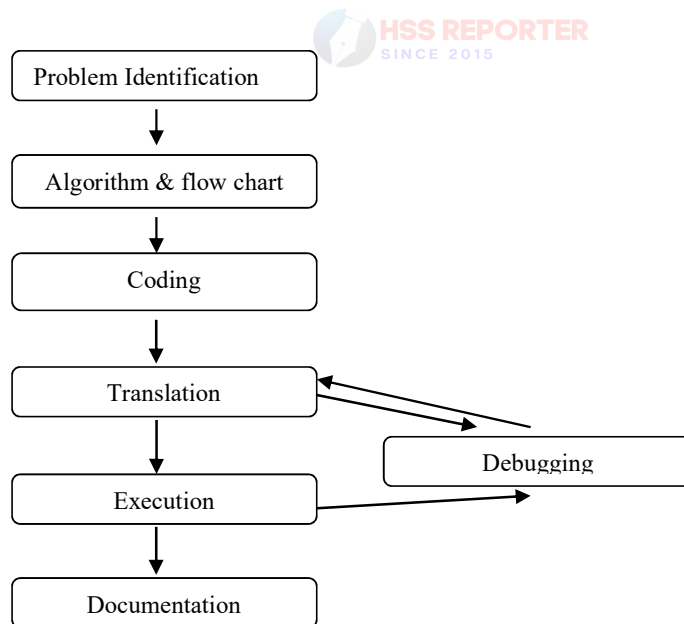
4. Land filling

It is one of the most widely used methods. In this method soil is excavated and waste material is buried in it, which is covered by a thick layer of soil.

(3 Scores – Any 3 points with explanation – 4 points only 2 scores)

33. What are the phases in programming?

The phases in programming are



(3 Scores for writing 7 phases – diagram not required)

34. Explain three errors in programming.

a. Syntax errors :- Syntax errors occur when the rules (syntax) of the language are not followed. E.g. Not using semicolon at the end, incorrect word, undefined term etc.

b. Logical errors :- These errors occur when the programmer makes a logical mistake. Logical errors may not be detected by the compiler. E.g. placing + symbol instead of * symbol.

c. Run-time errors :- These errors are detected only during the execution. E.g. Try to divide a number by zero.

(2 Scores – Name only 2 Scores)

35. Name the five tokens in C++.

Keywords, Identifiers, Literals, Punctuators, Operators

(3 Scores for all tokens – ½ score for 1 point)

36. Name the fundamental data types? How many bytes of memory are allocated for each of the data type?

void - 0 byte

char – 1 byte

int - 4 bytes

float – 4 bytes

double – 8 bytes

(3 scores – 1 ½ score for data types only)

37. Consider the following code

```
int num = 1500 ;
```

Write the variable, content and operator in the above code.

Variable = num (1 score)

Content = 1500 (1 score)

Operator = Assignment (or =) (1 score)



38. What do you mean by a conditional operator? Write an example.

It is a ternary operator. It requires three operands. It can be used as an alternative to if-else statement.

The general form is

Test expression ? True_case code : False_case code ;

E.g. if a, b and big are integers, then,

```
big = (a > b) ? a : b ;
```

Now big has the biggest value among a and b.

(3 Scores - Explanation only 2 scores – 1 score for example)

39. Convert the following *for* loop statement to *while* loop.

```
for( int i=1; i < 100 ; i+=2)
```

```
{
```

```
    cout << i << "\t" ;
```

```
}
```

```
int i = 1;
```

```
while(i < 100)
```

```

{
    cout<< i << "\t" ;
    i+=2 ;
}

```

(3 Scores)

40. Write array declarations

a) to store 100 numbers b) to store a name of 20 characters c) to store 10 large numbers

a. `int a[100];` (1 score)

b. `char b[20];` (1 score)

c. `double c[10];` (1 score)

41. Explain any two stream functions. Write example for each.

a. `get()`

This can accept a character or a string through keyboard.

`char ch;`

`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. `char str [20];`

`cin.getline (str, 10);` // This accepts a string of maximum 10 characters

`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. The object `cout` is used.

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"

(3 scores for 2 functions. 1 ½ for only one function)

42. Explain any three character functions.

a. `isupper()`

This is used to check whether a character is upper case or not. It returns 1 if true, and return 0 if false. Syntax is

E.g. `int n = isupper ('A');` // Now `n` has the value 1.

b. `islower()`

This is used to check whether a character is lower case or not. It returns 1 if true, and return 0 if false. Syntax is

E.g. `int n = islower ('A'); // Now n has the value 0.`

c. `isalpha()`

This is used to check whether a character is alphabet or not. It returns 1 if true, and return 0 if false.

E.g. `int n = isalpha ('A'); // Now n has the value 1.`

d. `isdigit()`

This is used to check whether a character is digit or not. It returns 1 if true, and return 0 if false.

E.g. `int n = isdigit ('5'); // Now n has the value 1.`

e. `isalnum()`

This is used to check whether a character is alphanumeric or not. It returns 1 if true, and return 0 if false.

E.g. `int n = isalnum (*); // Now n has the value 0.`

f. `toupper()`

This function is used to convert a character to its upper case. It returns the upper case letter. The

E.g. `char c = toupper ('a'); // Now c has the value 'A'`

g. `tolower()`

This function is used to convert a character to its lower case. It returns the lower case letter.

E.g. `char c = tolower ('A'); // Now c has the value a`
(3 scores for any two – Function name only 1 ½ scores)

43. What are the advantages of modular programming?

1. Reduces program size

Repetition of same expression can be avoided by using modules.

E.g. To find $\sqrt{x} + \sqrt{y}$, The module written for finding square root of x can be reused for y.

2. Reduces chances of error

Errors can be easily identified as they are localized to a function

3. Reduces programming complexity

Code for each module is short, simple and easy to understand.

4. Improves Reusability

A function once written can be reused later, which saves time and energy.

E.g. calling and using of predefined functions.

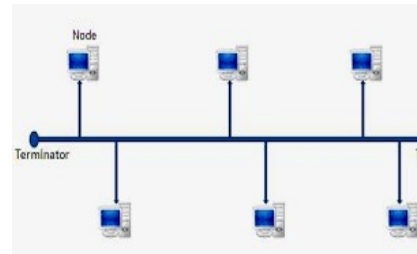
(3 scores - Any 3 points)

44. Explain any three network topologies.

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

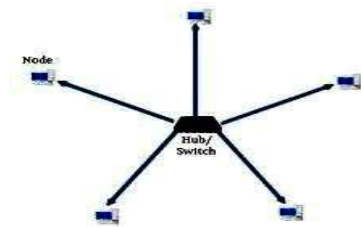
- Easy to install
- Requires less cable length
- Inexpensive
- Failure of node does not affect the network
- Failure of bus leads to network break down
- Only one node can transmit data at a time



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

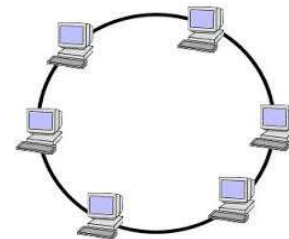
- More efficient compared to bus
- Easy to install
- Requires more cable length
- Failure of node does not affect the network
- Failure of hub leads to network break down
- Easy to expand



3. Ring

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

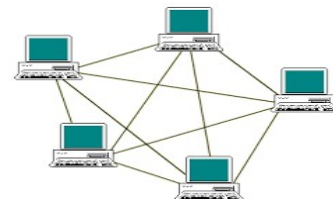
- Requires less cable length
- Inexpensive
- Failure of a node leads to network break down
- Addition of nodes is difficult
- No signal amplification is required



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



(3 Scores for any three topologies. Names only 1 ½ scores. Images only 2 scores)

45. What are the advantages of a network?

1. Resource sharing

Resources can be shared using network. Resources may be hardware (hard disk, printer, scanner etc.) or software (application software, anti-virus etc.).

2. Price-performance ratio

Cost of software will be reduced by sharing software without affecting performance.

3. Communication

Communication is easy and faster using networks. E-mail, chat, video conference etc. are examples.

4. Reliability

Information can be backed up in multiple computers using network. It improves reliability.

5. Scalability

Computing or storage capacity can be increased or decreased easily by adding or removing computers or devices to the network.

(3 Scores – Any three points with explanation- 5 advantages naming only 3 scores)

46. Explain different classification of social media.

1. Internet forums: - It is online discussion websites where people can engage in conversations and find solutions in the form of messages. Each discussion on a topic is called a thread. E.g. Ubuntu forum

2. Social blogs: - A blog is a discussion or informational website consisting of posts in a topic and owned by an individual or a group of individuals. Websites like blogger.com offers blogging facility

3. Micro blogs: - It allows users to exchange short sentences, images or video links. It can be used for expressing personal opinion. E.g. Twitter.com

4. Wikis: - It allows people to add or edit content about a topic. It is a content management system. Editing done by users are monitored by other editors, so that errors can be removed immediately. E.g. Wikipedia.org

5. Social networks: - This allows people to connect with other people. It allows posting and sharing or texts, images, videos etc. It influences public opinion. E.g. facebook.com, linkedin.com

6. Content communities: - These are websites that organize and share contents like photos and videos. E.g. Youtube.com is a popular video sharing website.

(3 scores – Naming 6 classification 3 scores. 3 points with explanation 3 scores)

47. What are the functions of an operating system?

a. Process management

Process is a program in execution. OS allocates, de-allocates and schedules processes

b. Memory management

OS keeps track of all memory location. It allocates and de-allocates memory

c. File management

OS does the file management activities such as organizing, naming, storing, retrieving, protection, recovery etc.

d. Device management

OS controls peripheral devices using device driver softwares.

(3 Scores – Any three functions with explanation- Naming only 2 scores)

48. Explain the following terms

- a) Virus b) Worm c) Trojan horse

1. Virus

A virus is a program that attaches itself to another executable file. It spread from one computer to another without users' knowledge. A virus may corrupt or delete data on the affected computer. Viruses spread through USB drives, file sharing, e-mail etc.

2. Worm

It is a standalone malware program that replicates itself. It spread from one computer to another on its own. A worm does not need another program to propagate.

3. Trojan horse

It will appear to be useful software, but will damage the computer by creating a backdoor on the computer. Trojans do not replicate.

(3 Scores)

Part D

49. Match the following

A	B
iostream	Punctuator
void	Operator
main ()	String
if	Character literal
while	Keyword
<<	Loop
"Hello"	Identifier
'\n'	Data type
#	Header file
sum	Function

A	B
iostream	Header file
void	Data type / Keyword
main ()	Function
if	Keyword
while	Loop/Keyword
<<	Operator
"Hello"	String

'\n'	Character literal
#	Punctuator
sum	Identifier

(5 scores - ½ score for each match)

50. Explain the following terms

- a) Router b) Repeater c) Bridge d) Spams e) Phishing

a. Router

Router is an intelligent device used to interconnect two networks of the same type using the same protocol. It can find the best path for data packets to travel and reduces network traffic.

b. Repeater

A repeater is used to regenerate incoming electrical, wireless or optical signals through a communication medium. It strengthens the incoming signal and retransmit them to the destination.

c. Bridge

Bridge is used to connect different segments of a network. A network can be split into different segments and can be interconnected with a bridge. This reduces network traffic.

d. Spams

These are junk mails indiscriminately sent to promote a product or service. Most email service providers provide email filters which separates spams from genuine mails.

e. Phishing

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

(5 Score – 1 score for each)

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