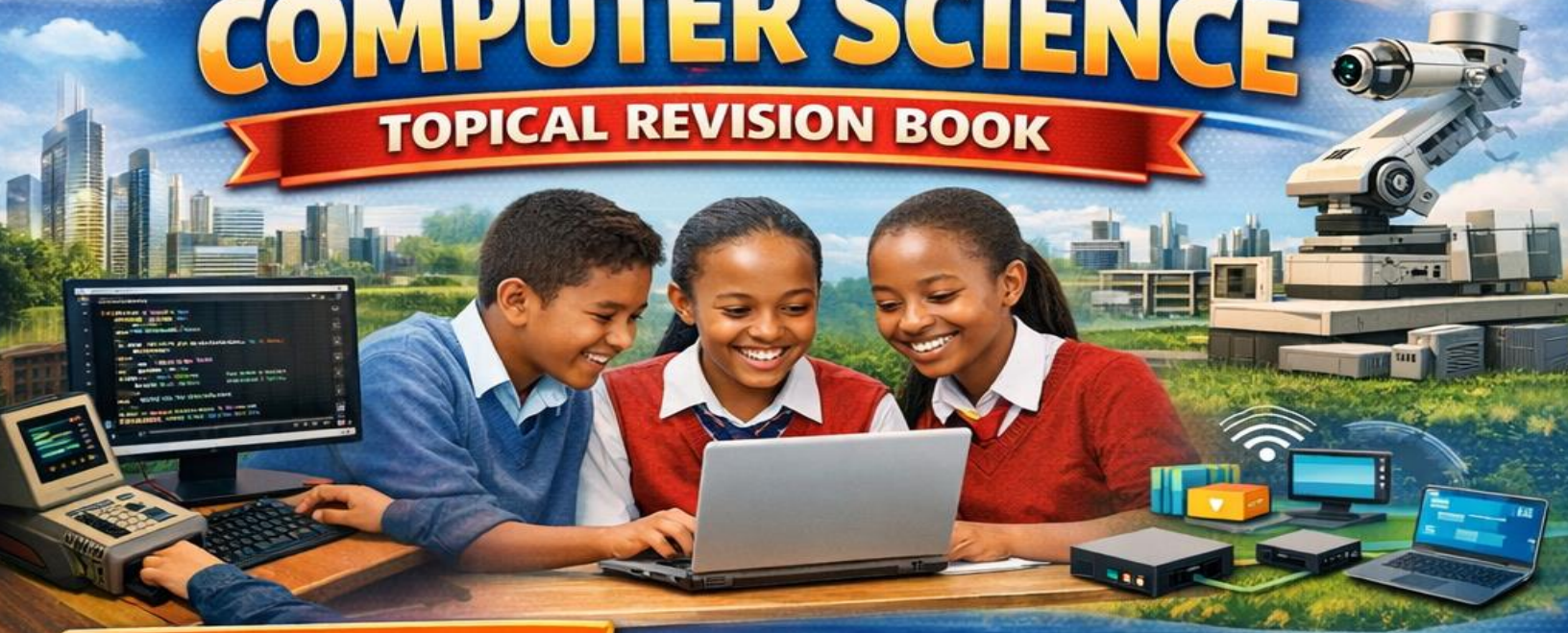
COMPETENCE BASED EDUCATION

SENIOR SCHOOL | GRADE 10

COMPUTER SCIENCE

TOPICAL REVISION BOOK



1.0 Foundation of Computer Science

- 1.1 Evolution of Computers
- 1.2 Computer Architecture
- 1.3 Input/Output (I/O) Devices
- 1.4 Computer Storage
- 1.5 Central Processing Unit (CPU)
- 1.6 Operating System (OS)
- 1.7 Computer Setup

2.0 Computer Networking

- 2.1 Data Communication
- 2.2 Data Transmission Media
- 2.3 Computer Network Elements
- 2.4 Network Topologies

3.0: Software Development

- 3.1 Computer Programming Concepts
- 3.2 Program Development
- 3.3 Identifiers and Operators
- 3.4 Control Structures
- 3.5 Containers
- 3.6 Functions

STRAND 1: EVOLUTION OF COMPUTERS

SUBSTRAND 1.1: EVOLUTION AND DEVELOPMENT OF COMPUTERS

SECTION A: EARLY COMPUTING DEVICES

1. Define the term **computer**. (2 marks)

   _____

   _____

2. State **two reasons** why early humans developed computing devices. (2 marks)

   i. _____.

   ii._____.

3. Name **two ancient computing devices**. (2 marks)

   i. _____.

   ii._____.

4. Identify the device mainly used for counting using beads and rods. (2 marks)

   _____

5. Name the device invented by **John Napier** used to simplify multiplication. (2 marks)

   _____

6. State **two uses** of the Abacus. (2 marks)

i. _____.

ii._____.

7. Explain **two limitations** of early computing devices. (4 marks)

i. _____.

ii._____.

8. Describe how **Napier's Bones** worked in calculations. (4 marks)

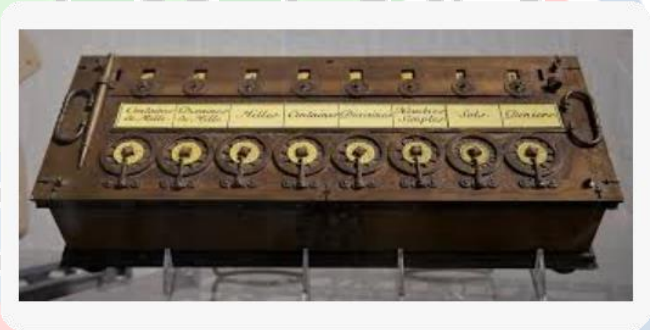
i. _____.

ii._____.

iii. _____

iv. _____.

9. Identify the device that used gears and dials and was invented by **Blaise Pascal**. (2 marks)



_____

10. State **two operations** performed by the Pascaline. (2 marks)

i. _____.

ii._____.

11. Describe the purpose of a **Slide Rule**. (2 marks)

i. _____.

ii._____.

12. Explain **two differences** between the Slide Rule and Abacus. (4 marks)

i. _____.

ii._____.

13. Name the device invented by **Charles Babbage** meant for automatic calculation of tables. (2 marks)

_____-

14. Name the device invented by Charles Babbage that formed the foundation of modern computers. (2 marks)

_____

15. State **two features** of the Analytical Engine. (4 marks)

i. _____.

ii._____.

16. Explain the role of the **Jacquard Loom** in the development of computers. (4 marks)

i. _____.

ii._____.

17. State **two ways** early computing devices influenced electronic computers. (4 marks)

i. _____.

ii._____.

18. Give **two reasons** why Charles Babbage is called the "Father of Computers." (4 marks)

i. _____.

ii._____.

SECTION B: PRINCIPAL TECHNOLOGIES IN COMPUTER DEVELOPMENT

19. Define the term **computer technology**. (2 marks)

_____

_____

20. List **five principal technologies** that defined computer development. (5 marks)

i. _____.

ii. _____.

iii. _____.

iv. _____.

v. _____.

21. State **two characteristics** of vacuum tubes. (4 marks)

i. _____.

ii. _____.

22. State **two disadvantages** of vacuum tubes. (4 marks)

i. _____.

ii. _____.

23. Identify the technology that replaced vacuum tubes in computers. (2 marks)

i. _____.

24. State **two advantages** of transistors over vacuum tubes. (4 marks)

i. _____.

ii. _____.

25. Define the term **Integrated Circuit (IC)**. (2 marks)

_____.

_____.

26. State **two advantages** of ICs in computers. (4 marks)

i. _____.

ii. _____.

27. Distinguish between **IC** and **Large Scale IC (LSI)**. (4 marks)

_____.

_____.

_____.

_____.

28. Explain what **Very Large Scale Integration (VLSI)** are. (2 marks)

i. _____.

ii. _____.

29. State **two advantages** of VLSI technology. (4 marks)

i. _____.

ii. _____.

30. Name the technology used in most modern microprocessors. (2 marks)

_____.

31. Explain why computers became smaller as technology advanced. (4 marks)

i. _____.

ii. _____.

32. Describe **two ways** computer speed improved from vacuum tubes to VLSI. (4 marks)

i. _____.

ii. _____.

33. Explain the relationship between **IC technology** and **memory capacity**. (4 marks)

_____.

_____.

_____.

_____.

34. State **two effects** of technological advancement on computer cost. (2 marks)

i. _____.

ii. _____.

35. **Write in full**

i. IC → _____.

ii. LSI → _____.

iii. VLSI→ _____.

36. Fill the gap with the appropriate technology

A timeline

Vacuum Tubes → [ ] → IC → [ ] → VLSI

SECTION C: COMPUTER GENERATIONS

35. Define the term **computer generation**. (2 marks)

_____

_____

36. State the **principal technology** used in the **first generation**. (2 marks)

_____.

_____.

37. Give **two characteristics** of first generation computers. (4 marks)

i. _____.

ii. _____.

38. State the principal technology used in the **second generation**. (2 marks)

_____.

_____.

39. Give **two advantages** of second generation computers over first generation. (4 marks)

i. _____.

ii. _____.

40. State the principal technology used in the **third generation**. (2 marks)

i. _____.

ii. _____.

41. Give **two characteristics** of third generation computers. (4 marks)

i. _____.

ii. _____.

42. State the principal technology used in the **fourth generation**. (2 marks)

i. _____.

ii. _____.

43. Explain **two ways** microprocessors changed computer usage. (4 marks)

i. _____.

ii. _____.

44. Identify the technology mostly associated with **fifth generation** computers. (2 marks)

_____.

45. State **two features** of fifth generation computers. (4 marks)

i. _____.

ii. _____.

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46. Write each generation with its technology. (5 marks)

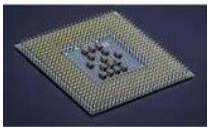
Generation	**Technology used**	**Example of computer**
1st		
2nd		
3rd		
4th		
5th		

47. State **two reasons** why computer generations are important in learning computer history. (4 marks)

i. _____.

ii. _____.

48. Identify the computer generation that used the following technology

Computer Technology used	Computer generation
Vacuum tubes 	
Transistors 	
Integrated circuits 	
Very large scale integration 	
Ultra large scale integration 	

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49. Describe the structure of an abacus.

i. _____.
ii. _____.

50. State the tasks performed by an abacus.

i. _____.
ii. _____.

51. Explain the technology used in the abacus and how it relates to modern computers.

i. _____.
ii. _____.

52. Mention one advantage of using an abacus during its time.

i. _____.
ii. _____.

53. List any five mechanical devices used before the electronic computer era.

i. _____.
ii. _____.
iii. _____.
iv. _____.
v. _____.

54. Match the following devices with their invention years:

Device	**Year**
Napier's bones	
Pascaline	
Stepped reckoner	
Jacquard loom	
Difference engine	

55. State the main tasks performed by mechanical devices like Napier's bones, Pascaline, and the analytical engine.

i. _____.
ii. _____.

56. Differentiate between the difference engine and analytical engine in terms of:

_____.
_____.
_____.
_____.

SECTION D: TECHNOLOGICAL ADVANCEMENT & APPRECIATION

48. Explain **four ways** computers have improved from early devices to modern systems. (8 marks)

    i. _____.
    ii. _____.
    iii. _____.
    iv. _____.

49. Explain **four benefits** of technological advancement in computer development to society today. (8 marks)

    i. _____.
    ii. _____.
    iii. _____.
    iv. _____.

50. Give two examples of electromechanical devices.

    i. _____.
    ii. _____.

51. Explain the technology used in the following devices:

i. Tabulating machine:_____
ii. Atanasoff-Berry Computer (ABC):_____

52. What improvements did electromechanical devices have over mechanical devices?

    i. _____.
    ii. _____.
    iii. _____.
    iv. _____.

53. Differentiate between two consecutive generations of computers in terms of speed, size, power consumption, and storage.

    _____.
    _____.
    _____.
    _____.

54. List at least five characteristics of **first generation computers** and give examples

    i. _____.
    ii. _____.
    iii. _____.
    iv. _____.
    v. _____.

55. List at least five characteristics of **second generation computers** and give examples.

    i. _____.
    ii. _____.
    iii. _____.
    iv. _____.
    v. _____.

56. State the characteristics and examples of **third generation computers**.
    i. _____.
    ii. _____.
    iii. _____.
    iv. _____.
57. Describe four characteristics of **fourth generation computers** and give examples.
    i. _____.
    ii. _____.
    iii. _____.
    iv. _____.
58. State five characteristics of **fifth generation computers** and give examples.
    i. _____.
    ii. _____.
    iii. _____.
    iv. _____.
    v. _____.
59. Explain how the characteristics of computers improved from the first generation to the fifth generation
    i. _____.
    ii. _____.
    iii. _____.
    iv. _____.
60. Differentiate between the following:
    i. Mechanical devices and electromechanical devices
    _____.
    _____.
    _____.
    _____.

    ii. Electromechanical devices and electronic digital computers
    _____.
    _____.
    _____.
    _____.

61. Explain why the analytical engine was considered a general-purpose computer while the difference engine was not.
    i. _____.
    ii. _____.
    iii. _____.
    iv. _____.
62. Compare the storage, input, and processing components of:

i. Difference engine vs Analytical engine

_____.
_____.
_____.
_____.

ii. First generation vs Fourth generation computers

_____.
_____.
_____.
_____.

63. Discuss how contemporary technology in computers supports sustainable development.

i. _____.
ii. _____.
iii. _____.
iv. _____.

64. Explain the technological advancements in the following devices:

i. Abacus: _____.
ii. Napier's bones: : _____.
iii. Pascaline: : _____.
iv. Jacquard loom: _____.
v. Stepped reckoner: _____.
vi. Difference engine: _____.
vii. Analytical engine: _____.
viii. Tabulating machine: _____.
ix. ABC: _____.

65. If a student wants to perform complex calculations today, which type of computer generation would they use and why?

_____.
_____.
_____.
_____.

66. How did the Jacquard loom influence modern computing?

_____.
_____.
_____.
_____.

SUBSTRAND 1.2: COMPUTER ORGANISATION AND ARCHITECTURE (Von Neumann)

SECTION A: BASIC CONCEPTS OF COMPUTER ARCHITECTURE

1. Define the term **computer architecture**. (2 marks)

   _____

   _____

2. Define the term **computer organisation**. (2 marks)

   _____

   _____

3. State **two differences** between computer architecture and computer organisation. (4 marks)

   _____

   _____

4. Identify the computer architecture that stores **data and instructions in the same memory**. (2 marks)

   _____

   _____

5. State **two key features** of a von Neumann computer. (4 marks)

   i. _____.
   ii. _____.

6. Name the **five main functional units** of a von Neumann computer. (5 marks)

   i. _____.
   ii. _____.
   iii. _____.
   iv. _____.
   v. _____.

7. State the function of the **Input Unit**. (2 marks)

   _____

   _____

8. State the function of the **Output Unit**. (2 marks)

   _____

   _____

9. Explain the role of the **Central Processing Unit (CPU)**. (2 marks)

   _____

   _____

10. Name the two main parts of the CPU. (2 marks)

i. _____.
ii. _____.

11. State the function of the **Arithmetic and Logic Unit (ALU)**. (2 marks)

_____.
_____.

12. State the function of the **Control Unit (CU)**. (2 marks)

_____.
_____.

13. Identify four components of the CPU. (4marks)

i. _____.
ii. _____.
iii. _____.
iv. _____.

SECTION B: RELATIONSHIPS AMONG FUNCTIONAL ELEMENTS

14. Explain how the CPU communicates with memory. (4 marks)

_____.
_____.
_____.
_____.

15. State **two roles** of system buses in computer architecture. (4 marks)

i. _____.
ii. _____.

16. Name the **three types of buses** used in a computer system. (3 marks)

i. _____.
ii. _____.
iii. _____.

17. The illustrations below represents two orientations of a very important part of a desktop computer. Study them to answer the questions below.

A

B

(a)Name the objects represented in the above images (1 mk)

_____

(b)Identify the orientations represented in orientations A and B (2 marks)

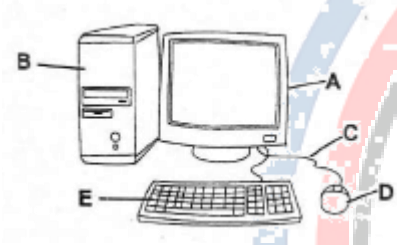
A_____

B_____

(c)Give four components that are housed inside the object represented in the above image (4 marks)

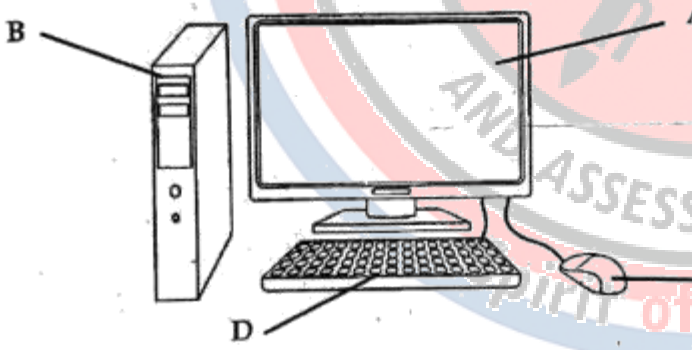
i. _____.
ii. _____.
iii. _____.
iv. _____.

18. The diagram below sows physical parts of a computer.



A -
B -
C -
D -
E -

19. Study the diagram below and answer questions that follow



a. Name the parts marked (4 mks)

A_____

B_____

C_____

D_____

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b. What is the function of the part marked A? (1 mk)

_____

_____

20. State the role of the **Data Bus**. (2 marks)

i. _____.
ii. _____.

21. State the role of the **Address Bus**. (2 marks)

i. _____.
ii. _____.

22. State the role of the **Control Bus**. (2 marks)

i. _____.
ii. _____.

23. Explain why the address bus is usually **unidirectional**. (2 marks)

i. _____.
ii. _____.

24. Explain why the data bus is usually **bidirectional**. (2 marks)

i. _____.
ii. _____.

25. State **two examples** of input interfaces/ports. (2 marks)

i. _____.
ii. _____.

26. State **two examples** of output interfaces/ports. (2 marks)

i. _____.
ii. _____.

27. Explain the relationship between **storage** and **processing** in a computer. (4 marks)

_____.
_____.
_____.
_____.

28. Describe **two functions of registers** in a CPU. (4 marks)

i. _____.
ii. _____.

29. Write in full

C.P.U:_____

A.L.U:_____

30. Allan opened the inside parts of a C.P.U and identified the following components. Name them

_____

_____

_____

_____

_____

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SECTION C: FETCH–EXECUTE CYCLE (25–33)

31. Define the term **fetch–execute cycle**. (2 marks)

_____

_____

_____

32. List **four steps** in the fetch–execute cycle in the correct order. (4 marks)

i. _____.
ii. _____.
iii. _____.
iv. _____.

33. State the role of the **Program Counter (PC)**. (2 marks)

_____.

_____.

34. State the role of the **Memory Address Register (MAR)**. (2 marks)

_____.

_____.

35. State the role of the **Memory Data Register (MDR)**. (2 marks)

_____.

_____.

36. State the role of the **Instruction Register (IR)**. (2 marks)

_____.

_____.

37. Explain why the fetch–execute cycle is continuous. (2 marks)

_____.

_____.

38. Describe **two importance** of the fetch–execute cycle in computer processing. (4 marks)

i. _____.
ii. _____.

39. Explain **two problems** that may occur if the control unit fails during the fetch–execute cycle. (4 marks)

i. _____.
ii. _____.

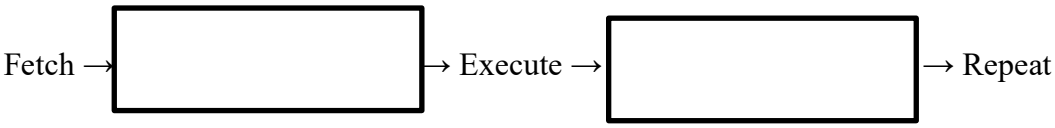
40. Write in full

MAR:_____

MDR:_____

IR:_____

41. Complete the following cycle



SECTION D: INSTRUCTION SETS, RISC AND CISC

42. Define the term **instruction set**. (2 marks)

_____

_____

43. State **two characteristics** of RISC architecture. (4 marks)

i. _____.
ii. _____.

44. State **two characteristics** of CISC architecture. (4 marks)

i. _____.
ii. _____.

45. Give **two differences** between RISC and CISC. (4 marks)

RISC	CISC

46. State **two advantages** of RISC. (2 marks)

i. _____.
ii. _____.

47. State **two advantages** of CISC. (2 marks)

i. _____.
ii. _____.

48. Give **two examples** of where RISC and CISC are commonly used today. (4 marks)

i. _____.
ii. _____.

SECTION E: NUMBER SYSTEMS IN COMPUTER ARCHITECTURE

49. Convert 25_{10} to binary. (2 marks)

50. Convert 64_{10} to octal. (2 marks)

51. Convert 255_{10} to hexadecimal. (2 marks)

52. Convert $101101_2$to decimal. (2 marks)

53. Convert 157_8 to decimal. (2 marks)

54. Convert $3F_{16}$ to decimal. (2 marks)

55. Convert 11011010_2 to hexadecimal. (4 marks)

56. Convert 725_8 to binary. (4 marks)

57. Convert $A9_{16}$ to binary. (4 marks)

58. Name the following input devices





A **B** **C** **D** **E**

A:_____

B:_____

C:_____

D:_____

E:_____

59. Name these keying devices



A B C D

A:_____-

B:_____

C:_____

D:_____

60. Name these scanning devices

M

N

O

P

Q

M:_____
N:_____
O:_____
P:_____
Q:_____

61. Identify the following computer output devices

_____ _____ _____

_____ _____

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MODEL TEST ASSESSMENT

Topic: Foundation of Computer Science

Total: 100 Marks | Questions: 50

SECTION A: SHORT ANSWER QUESTIONS (1–20)

(40 marks: 2 marks each)

1. Define the term **computer generation**. (2m)

   _____

   _____

2. State **two uses** of the Abacus. (2m)

   i. _____.
   ii. _____.

3. Identify the early computing device that used **rods and beads**. (2m)

   _____.

   _____.

4. Name the device invented by **John Napier** for calculations. (2m)

   _____.

5. State **two functions** of Pascaline. (2m)

   i. _____.
   ii. _____.

6. Name the machine designed by Charles Babbage for mathematical tables. (2m)

   _____.

7. What is the difference between the **Difference Engine** and the **Analytical Engine**? (2m)

   _____.

   _____.

   _____.

   _____.

8. State **one contribution** of the Jacquard loom to computer development. (2m)

   _____.

   _____.

9. State **two characteristics** of first generation computers. (2m)

   i. _____.
   ii. _____.

10. Which principal technology defined the **second generation** computers? (2m)

_____.
_____.

11. State **two advantages** of transistors over vacuum tubes. (2m)

i. _____.
ii. _____.

12. Name the principal technology used in the **third generation** computers. (2m)

_____.
_____.

13. Which computer generation is associated with **Very Large Scale Integration (VLSI)**? (2m)

_____.
_____.

14. State **two features** of fifth generation computers. (2m)

i. _____.
ii. _____.

15. Define the term **computer architecture**. (2m)

_____.
_____.

16. List the **four main functional units** of a Von Neumann computer. (2m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

17. Name the part of the CPU that performs arithmetic and logic operations. (2m)

_____.
_____.

18. State the meaning of the term **bus** in computer systems. (2m)

_____.
_____.

19. Convert $\mathbf{10_{10}}$ into binary. (2m)

20. Give **two examples** of pointing devices. (2m)

i. _____.
ii. _____.

SECTION B: STRUCTURED QUESTIONS

(40 marks total)

21. Early Computing Devices (4m)

(a) List **four early computing devices**. (2m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

(b) Explain **two ways** these devices influenced modern computers. (2m)

i. _____.
ii. _____.

22. Computer Generations (4m)

Complete the table below:

Generation	Principal Technology	Example Computer
First	_____	_____
Second	_____	_____

23. Matching (4m)

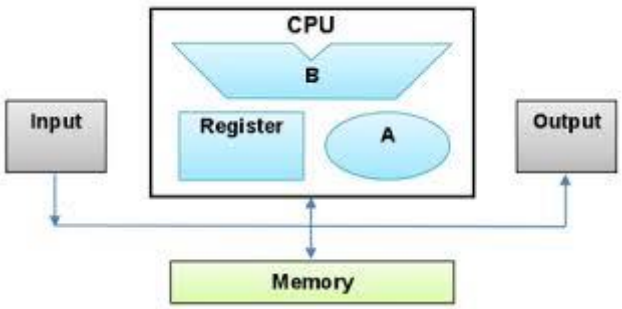
Match the device to the correct inventor.

A. Napier's Bones
B. Pascaline
C. Analytical Engine
D. Jacquard Loom

Blaise Pascal
Charles Babbage
Joseph Jacquard
John Napier

24. Von Neumann Architecture Diagram (5m)

Below is a simplified Von Neumann architecture:



(a) Identify **three components** inside the CPU. (3m)

i. _____.
ii. _____.
iii. _____.

(b) Explain the role of **storage** in this model. (2m)

i. _____.
ii. _____.

25. Relationships in Architecture (4m)

(a) Explain how the CPU communicates with memory using buses. (2m)

_____.
_____.
_____.

(b) Name **two types of buses**. (2m)

i. _____.
ii. _____.

26. Fetch-Execute Cycle (5m)

(a) List **five steps** in the fetch-execute cycle. (5m)

i. _____.
ii. _____.
iii. _____.
iv. _____.
v. _____.

27. RISC vs CISC (4m)

(a) Define RISC. (1m)

_____
_____

(b) Define CISC. (1m)

_____
_____

(c) Give **two differences** between RISC and CISC. (2m)

_____
_____
_____
_____

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28. Number Systems (4m)

Convert the following:
(a) 25_{10} to binary (2m)

(b) 101101_2 to decimal (2m)

29. Hexadecimal (4m)

(a) Convert 255_{10} to hexadecimal. (2m)

(b) Convert FF_{16} to decimal. (2m)

30. Binary, Octal Conversion (4m)

(a) Convert 64_{10} to octal. (2m)

(b) Convert 100_8 to decimal. (2m)

31. Input Devices (4m)

(a) List **four keying devices**. (2m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

(b) State **two scanning devices**. (2m)

i. _____.
ii. _____.

32. Output Devices (4m)

(a) Name **three output devices** used in schools. (3m)

i. _____.
ii. _____.
iii. _____.

(b) State **one use** of a plotter. (1m)

i. _____.
ii. _____.

33. Selecting I/O Devices (4m)

State **four factors** considered when selecting an input/output device. (4m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

34. QR Code Application (5m)

(a) What is a QR code? (2m)

_____.
_____.

(b) Give **two advantages** of QR codes over barcodes. (2m)

i. _____.
ii. _____.

(c) State **one disadvantage** of QR codes. (1m)

_____.
_____.
_____.

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35. Touch Screen Types (4m)

(a) Name **three types of touch screens**. (3m)

i. _____.
ii. _____.
iii. _____.

(b) State one device that uses a touch screen. (1m)

_____.
_____.

36. Scanners (4m)

Differentiate between:
(a) 2D scanners and 3D scanners (2m)

_____.
_____.
_____.
_____.
_____.
_____.

(b) Give **one use** of each. (2m)

_____.
_____.
_____.

37. Digital Cameras as Input Devices (3m)

(a) Explain how a digital camera is an input device. (2m)

_____.
_____.
_____.

(b) Give one advantage of using a digital camera in data collection. (1m)

_____.
_____.
_____.

38. Safety in Computer Environment (3m)

State **three safety practices** when working in a computer environment. (3m)

i. _____.
ii. _____.
iii. _____.

39. Reusing I/O Devices (3m)

Give **three ways** to reuse input/output devices to reduce wastage. (3m)

i. _____.
ii. _____.
iii. _____.

40. Ports and Interfaces (3m)

(a) Define a port. (1m)

_____.
_____.
_____.

(b) Name **two common ports** used for I/O devices. (2m)

i. _____.
ii. _____.

SECTION C:

(20 marks total)

41. Diagram: Early Computing Device (2m)

Draw and label a simple diagram of an **Abacus**.

42. Diagram: Von Neumann Architecture (3m)

Draw a well-labelled Von Neumann computer showing:
Input, CPU, Output, Storage, Buses. (3m)

43. Diagram: CPU Components (2m)

Draw and label the **ALU** and **Control Unit**. (2m)

44. Application: School Computer Lab (2m)

A student wants to print an assignment but the printer is slow.
State **two possible causes** of slow printing. (2m)

i. _____.
ii. _____.

45. Practical-Based Question (2m)

A learner scans a document and saves it as a PDF.
State **two benefits** of scanning documents. (2m)

i. _____.
ii. _____.

46. Scenario: Buying a Printer (2m)

A school wants to buy printers for exams.
Suggest the **best type of printer** and give **one reason**. (2m)

_____.
_____.

47. QR Code Practical (2m)

Give **two uses** of QR codes in education. (2m)

i. _____.
ii. _____.

48. Data Representation (2m)

Explain why computers use binary in processing. (2m)

i. _____.
ii. _____.

49. Identify the keyboard keys

U: _____.

V: _____.

W: _____.

X: _____.

Y: _____.

Z: _____.

50. What is the name of this device?

_____

1.4 COMPUTER STORAGE

SECTION A: SHORT ANSWER QUESTIONS (1–20)

(40 marks: 2 marks each)

1. Define the term **computer storage**. (2m)

   _____

   _____

2. State **two reasons** why storage is important in a computer system. (2m)

   i. _____.
   ii. _____.

3. List **two examples** of primary storage. (2m)

   i. _____.
   ii. _____.

4. List **two examples** of secondary storage. (2m)

   i. _____.
   ii. _____.

5. State the difference between **primary** and **secondary** storage. (2m)

Primary storage	Secondary storage

6. Name the two main types of **primary memory**. (2m)

   i. _____.
   ii. _____.

7. What does RAM stand for? (2m)

   _____.
   _____.
   _____.

8. What does ROM stand for? (2m)

   _____.
   _____.
   _____.

9. State **one feature** of RAM. (2m)

   i. _____.

10. State **one feature** of ROM. (2m)

i. _____.

11. Name the two types of RAM technology. (2m)

i. _____.
ii. _____.

12. What does DRAM stand for? (2m)

_____

13. What does SRAM stand for? (2m)

_____

14. State **one difference** between DRAM and SRAM. (2m)

DRAM	SRAM

15. State **two examples** of devices that use ROM besides computers. (2m)

i. _____.
ii. _____.

16. Name two types of internal secondary storage. (2m)

i. _____.
ii. _____.

17. State **two examples** of external secondary storage. (2m)

i. _____.
ii. _____.

18. What is meant by **remote storage**? (2m)

_____
_____

19. Give **two examples** of remote storage. (2m)

i. _____.
ii. _____.

20. State **two safety precautions** when handling storage devices. (2m)

i. _____.
ii. _____.

SECTION B: STRUCTURED QUESTIONS

(40 marks total)

21. Categorising Storage (4m)

(a) Name the **two categories** of computer storage. (2m)

i. _____.
ii. _____.

(b) Give **one example** for each category. (2m)

_____
_____
_____
_____

22. RAM and ROM Comparison (5m)

(a) State **three differences** between RAM and ROM. (3m)

RAM	ROM

(b) Give **one similarity** between RAM and ROM. (1m)

_____.
_____.
_____.

(c) Which memory is volatile? (1m)

_____.
_____.
_____.

23. DRAM vs SRAM (4m)

(a) State **two differences** between DRAM and SRAM. (2m)

i. _____.
ii. _____.
iii. _____.

(b) Which one is faster? (1m)

_____

(c) Which one is cheaper? (1m)

_____

24. ROM Chips in Other Devices (4m)

A resource person explains ROM in household devices.
(a) Name **two household devices** that contain ROM chips. (2m)

i. _____.
ii. _____.

(b) Explain **why ROM is used** in such devices. (2m)

i. _____.
ii. _____.

25. Internal vs External Secondary Storage (4m)

(a) Differentiate between internal and external secondary storage. (2m)

_____.
_____.
_____.

(b) Give **two examples** of each. (2m)

i. _____.
ii. _____.

26. Optical Storage Devices (4m)

(a) Name **three optical storage devices**. (3m)

i. _____.
ii. _____.
iii. _____.

(b) State one disadvantage of optical storage. (1m)

_____.
_____.
_____.

27. HDD vs SSD (5m)

(a) State **three differences** between HDD and SSD. (3m)

HDD	SSD

(b) Which is more robust? (1m)

_____

(c) Which is cheaper per GB? (1m)

_____

28. Advantages and Disadvantages (4m)

State **two advantages** and **two disadvantages** of using a USB flash disk. (4m)

i. _____.
ii. _____.

29. Data Transfer Practical (4m)

A learner transfers files from computer A to computer B.
(a) Name **two storage devices** that can be used. (2m)

i. _____.
ii. _____.

(b) Outline **two steps** involved in transferring the data. (2m)

i. _____.
ii. _____.

30. Read and Write Operations (4m)

(a) Explain what is meant by **reading data** from storage. (2m)

_____
_____

(b) Explain what is meant by **writing data** to storage. (2m)

_____
_____

31. Remote Storage vs Local Storage (4m)

(a) State **two benefits** of remote storage. (2m)

i. _____.
ii. _____.

(b) State **two disadvantages** of remote storage. (2m)

i. _____.
ii. _____.

32. Case Study: Choosing Storage (5m)

A school wants storage for:

- exam papers
- videos
- student records

(a) Suggest a suitable storage solution. (2m)

_____.
_____.

(b) Give **three reasons** for your choice. (3m)

i. _____.
ii. _____.
iii. _____.

33. Storage Selection Criteria (4m)

State **four factors** to consider when selecting a storage device. (4m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

34. Data Security in Storage (4m)

(a) State **two threats** to data stored in a computer. (2m)

i. _____.
ii. _____.

(b) Give **two ways** to protect data in storage devices. (2m)

i. _____.
ii. _____.

35. Storage Capacity Units (4m)

(a) Arrange these in ascending order: KB, TB, MB, GB. (2m)

(b) Convert 1024 MB to GB. (2m)

36. Backup and Recovery (3m)

(a) Define the term backup. (1m)

_____

_____

(b) Give **two reasons** why backup is important. (2m)

i. _____.
ii. _____.

37. Robustness and Portability (3m)

Explain why a removable hard drive is:
(a) more portable than HDD in a desktop (1m)

_____.
_____.
_____.

(b) more robust than a DVD (2m)

_____.
_____.
_____.

38. Storage and E-Waste (3m)

(a) Define e-waste. (1m)

_____.
_____.
_____.

(b) Give **two ways** to reuse storage devices to reduce e-waste. (2m)

i. _____.
ii. _____.

39. Community Sensitisation (3m)

State **three messages** you would give community members on safe disposal and reuse of storage e-waste. (3m)

i. _____.
ii. _____.
iii. _____.

40. Debate Question (3m)

Give **three points** supporting the statement:
"Remote storage is better than local storage." (3m)

i. _____.
ii. _____.
iii. _____.

SECTION C: DIAGRAMS + APPLICATION QUESTIONS (41–50)

(20 marks total)

41. Diagram: Storage Categories (2m)

Draw a simple diagram showing:
Primary Storage and **Secondary Storage** with at least **two examples** under each. (2m)

42. Diagram: Memory Hierarchy (2m)

Draw a simple memory hierarchy pyramid showing:
Cache → RAM → SSD/HDD → Remote Storage. (2m)

43. Diagram: Internal Secondary Storage (2m)

Draw and label one internal secondary storage device (HDD or SSD). (2m)

44. Diagram: External Secondary Storage (2m)

Draw and label a USB flash disk showing:
USB connector, casing, memory chip. (2m)

45. Diagram: Optical Disc (2m)

Draw a CD/DVD and label:
central hole, data track, reflective layer. (2m)

46. Scenario: Lost Files (2m)

A learner saved an assignment on a flash disk, but the file cannot open.
State **two possible causes**. (2m)

i. _____.
ii. _____.

47. Practical: Saving Data (2m)

Outline **two steps** to save a document to a flash disk. (2m)

i. _____.
ii. _____.

48. Practical: Retrieving Data (2m)

Outline **two steps** to retrieve a file from remote storage. (2m)

i. _____.
ii. _____.

49. Safety Practices (2m)

State **two precautions** to prevent physical damage to a storage device. (2m)

i. _____.
ii. _____.

50. Extended Response (4m)

Write a short explanation describing how a learner can:
(a) store data locally,

i. _____.
ii. _____.
iii. _____.

(b) store data remotely,

i. _____.
ii. _____.
iii. _____.

(c) keep both safe. (4m)

i. _____.
ii. _____.
iii. _____.

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51. Name the following storage devices.

C

D

E

F

G

H

C:_____

D:_____

E:_____

F:_____

G:_____

H:_____

1.5 CENTRAL PROCESSING UNIT (CPU)

SECTION A: SHORT ANSWER QUESTIONS

1. Define the term **Central Processing Unit (CPU)**. (2m)

   _____

   _____

2. State **two roles** of the CPU in a computer system. (2m)

   i. _____.
   ii. _____.

3. Name the **four main structural elements** of the CPU. (2m)

   i. _____.
   ii. _____.
   iii. _____.
   iv. _____.

4. What is the full meaning of **ALU**? (2m)

   _____.
   _____.

5. State **two functions** of the ALU. (2m)

   i. _____.
   ii. _____.

6. What is the full meaning of **CU**? (2m)

   _____.
   _____.

7. State **two functions** of the Control Unit. (2m)

   i. _____.
   ii. _____.

8. What are **registers** in a CPU? (2m)

   i. _____.
   ii. _____.

9. State **two reasons** why registers are important in processing. (2m)

   i. _____.
   ii. _____.

10. Name **any two registers** found in a CPU. (2m)

    i. _____.
    ii. _____.

11. Define the term **bus** as used in computer architecture. (2m)

_____.
_____.

12. Name the **three types of buses** used in a computer system. (2m)

i. _____.
ii. _____.
iii. _____.

13. State one role of the **data bus**. (2m)

_____.
_____.

14. State one role of the **address bus**. (2m)

_____.
_____.

15. State one role of the **control bus**. (2m)

_____.
_____.

16. What is meant by the term **instruction set**? (2m)

_____.
_____.

17. State the difference between **RISC** and **CISC** CPUs. (2m)

_____.
_____.
_____.
_____.

18. What is meant by **word length** in a CPU? (2m)

_____.
_____.

19. Give two examples of word length used in CPUs today. (2m)

i. _____.
ii. _____.

20. State **two examples** of CPU core designs. (2m)

i. _____.
ii. _____.

SECTION B: STRUCTURED QUESTIONS

21. CPU Structural Elements (4m)

(a) List the structural elements of the CPU. (2m)

i. _____.
ii. _____.

(b) State one function of each element listed in (a). (2m)

_____.
_____.

22. ALU Operations (4m)

(a) Give **two arithmetic operations** done by the ALU. (2m)

i. _____.
ii. _____.

(b) Give **two logical operations** done by the ALU. (2m)

i. _____.
ii. _____.

23. Control Unit Tasks (4m)

Explain FOUR tasks performed by the Control Unit during processing. (4m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

24. Registers and Their Uses (5m)

(a) Name any **three CPU registers**. (3m)

i. _____.
ii. _____.
iii. _____.

(b) State the function of each register named. (2m)

i. _____.
ii. _____.

25. Buses in Communication (5m)

(a) Explain how data moves between CPU and memory using buses. (3m)

i. _____.
ii. _____.
iv. _____.
v. _____.

(b) State the bus used for:
(i) carrying memory locations (1m)

_____.
_____.

(ii) carrying actual information (1m)

i. _____.
ii. _____.

26. CPU and Memory Relationship (4m)

Describe how the CPU depends on main memory (RAM) during processing. (4m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

27. Fetch–Decode–Execute Cycle (6m)

(a) State the three stages of the CPU cycle. (3m)

i. _____.
ii. _____.
vi. _____.

(b) Explain what happens in each stage. (3m)

i. _____.
ii. _____.
iii. _____.

28. CPU Cycle Importance (3m)

Give three reasons why the fetch–decode–execute cycle is important. (3m)

i. _____.
ii. _____.
iii. _____.

29. RISC vs CISC (5m)

(a) State **three differences** between RISC and CISC. (3m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

(b) Give one advantage of RISC. (1m)

i. _____.
ii. _____.

(c) Give one advantage of CISC. (1m)

i. _____.
ii. _____.

30. Word Length and Performance (4m)

(a) Define computer bits. (1m)

i. _____.
ii. _____.

(b) State two advantages of a 64-bit CPU over a 32-bit CPU. (2m)

i. _____.
ii. _____.

(c) Give one disadvantage of higher word length. (1m)

i. _____.
ii. _____.

31. Core Design and Multitasking (4m)

(a) Differentiate between single-core and multi-core CPU. (2m)

i. _____.
ii. _____.

(b) State two advantages of multi-core CPUs. (2m)

i. _____.
ii. _____.

32. Types of CPUs in Devices (4m)

Match each device with a suitable CPU type (RISC/CISC).
(a) Smartphone:_____ (1m)
(b) Desktop computer :_____(1m)
(c) Smartwatch_____ (1m)
(d) Server computer :_____(1m)

33. Selecting a CPU (5m)

State five factors to consider when selecting a CPU for a computer. (5m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

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34. CPU Performance (4m)

Explain four factors that affect CPU performance. (4m)

i. _____.
ii. _____.

35. (3m)

A learner's computer is slow when opening many applications.
State three CPU-related causes of the problem. (3m)

i. _____.
ii. _____.
iii. _____.

36. CPU Overheating (3m)

State three causes of CPU overheating. (3m)

i. _____.
ii. _____.
iii. _____.

37. Safety and Maintenance (3m)

Give three safety precautions to observe when handling CPU hardware. (3m)

i. _____.
ii. _____.
iii. _____.

38. CPU Roles in a Computer System (3m)

State three ways the CPU coordinates other computer components. (3m)

i. _____.
ii. _____.
iii. _____.

39. Instruction Set and Compatibility (3m)

Explain why instruction set affects software compatibility. (3m)

i. _____.
ii. _____.
iii. _____.

40. CPU Appreciation Question (2m)

Write two statements showing appreciation of the CPU in computing. (2m)

i. _____.
ii. _____.

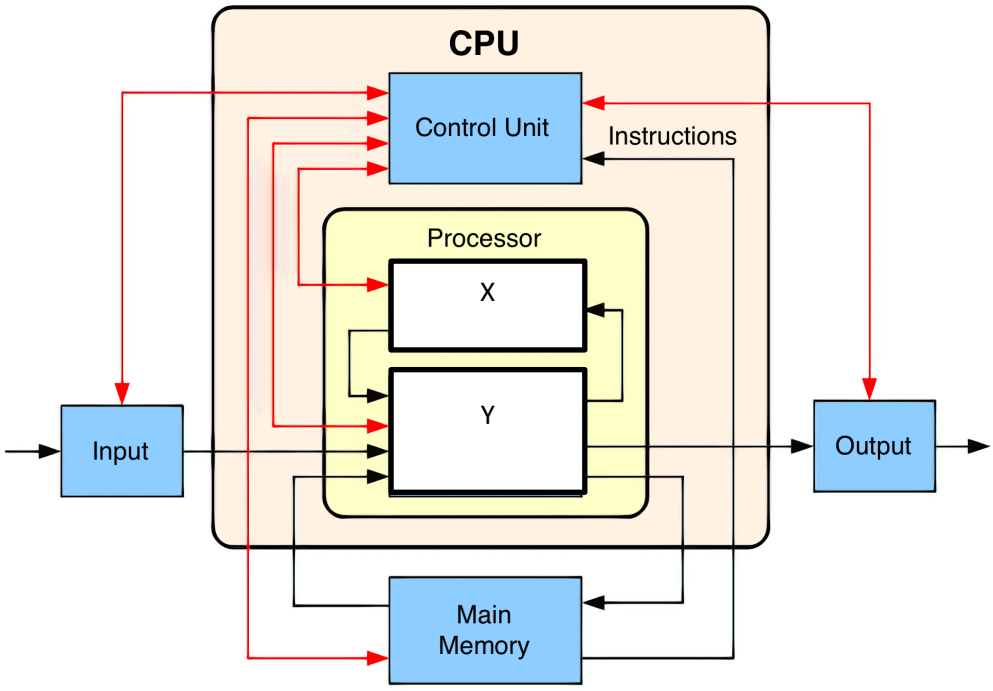
SECTION C:

41. Diagram: CPU Structural Elements (2m)

Draw and label a simple CPU block diagram showing:
ALU, Control Unit, Registers, Buses. (2m)

42. Diagram: Buses (2m)

the diagram below shows the C.P.U. Fill the gaps. (2m)



X:_____

Y:_____

43. Diagram: Fetch–Decode–Execute (2m)

Draw a flow diagram showing fetch → decode → execute. (2m)

44. Diagram: CPU and Memory Interaction (2m)

Draw and label a diagram showing interaction between CPU, registers and memory. (2m)

45. Table: CPU Types (2m)

Complete the table:

CPU Type	Example Device
RISC	_____
CISC	_____

46. RISC/CISC Decision Question (2m)

A company is designing a battery-powered tablet.
Which CPU architecture is more suitable and why? (2m)

_____.
_____.

47. Word Length Application (2m)

A computer is described as a 32-bit machine.
Explain what this means in terms of processing. (2m)

_____.
_____.

48. Core Design Application (2m)

Explain why a quad-core CPU performs better than a single-core CPU. (2m)

_____.
_____.

49. CPU Selection Scenario (2m)

A learner wants a computer mainly for gaming and video editing.
Suggest two CPU features they should prioritize. (2m)

i. _____.
ii. _____.

1.6 OPERATING SYSTEM (OS)

SECTION A: SHORT ANSWER QUESTIONS

(1–20) 40 marks (2 marks each)

1. Define the term **Operating System (OS)**. (2m)

   _____.
   _____.

2. Give **two examples** of operating systems used in computers. (2m)

   i. _____.
   ii. _____.

3. Give **two examples** of operating systems used in smartphones. (2m)

   i. _____.
   ii. _____.

4. State **two functions** of an operating system. (2m)

   1. _____.
   2. _____.

5. What is meant by **booting**? (2m)

   _____.
   _____.

6. State **two types of booting**. (2m)

   i. _____.
   ii. _____.

7. What is meant by **resource management** in an OS? (2m)

   _____.
   _____.

8. State **two resources** managed by an operating system. (2m)

   i. _____.
   ii. _____.

9. What is meant by **memory management**? (2m)

   _____.
   _____.

10. State **two tasks** performed by OS in memory management. (2m)

    i. _____.
    ii. _____.

11. Define **file management** as used in an operating system. (2m)

_____.
_____.

12. State **two examples** of file operations performed by an OS. (2m)

i. _____.
ii. _____.

13. What is meant by **process management**? (2m)

_____.
_____.

14. State **two activities** done by OS in process management. (2m)

i. _____.
ii. _____.

15. Define **user interface** in relation to an operating system. (2m)

_____.
_____.

16. State **three types of user interfaces** used in operating systems. (2m)

i. _____.
ii. _____.
iii. _____.

17. What is meant by a **single-user operating system**? (2m)

_____.
_____.

18. What is meant by a **multi-user operating system**? (2m)

_____.
_____.

19. Define **multitasking** as used in operating systems. (2m)

i. _____.
ii. _____.

20. Give one reason why **operating systems are important** in computing. (2m)

_____.
_____.

SECTION B: STRUCTURED QUESTIONS

21. Functions of an Operating System (6m)

Describe SIX functions of an operating system. (6m)

i. _____.
ii. _____.
iii. _____.
iv. _____.
v. _____.
vi. _____.

22. OS Examples and Uses (4m)

(a) Name TWO desktop operating systems. (2m)

i. _____.
ii. _____.

(b) Name TWO mobile operating systems. (2m)

i. _____.
ii. _____.

23. Booting Process (4m)

(a) Explain what happens during booting. (2m)

_____.
_____.
_____.
_____.

(b) Differentiate between cold booting and warm booting. (2m)

_____.
_____.
_____.
_____.

24. Classification by Tasks (4m)

(a) Define single-tasking operating system. (2m)

_____.
_____.

(b) Define multitasking operating system. (2m)

_____.
_____.

25. Classification by Users (4m)

(a) Explain single-user OS. (2m)

_____.
_____.

(b) Explain multi-user OS. (2m)

_____.
_____.

26. Classification by User Interface (6m)

(a) State three OS user interface types. (3m)

i. _____.
ii. _____.
i. _____.

(b) Give one example of an OS that uses:
(i) GUI (1m)

_____

(ii) Command line (1m)

_____

(iii) Menu-driven (1m)

_____

27. Factors in Choosing an OS (5m)

State FIVE factors to consider when selecting an operating system. (5m)

i. _____.
ii. _____.
iii. _____.
iv. _____.
v. _____.

28. Selecting OS for a Situation (4m)

Choose the most suitable OS type for each situation and give a reason.

(a) A bank server with many users. (2m)

_____

(b) A simple device performing one task at a time. (2m)

_____

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29. Installing an Operating System (6m)

Write SIX steps followed when installing an operating system on a computer. (6m)

i. _____.
ii. _____.
iii. _____.
iv. _____.
v. _____.
vi. _____.

30. Virtual Installation (3m)

(a) What is a virtual machine? (2m)

_____

_____

(b) Give one advantage of installing OS using VirtualBox/VM. (1m)

_____.
_____.

31. File and Folder Management (5m)

Explain FIVE file/folder operations performed using an OS. (5m)

i. _____.
ii. _____.
iii. _____.
iv. _____.
v. _____.

32. Backup and Restore (4m)

(a) Define backup. (2m)

_____.
_____.

(b) Explain two reasons why backup is important. (2m)

i. _____.
ii. _____.

33. I/O Device Management (4m)

Explain how an operating system manages input and output devices. (4m)

_____.
_____.
_____.
_____.

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34. Error Handling and Interrupts (4m)

(a) Define interrupt. (2m)

_____.
_____.

(b) State two ways the OS handles errors and interrupts. (2m)

i. _____.
ii. _____.

35. User Management (4m)

Explain FOUR activities performed by OS in user management. (4m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

36. OS Importance (3m)

Give THREE reasons why an operating system is essential in a computer. (3m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

37. Practical OS Use (3m)

State THREE tasks a learner can perform using an OS to manage files. (3m)

i. _____.
ii. _____.
iii. _____.

38. OS and Security (3m)

Explain THREE ways an operating system improves security. (3m)

i. _____.
ii. _____.
iii. _____.

39. OS and Application Software (3m)

Explain why application software cannot work without an operating system. (3m)

_____.
_____.

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40. Community Awareness Question (2m)

State TWO ways learners can help reduce OS-related e-waste in the community. (2m)

i. _____.
ii. _____.

SECTION C: DIAGRAMS + APPLICATION QUESTIONS

41. Diagram: OS as an Interface (2m)

Draw a simple diagram showing:
User → OS → Hardware (2m)

42. Diagram: Booting Process (2m)

Draw a flowchart showing the booting sequence. (2m)

43. Diagram: OS Functions (2m)

Draw and label a mind map showing FOUR OS functions. (2m)

44. Table: OS Classification (2m)

Complete the table:

Classification	Types
By tasks	_____ and _____
By users	_____ and _____

45. Practical Scenario (2m)

A learner copied a folder but it disappeared from the original location.
What file operation was done? Explain. (2m)

_____.
_____.

46. OS Selection Scenario (2m)

A learner wants an OS that is free, open-source and secure.
Which OS is suitable? Give a reason. (2m)

_____.
_____.
_____.
_____.

47. Folder Task (2m)

Write steps to create a folder called **GRADE10_NOTES** and rename it to **GRADE10_REVISION**. (2m)

_____.
_____.
_____.
_____.

48. OS Installation Safety (2m)

State TWO precautions to observe before installing an OS. (2m)

i. _____.
ii. _____.

49. Virtual Machine Application (2m)

Give TWO reasons why schools use VirtualBox when teaching OS installation. (2m)

i. _____.
ii. _____.

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1.7 COMPUTER SETUP

SECTION A: SHORT ANSWER QUESTIONS

1. Define the term **computer setup**. (2m)

   _____

   _____

2. State TWO reasons why correct computer setup is important. (2m)

   i. _____.
   ii. _____.

3. Name TWO tools used when setting up a desktop computer. (2m)

   i. _____.
   ii. _____.

4. State TWO safety precautions to observe when setting up a computer. (2m)

   i. _____.
   ii. _____.

5. What is a **computer port**? (2m)

   _____.
   _____.

6. What is a **computer cable**? (2m)

   _____.
   _____.

7. State TWO differences between a port and a cable. (2m)

PORT	CABLE

8. Name TWO types of USB ports found in computers. (2m)

   i. _____.
   ii. _____.

9. State TWO uses of a USB port. (2m)

   i. _____.
   ii. _____.

10. Name TWO display ports used to connect a monitor. (2m)

    i. _____.
    ii. _____.

11. State ONE advantage of HDMI over VGA. (2m)

_____.
_____.

12. What is the use of an Ethernet (LAN) port? (2m)

_____.
_____.

13. State TWO devices that use audio ports. (2m)

i. _____.
ii. _____.

14. Name TWO types of audio connectors. (2m)

i. _____.
ii. _____.

15. State TWO characteristics of a VGA cable. (2m)

i. _____.
ii. _____.

16. What is the function of a power cable in computer setup? (2m)

i. _____.
ii. _____.

17. State TWO ports commonly found on a laptop. (2m)

i. _____.
ii. _____.

18. Define the term **peripheral device**. (2m)

_____.
_____.

19. Name TWO examples of input devices connected during computer setup. (2m)

i. _____.
ii. _____.

20. Name TWO examples of output devices connected during computer setup. (2m)

i. _____.
ii. _____.

SECTION B: STRUCTURED QUESTIONS

21. Ports in Computer Systems (6m)

State SIX computer ports and mention ONE device connected to each. (6m)

i. _____.
ii. _____.
iii. _____.
iv. _____.
v. _____.
vi. _____.

22. Cables Used in Computer Setup (4m)

(a) List FOUR common computer cables. (4m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

23. Matching Ports and Cables (6m)

Match the ports in Column A with the correct cables in Column B.

Column A (Ports)	Column B (Cables)
1. HDMI	LAN cable
2. VGA	USB cable
3. Ethernet (RJ-45)	Power cable
4. USB	HDMI cable
5. Audio port	VGA cable
6. Power port	Audio jack cable

24. Monitor Connection (4m)

(a) Name TWO ports used to connect a monitor. (2m)

i. _____.
ii. _____.

(b) Give TWO differences between HDMI and VGA. (2m)

i. _____.
ii. _____.

25. LAN Connection (4m)

(a) What is the function of a LAN cable? (2m)

_____

_____

(b) State TWO benefits of connecting a computer to the internet through LAN. (2m)

i. _____.
ii. _____.

26. Audio Connections (4m)

(a) Name TWO audio ports found on a computer. (2m)

i. _____.
ii. _____.

(b) State TWO uses of audio ports. (2m)

i. _____.
ii. _____.

27. Procedure for Setting up a Desktop Computer (8m)

Write EIGHT steps followed when setting up a desktop computer from scratch. (8m)

i. _____.
ii. _____.
iii. _____.
iv. _____.
v. _____.
vi. _____.
vii. _____.
viii. _____.

28. Safety Precautions (6m)

Explain SIX safety precautions observed when setting up a computer. (6m)

i. _____.
ii. _____.
iii. _____.
iv. _____.
v. _____.
vi. _____.

29. Troubleshooting Setup Problems (4m)

A computer is connected but the monitor shows **"No Signal"**.
Give FOUR possible causes. (4m)

i. _____.
ii. _____.

iii. _____.
iv. _____.

30. Correct Cable Selection (4m)

A learner tries to connect a monitor using a USB cable.
(a) Is this correct? (1m)

_____.
_____.

(b) Give the correct cable(s) that should be used. (1m)

i. _____.
ii. _____.

(c) State TWO reasons why USB is not suitable for a normal monitor connection. (2m)

i. _____.
ii. _____.

31. Reusing Computer E-waste (4m)

State FOUR ways of reusing old computer parts that are still functional. (4m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

32. Computer Setup for Practical Use (4m)

After setting up a computer, list FOUR tasks a learner can do to confirm the setup is successful. (4m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

33. Laptop Setup vs Desktop Setup (4m)

State FOUR differences between setting up a laptop and setting up a desktop computer. (4m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

34. Ports Identification (4m)

Explain FOUR ways a learner can identify a port without guessing. (4m)

i. _____.
ii. _____.

iii. _____.
iv. _____.

35. Give FOUR reasons why following the correct procedure is important when setting up a computer. (4m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

36. What are the advantages of using **USB Type C** ?. (2m)

i. _____.
ii. _____.

37. A learner connected the monitor and system unit but forgot to connect the monitor to power.
What will happen when the computer is switched on? Explain. (2m)

i. _____.
ii. _____.

38. State TWO dangers of plugging many devices in one extension cable during setup. (2m)

i. _____.
ii. _____.

39. Explain why it is important to match the correct cable to the correct port. (2m)

i. _____.
ii. _____.

40. Write the correct order of switching on the following:
Power socket, UPS (if available), system unit, monitor. (2m)

i. _____.
ii. _____.

41. Write TWO items that should appear in a computer setup checklist. (2m)

i. _____.
ii. _____.

42. A school received donated computers without cables.
Write a list of cables and devices needed to make one desktop computer fully functional for learning. (4m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

43. Mwangi wants to know the following computer ports. Identify them



_____ _____ _____



_____ _____ _____

44. Name these computer cords


_____ _____

2.1 DATA COMMUNICATION

SECTION A: SHORT ANSWER QUESTIONS

1. Define the term **data**. (2m)

   _____.
   _____.

2. Define the term **signal**. (2m)

   _____.
   _____.

3. State TWO examples of signals used in data communication. (2m)

   i. _____.
   ii. _____.

4. Define the term **communication channel**. (2m)

   i. _____.
   ii. _____.

5. What is a **computer network**? (2m)

   _____.
   _____.

6. Define **transmission media**. (2m)

   _____.
   _____.

7. Give TWO examples of guided transmission media. (2m)

   i. _____.
   ii. _____.

8. Give TWO examples of unguided transmission media. (2m)

   i. _____.
   ii. _____.

9. What is meant by a **protocol**? (2m)

   _____.
   _____.

10. State TWO examples of communication protocols. (2m)

    i. _____.
    ii. _____.

11. Expand the term **TCP/IP**. (2m)

_____.
_____.

12. State ONE function of TCP/IP in networking. (2m)

i. _____.
ii. _____.

13. What is the meaning of **OSI model**? (2m)

_____.
_____.

14. State the number of layers in the OSI model. (2m)

_____.
_____.

15. Define the term **data transmission**. (2m)

_____.
_____.

16. Differentiate between **analog signal** and **digital signal**. (2m)

_____.
_____.
_____.
_____.

17. Define **data rate**. (2m)

_____.
_____.

18. Define **baud rate**. (2m)

_____.
_____.

19. Define **bandwidth**. (2m)

_____.
_____.

20. State TWO uses of data communication in daily life. (2m)

i. _____.
ii. _____.

SECTION B: STRUCTURED QUESTIONS

21. Basic Data Communication Concepts (6m)

Explain the following terms:
(a) Data (1m)

i. _____.
ii. _____.

(b) Signal (1m)

_____.
_____.

(c) Transmission media (1m)

_____.
_____.

(d) Protocol (1m)

_____.
_____.

(e) TCP/IP (1m)

_____.
_____.

(f) Network (1m)

_____.
_____.

22. Characteristics of Data Communication (6m)

State and explain SIX characteristics of an effective data communication system. (6m)

i. _____.
ii. _____.
iii. _____.
iv. _____.
v. _____.
vi. _____.

23. Components of a Data Communication System (6m)

(a) List FIVE components of a data communication system. (5m)

i. _____.
ii. _____.

iii. _____.
iv. _____.
v. _____.

(b) State ONE role of each component. (1m)

i. _____.
ii. _____.
iii. _____.
iv. _____.
v. _____.

24. Communication Components (4m)

Draw and label a diagram showing the components of communication and protocol. (4m)

25. Simulation Question (4m)

A learner sends a WhatsApp message to a classmate.
Identify the data communication components involved:
(a) Sender (1m)

_____

(b) Message (1m)

_____

(c) Medium (1m)

_____

(d) Receiver (1m)

_____

26. Data Transmission Concepts (5m)

Explain the meaning of:
(a) Data transmission (2m)

_____

_____

(b) Bandwidth (1m)

_____

_____

(c) Data rate (1m)

_____

_____

(d) Baud rate (1m)

_____

_____

27. Analog and Digital Signals (4m)

(a) State TWO examples of analog signals. (2m)

i. _____.
ii. _____.

(b) State TWO examples of digital signals. (2m)

i. _____.
ii. _____.

28. Guided vs Unguided Media (6m)

(a) Differentiate between guided and unguided transmission media. (2m)

_____.
_____.
_____.
_____.

(b) Give TWO examples of each. (4m)

i. _____.
ii. _____.

29. Modes of Data Flow (6m)

(a) Define simplex mode. (2m)

_____.
_____.

(b) Define half-duplex mode. (2m)

_____.
_____.

(c) Define full-duplex mode. (2m)

_____.
_____.

30. Modes of Data Flow in Real Life (6m)

Give ONE real-life example for each:
(a) Simplex (2m)

_____.
_____.

(b) Half-duplex (2m)

_____.
_____.

(c) Full-duplex (2m)

_____.
_____.

31. Advantages and Disadvantages of Modes (6m)

State ONE advantage and ONE disadvantage of:
(a) Simplex (2m)

_____.
_____.

(b) Half-duplex (2m)

_____.
_____.

(c) Full-duplex (2m)

_____.
_____.

32. Protocols and Their Importance (4m)

(a) What is a protocol? (2m)

_____.
_____.

(b) State TWO reasons why protocols are important in networking. (2m)

_____.
_____.

33. TCP/IP and OSI Model (4m)

(a) What does TCP/IP stand for? (2m)

_____.
_____.

(b) State TWO differences between TCP/IP and OSI model. (2m)

i. _____.
ii. _____.

34. Significance of Data Communication (5m)

State FIVE reasons why data communication is important in computer networking. (5m)

i. _____.
ii. _____.
iii. _____.
iv. _____.
v. _____.

35. Application Question (3m)

A school uses internet-based learning.
State THREE ways data communication supports learning. (3m)

i. _____.
ii. _____.
iii. _____.

36. Scenario-Based Question (4m)

During online learning, video keeps buffering.
(a) Name ONE possible cause related to bandwidth. (2m)

_____.
_____.

(b) Suggest TWO solutions. (2m)

i. _____.
ii. _____.

37. Data Communication Errors (4m)

State FOUR causes of errors in data communication. (4m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

38. Security in Data Communication (3m)

State THREE ways data communication can be secured. (3m)

i. _____.
ii. _____.
iii. _____.

39. Comparison Table (4m)

Complete the table:

Feature	Analog Signal	Digital Signal
Nature	_____	_____
Noise	_____	_____

40. Practical Class Activity (2m)

State TWO activities learners can do to simulate data flow modes in class. (2m)

i. _____.
ii. _____.

SECTION C: DIAGRAMS + PRACTICAL APPLICATION

41. Diagram: Simplex Mode (2m)

Draw a diagram to illustrate simplex communication. (2m)

42. Diagram: Half-Duplex Mode (2m)

Draw a diagram to illustrate half-duplex communication. (2m)

43. Diagram: Full-Duplex Mode (2m)

Draw a diagram to illustrate full-duplex communication. (2m)

44. Diagram: Communication System Flow (2m)

Draw a diagram showing the flow of data from:
Laptop → Wi-Fi Router → Internet → Smartphone (2m)

45. Data Communication Components (Real Example) (2m)

In the communication:
Teacher sends assignment via email to students
Identify the:
(a) Sender (1m)

_____

(b) Receiver (1m)

_____

46. Short Calculation Question (2m)

A file of 20 MB is downloaded in 10 seconds.
Calculate the data rate in MB/s. (2m)

47. OSI Layering Concept (2m)

State TWO reasons why network communication is divided into layers. (2m)

i. _____.
ii. _____.

48. Bandwidth vs Data Rate (2m)

Explain the difference between bandwidth and data rate. (2m)

_____.
_____.
_____.
_____.

49. Mini-Case Study (2m)

A school installed fiber optic internet and network speed improved.
State TWO reasons why fiber optic is faster than copper cables. (2m)

i. _____.
ii. _____.

50. Extended Response (4m)

Explain how a data communication system works when a learner sends a document from a computer to a printer through a network. (4m)

i. _____.
ii. _____.
iii. _____.
iv. _____.

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2.2 DATA TRANSMISSION MEDIA

SECTION A: SHORT ANSWER QUESTIONS

1. Define the term **transmission**. (2m)

   _____
   _____

2. Define **transmission media**. (2m)

   _____
   _____

3. What is **encoding** in data communication? (2m)

   _____
   _____

4. What is **decoding**? (2m)

   _____
   _____

5. Define **modulation**. (2m)

   _____
   _____

6. Define **demodulation**. (2m)

   _____
   _____

7. What is **multiplexing**? (2m)

   _____
   _____

8. Define **demultiplexing**. (2m)

   _____
   _____

9. State TWO examples of **guided transmission media**. (2m)

   i. _____.
   ii. _____.

10. State TWO examples of **unguided transmission media**. (2m)

    i. _____.
    ii. _____.

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11. Name TWO types of cables used in wired networks. (2m)

i. _____.
ii. _____.

12. Give TWO advantages of using fiber optic cables. (2m)

i. _____.
ii. _____.

13. State TWO disadvantages of using wireless media. (2m)

i. _____.
ii. _____.

14. What is meant by **signal transmission impairment**? (2m)

_____.
_____.

15. State TWO factors that cause transmission impairment. (2m)

i. _____.
ii. _____.

16. State TWO safety rules to observe when connecting network devices. (2m)

i. _____.
ii. _____.

17. Mention TWO digital devices used in data communication. (2m)

i. _____.
ii. _____.

18. State TWO examples of network connecting devices. (2m)

i. _____.
ii. _____.

19. What is **bandwidth**? (2m)

_____.
_____.

20. State TWO roles of transmission media in computer networking. (2m)

i. _____.
ii. _____.

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SECTION B: STRUCTURED QUESTIONS

21. Basic Concepts (6m)

Explain the following terms:

(a) Encoding (1m)

_____

_____

(b) Decoding (1m)

_____

_____

(c) Modulation (1m)

_____

_____

(d) Demodulation (1m)

_____

_____

(e) Multiplexing (1m)

_____

_____

(f) Demultiplexing (1m)

_____

_____

22. Guided Transmission Media (6m)

(a) List THREE types of guided media. (3m)

i. _____.
ii. _____.
iii. _____.

(b) State ONE use of each. (3m)

_____.
_____.
_____.

23. Unguided Transmission Media (6m)

(a) List THREE types of unguided media. (3m)

_____.
_____.
_____.

(b) State ONE advantage of each. (3m)

i. _____.
ii. _____.
iv. _____.

24. Comparison Table (6m)

Complete the table below:

Medium	Guided/Unguided	Speed	Cost
Twisted pair	_____	_____	_____
Fibre optic	_____	_____	_____
Wi-Fi	_____	_____	_____

25. Device Connection Task (4m)

A student wants to connect a desktop computer to a router.
(a) Name the best cable to use. (2m)

_____

(b) Name the ports used at both ends. (2m)

_____

26. Diagram: Types of Transmission Media (4m)

Draw and label diagrams of:
(a) Twisted pair cable (2m)

(b) Fibre optic cable (2m)

27. Signal Illustration (4m)

Draw diagrams of:
(a) Analog signal waveform (2m)

(b) Digital signal waveform (2m)

28. Multiplexing Illustration (4m)

Draw a diagram showing how THREE different signals can be combined into ONE line using multiplexing. (4m)

29. Demultiplexing Illustration (4m)

Draw a diagram showing how ONE combined signal is separated back into THREE signals using demultiplexing. (4m)

30. Modulation and Demodulation (5m)

(a) Explain why modulation is necessary in wireless communication. (3m)

(b) State TWO devices where modulation and demodulation happen. (2m)

i. _____.
ii. _____.

31. Factors Affecting Communication (6m)

State SIX factors that affect communication over a computer network. (6m)

i. _____.
ii. _____.
iii. _____.
iv. _____.
v. _____.
vi. _____.

32. Transmission Impairment (4m)

(a) Define attenuation. (2m)

_____.
_____.
_____.

b) State TWO ways of reducing attenuation. (2m)

vii. _____.
viii. _____.

33. Interference (4m)

(a) What is electromagnetic interference (EMI)? (2m)

_____
_____

(b) State TWO ways of minimizing EMI. (2m)

i. _____
ii. _____

34. Crosstalk (4m)

(a) Define crosstalk. (2m)

_____
_____

(b) State TWO ways of reducing crosstalk. (2m)

i. _____
ii. _____

35. Noise in Communication (3m)

State THREE sources of noise in transmission media. (3m)

i. _____
ii. _____
iii. _____

36. Practical Setup (4m)

List FOUR steps to connect two computers using a LAN cable for file sharing. (4m)

i. _____
ii. _____
iii. _____
iv. _____

37. Safety Rules (3m)

State THREE safety precautions when setting up network cables in a computer lab. (3m)

i. _____
ii. _____
iii. _____

38. Resource Sharing (4m)

State FOUR resources that can be shared through connected digital devices. (4m)

i. _____
ii. _____
iii. _____
iv. _____

39. Selecting Transmission Media (4m)

State FOUR factors to consider when choosing transmission media for a network. (4m)

i. _____
ii. _____
iii. _____
iv. _____

40. Role of Transmission Media (2m)

Explain TWO roles of transmission media in computer networking. (2m)

i. _____
ii. _____

SECTION C: APPLICATION + DIAGRAMS

41. Matching Question (4m)

Match the device in Column A with the transmission medium in Column B.

Column A	Column B
(i) TV remote control	A. Fibre optic
(ii) Satellite communication	B. Infrared
(iii) LAN cable	C. Radio waves
(iv) Undersea cable	D. Twisted pair

42. Scenario Question (2m)

A learner experiences slow internet when it rains heavily.
State TWO likely causes. (2m)

i. _____
ii. _____

43. Network Problem Solving (2m)

A cable is too long and network connection becomes weak.
State TWO solutions. (2m)

i. _____
ii. _____

44. Diagram: Communication Setup (2m)

Draw a simple diagram showing:
Computer → Switch → Printer (2m)

45. Short Calculation (Bandwidth Concept) (2m)

A network transfers 200 MB in 20 seconds.
Calculate the data rate in MB/s. (2m)

46. Practical Question (2m)

State TWO reasons why fibre optic cables are preferred in long-distance communication. (2m)

i. _____
ii. _____

47. Wireless Connection (2m)

Name TWO wireless media used in networking and state ONE use for each. (2m)

i. _____
ii. _____

48. True/False with Correction (2m)

State whether TRUE or FALSE, then correct if false:
"Twisted pair cable is an unguided transmission medium." (2m)

_____

_____

49. Diagram: Multiplexing and Demultiplexing (2m)

Using a single drawing, illustrate multiplexing and demultiplexing in one system. (2m)

50. Extended Response (4m)

Explain how data is transmitted from a smartphone to a Wi-Fi router and then to the internet, mentioning encoding, transmission medium, and decoding. (4m)

i. _____
ii. _____
iii. _____
iv. _____

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2.3 COMPUTER NETWORK ELEMENTS

SECTION A: SHORT ANSWER QUESTIONS

1. Define a **computer network**. (2m)

   _____

   _____

2. State TWO examples of **Local Area Networks (LAN)**. (2m)

   _____

   _____

3. Define **Metropolitan Area Network (MAN)**. (2m)

   _____

   _____

4. State ONE example of a **Wide Area Network (WAN)**. (2m)

   _____

   _____

5. What is a **Personal Area Network (PAN)**? (2m)

   _____

   _____

6. Define **Wireless Local Area Network (WLAN)**. (2m)

   _____

   _____

7. List TWO functions of a **router** in a network. (2m)

   _____

   _____

8. List TWO functions of a **switch/hub** in a network. (2m)

   _____

   _____

9. State TWO functions of a **Network Interface Card (NIC)**. (2m)

   _____

   _____

10. What is a **gateway** in networking? (2m)

    _____

    _____

11.

12. State ONE function of a **bridge**. (2m)

13. Define a **modem**. (2m)

14. Give TWO examples of **network software**. (2m)

15. What is a **protocol** in computer networking? (2m)

16. State TWO qualities a computer network should have. (2m)

17. What is meant by **scalability** in networking? (2m)

18. State TWO advantages of connecting a computer to a network. (2m)

19. Define **point-to-point connection**. (2m)

20. Define **multi-point connection**. (2m)

21. State TWO rues for safe online communication in a network. (2m)

SECTION B: STRUCTURED QUESTIONS

21. Types of Networks (6m)

(a) List FIVE types of computer networks. (5m)

(b) Give ONE example for each type. (5m)

22. Network Elements (6m)

(a) Identify FOUR essential elements of a computer network. (4m)

(b) Describe the function of each element. (4m)

23. Network Devices (6m)

Match the device to its function:

Device	Function
Router	
NIC	
Bridge	
Hub	
Modem	

24. Protocols (4m)

(a) List THREE network protocols. (3m)

(b) State ONE function of each. (3m)

_____

_____

25. Network Qualities (4m)

Explain TWO network qualities:
(a) Reliability (2m)

_____

_____

(b) Security (2m)

_____

_____

26. Practical Connection Task (4m)

A student wants to connect a laptop to a Wi-Fi router.
(a) State the type of network used. (2m)

_____

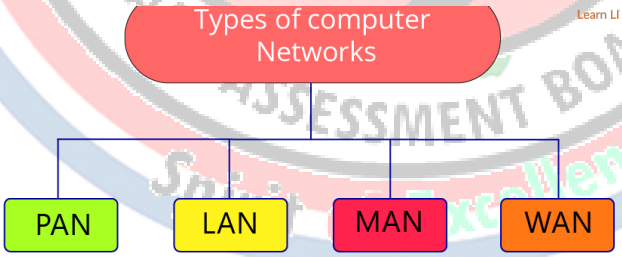
_____

(b) List TWO devices or elements used in the connection. (2m)

_____

_____

27. Write the following terms in full (4m)



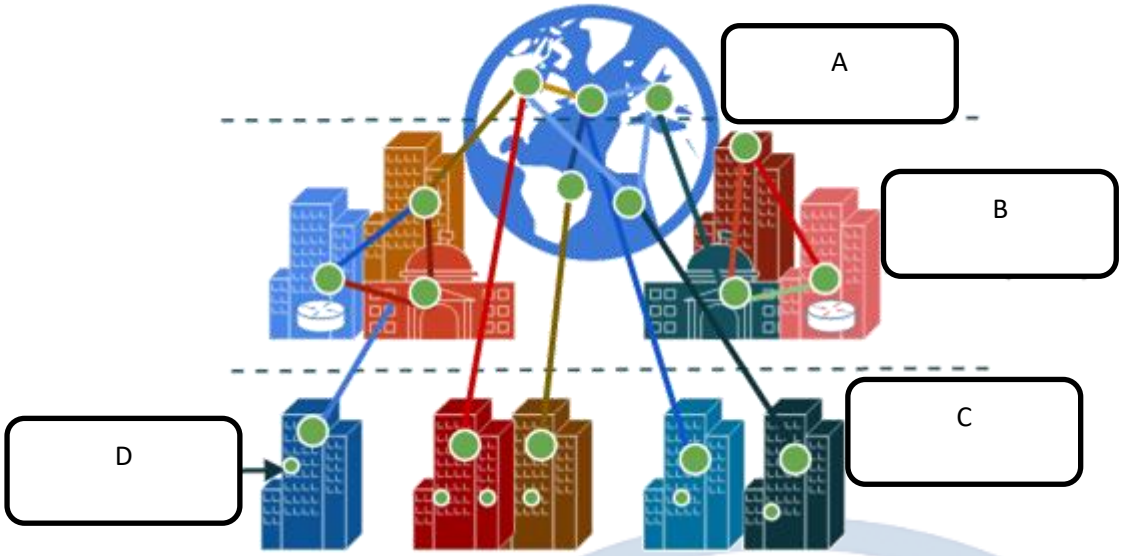
PAN:_____.

LAN:_____.

MAN:_____.

WAN:_____.

28. Identify the following types of Network Setup (4m)



A:_____ B :_____

C:_____ D:_____

29. Network Performance (4m)

(a) List TWO factors that affect network performance. (2m)

_____

_____

(b) Explain how each factor affects performance. (2m)

_____

_____

30. Network Connection Methods (4m)

(a) Explain **point-to-point connection**. (2m)

_____

_____

(b) Explain **multi-point connection**. (2m)

_____

_____

31. Network Software Task (3m)

List THREE network software applications and state ONE use of each. (3m)

_____

_____

_____

_____

32. Connecting Digital Devices (4m)

Explain how a digital device (e.g., laptop) can connect to:
(a) LAN (2m)

_____
_____

(b) WLAN (2m)

_____
_____

33. Network Diagram Task (4m)

Draw and label a diagram showing a **WAN** connecting:

- 3 branch offices
- Central office with router
- Internet cloud (4m)

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34. Router vs Switch (4m)

State TWO differences between a **router** and a **switch**. (4m)

_____

_____

35. Network Safety (4m)

List FOUR online safety precautions when sharing resources over a network. (4m)

_____

_____

_____

_____

36. Network Troubleshooting (3m)

A computer fails to connect to the LAN. State THREE possible reasons. (3m)

_____

_____

_____

_____

37. Resource Sharing (3m)

State THREE resources that can be shared over a network. (3m)

_____

_____

_____

_____

38. LAN vs WAN (4m)

Complete the table:

Feature	**LAN**	**WAN**
Coverage		
Speed		
Cost		
Example		

39. Network Modelling (4m)

Using locally available materials, describe how to **model a computer network** in class. (4m)

_____

_____

_____

_____

40. Advantages of Networks (4m)

State FOUR advantages of computer networks. (4m)

_____
_____
_____
_____

SECTION C: 41. Device Matching (4m)

Match network device to its function:

Device	Function
Hub	_____
Router	_____
Modem	_____
Bridge	_____

42. Scenario Question (2m)

A student wants to send files from a computer in the lab to a printer in another room.
(a) Which type of network would you recommend? (1m)

_____
_____

(b) Explain why. (1m)

_____
_____

43. Network Problem Solving (2m)

The Wi-Fi signal is weak in some rooms. Suggest TWO solutions. (2m)

_____
_____

44. Network Topology Diagram (2m)

Draw a **star topology** showing:

- Central switch
- 4 connected computers (2m)

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45. Extended Response (4m)

Explain how TCP/IP protocol ensures successful communication in a computer network. (4m)

_____

_____

46. Practical Connection Question (2m)

List TWO steps to connect a desktop computer to a router using an Ethernet cable. (2m)

_____

_____

47. Wireless Network Devices (2m)

List TWO devices used in wireless networks and ONE function for each. (2m)

_____

_____

48. True/False with Correction (2m)

State TRUE or FALSE. Correct if false:
"A bridge connects different networks and works at the network layer." (2m)

_____

_____

49. Network Diagram: Resource Sharing (2m)

Draw a network showing a printer shared among 3 computers in a LAN. (2m)

50. Explain the process of sending an email from a smartphone to a laptop over a WLAN, mentioning:

- Transmission medium
- Network devices involved
- Protocols used
- Safety measures (4m)

2.4 NETWORK TOPOLOGIES

SECTION A: SHORT ANSWER QUESTIONS

1. Define the term **network topology**. (2m)

2. Differentiate between **physical** and **logical** topology. (2m)

3. List TWO examples of **physical network topologies**. (2m)

4. List TWO examples of **logical network topologies**. (2m)

5. State ONE advantage of **star topology**. (2m)

6. State ONE disadvantage of **star topology**. (2m)

7. State ONE advantage of **bus topology**. (2m)

8. State ONE disadvantage of **bus topology**. (2m)

9. State ONE advantage of **ring topology**. (2m)

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10. State ONE disadvantage of **ring topology**. (2m)

11. State ONE advantage of **mesh topology**. (2m)

12. State ONE disadvantage of **mesh topology**. (2m)

13. State ONE advantage of **tree topology**. (2m)

14. State ONE disadvantage of **tree topology**. (2m)

15. State ONE advantage of **hybrid topology**. (2m)

16. State ONE disadvantage of **hybrid topology**. (2m)

17. Define **central node** in a network topology. (2m)

18. Define **node** in a network. (2m)

19. Give TWO factors to consider when choosing a network topology. (2m)

20. Explain the importance of selecting the right network topology. (2m)

SECTION B: STRUCTURED QUESTIONS

21. Comparison Table (6m)

Complete the table comparing star and bus topologies:

Feature	Star Topology	Bus Topology
Data Flow		
Fault Tolerance		
Cost		
Complexity		

22. Draw and Label Topology (6m)

Draw and label a **star topology** with:

- 1 server
- 4 computers
- 1 printer
(6m)

23. Ring Topology Diagram (4m)

Draw a **ring topology** connecting 5 computers. Label nodes and direction of data flow. (4m)

24. Bus Topology Diagram (4m)

Draw a **bus topology** connecting 5 computers to a single backbone cable. Label all nodes and backbone. (4m)

25. Mesh Topology Diagram (4m)

Draw a **partial mesh topology** connecting 4 computers. Show all possible connections. (4m)

26. Hybrid Topology Scenario (4m)

A company wants to connect its **3 departments**, each using a **star topology**, and interconnect departments in a **tree formation**.

(a) Name the resulting topology. (2m)

_____

_____

(b) Draw a labeled diagram showing the setup. (2m)

27. Logical vs Physical Topology (4m)

(a) Explain the difference between **logical topology** and **physical topology**. (2m)

(b) Give ONE example where the physical topology differs from the logical topology. (2m)

28. Advantages of Network Topologies (4m)

State TWO advantages of:
(a) Star topology (2m)

(b) Mesh topology (2m)

29. Disadvantages of Network Topologies (4m)

State TWO disadvantages of:
(a) Bus topology (2m)

(b) Ring topology (2m)

30. Fault Tolerance (4m)

Explain which topology is **most fault-tolerant** and why. (4m)

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31. Network Topology Selection (4m)

List FOUR factors to consider when selecting a network topology for a school lab. (4m)

_____

_____

_____

_____

32. Practical Task (4m)

You are given 5 computers and 1 server:
(a) Suggest a suitable **topology** and justify your choice. (2m)

_____

_____

(b) Sketch the setup. (2m)

33. Cable Requirement Calculation (4m)

A **star topology** has 1 server and 6 computers.
(a) How many cables are needed to connect all computers to the server? (2m)

_____

_____

(b) Explain your calculation. (2m)

_____

_____

34. Topology Scenario Analysis (4m)

A **bus network** of 10 computers fails in one segment. Explain the effect on the network. (4m)

_____

_____

35. Topology Advantages/Disadvantages (4m)

Compare **star** and **ring** topologies in terms of:
(a) Fault tolerance (2m)

_____

_____

(b) Data transfer speed (2m)

_____

_____

36. Practical Activity (4m)

Describe **how to simulate a small LAN using star topology** in class using:

- Cables
- Switch
- 3 computers (4m)

37. (4m)

A company wants high-speed communication between all computers with redundancy. Which topology is recommended? Explain why. (4m)

38. Logical Topology Diagram (4m)

Draw a **logical ring topology** for 6 computers connected physically in a star. (4m)

39. Topology Cost Analysis (4m)

Compare **bus** and **mesh** topology in terms of cost for 10 computers. (4m)

40. Tree Topology Diagram (4m)

Draw a **tree topology** for a network connecting:

- 1 server
- 2 switches
- 6 computers (3 under each switch)
  Label all devices. (4m)

SECTION C:

41. Topology Matching (4m)

Match topology to description:

Topology	Description
Star	_____
Ring	_____
Bus	_____
Mesh	_____

42. Scenario Question (2m)

Explain why a **star topology** is preferred in modern offices. (2m)

_____

_____

43. Network Failure (2m)

A computer fails to send data in a ring topology. Explain what happens to data flow. (2m)

_____

_____

44. Hybrid Topology Diagram (2m)

Draw a **hybrid topology** combining bus and star for 6 computers. Label all devices. (2m)

45. Advantages of Physical Topology (4m)

State FOUR advantages of using **physical topology** in a network. (4m)

46. Topology Selection Task (2m)

Select a suitable topology for:
(a) Home network with 3 devices. (1m)

(b) University with 1000 devices. (1m)

47. Fault Tolerance Analysis (2m)

Explain which topology is most suitable for **mission-critical servers** and why. (2m)

48. Practical Simulation (2m)

Using locally available materials, describe **how to simulate a star topology** in class. (2m)

49. Network Upgrade Scenario (2m)

A small office wants to upgrade from bus to **mesh topology**. Explain TWO advantages. (2m)

_____

_____

50. Extended Response (4m)

Explain how the choice of topology affects:

- Network speed
- Fault tolerance
- Cost
- Scalability (4m)

3.1 COMPUTER PROGRAMMING CONCEPTS

1. Define **programming**. (2m)

2. Define **programming language**. (2m)

3. Define **assembler**. (2m)

4. Define **compiler**. (2m)

5. Define **interpreter**. (2m)

6. Explain the meaning of **syntax** in programming. (2m)

7. Define **source code**. (2m)

8. Define **machine code**. (2m)

9. Explain the role of an **Integrated Development Environment (IDE)**. (2m)

10. Define **software development lifecycle**. (2m)

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11. Give TWO examples of **low-level programming languages**. (2m)

_____

_____

12. Give TWO examples of **high-level programming languages**. (2m)

_____

_____

13. Name TWO **structured programming languages**. (2m)

_____

_____

14. Name TWO **object-oriented programming languages**. (2m)

_____

_____

15. Name ONE **functional programming language**. (2m)

_____

_____

16. Name ONE **logic programming language**. (2m)

_____

_____

17. Name ONE **event-driven programming language**. (2m)

_____

_____

18. State TWO reasons for the **evolution of programming languages**. (2m)

_____

_____

19. Explain the difference between **low-level** and **high-level** programming languages. (2m)

_____

_____

20. Explain the importance of **programming languages in software development**. (2m)

_____

_____

SECTION B: STRUCTURED QUESTIONS

21. Evolution Chart (6m)

Draw a **timeline showing the evolution of programming languages** from machine language to modern high-level languages. Label:

- Machine language
- Assembly language
- FORTRAN
- C
- Java
- Python

22. Terminology Matching (4m)

Match the programming term to its description:

Term	Description
Compiler	
Interpreter	
Assembler	
IDE	

23. Language Level Table (6m)

Complete the table:

Language Level	Examples	Advantage	Disadvantage
Low-Level			
High-Level			

24. Programming Paradigms (4m)

Classify the following languages into the correct **paradigm**:

- C++
- Python
- Haskell
- Prolog
- JavaScript

25. Simple Instructions (4m)

Write 5 **low-level instructions** (machine/assembly) to:
(a) Load a value into a register
(b) Add two values
(c) Store result in memory

26. IDE Features (4m)

List FOUR features of an **IDE** that help in software development.

_____
_____
_____
_____

27. (4m)

A student wants to create a small calculator program:
(a) Which type of language (low-level or high-level) is recommended? Explain. (2m)

_____
_____

(b) Give ONE example of such a language. (2m)

_____
_____

28. Source vs Machine Code (4m)

Explain the difference between **source code** and **machine code**. Provide an example for each.

_____
_____
_____
_____

29. Programming Language Advantages (4m)

State TWO advantages of **high-level programming languages** over low-level languages.

_____
_____

30. Programming Language Disadvantages (4m)

State TWO disadvantages of using **low-level programming languages**.

_____
_____

31. Flowchart Drawing (4m)

Draw a **flowchart** to show steps of converting **source code to machine code** using a compiler.

32. Paradigm Advantages (4m)

Explain TWO advantages of **object-oriented programming** in software development.

_____

_____

33. Event-Driven Scenario (4m)

Give an example of an **event-driven program** and explain how it reacts to user input.

_____

_____

34. Evolution Importance (4m)

Explain TWO reasons why programming languages have **evolved** over time.

_____

_____

35. Low-Level Simulation (4m)

Simulate **assembly-level instructions** for adding two numbers and storing the result in memory. Show step-by-step in a table.

_____

_____

_____

_____

36. Compiler vs Interpreter (4m)

Create a **table showing differences between compiler and interpreter** in terms of:

- Translation
- Execution
- Error detection
- Speed

37. Paradigm Matching (4m)

Match the following **programming languages** to their paradigms:

Language	**Paradigm**
Java	_____
C	_____
Haskell	_____
Prolog	_____

38. Practical IDE Activity (4m)

Describe **three tasks performed in an IDE** when writing a simple program.

39. Source Code Example (4m)

Write a **simple high-level program** to add two numbers. Highlight the **source code**, **compiler action**, and **machine code** output.

40. Software Lifecycle Question (4m)

Explain how **programming languages** are used in the **software development lifecycle** stages.

SECTION C: APPLICATION + SCENARIOS

41. Programming Scenario (4m)

A company wants to develop a **cross-platform application**:
(a) Which programming language(s) would you recommend? (2m)

(b) Explain your choice. (2m)

42. Low-Level Language Simulation (2m)

Show **how a CPU executes a simple low-level instruction** to move data from memory to register.

43. Terminology Question (2m)

Explain the roles of **assembler** and **interpreter** in executing a program.

_____

_____

44. Paradigm Scenario (2m)

A bank wants to develop software for online transactions. Which **programming paradigm** is most suitable? Explain.

_____

_____

45. Flowchart Drawing (2m)

Draw a **flowchart** illustrating **source code → compiler → machine code → execution**.

46. Programming Evolution Table (2m)

Complete the table showing **programming language evolution**:

Year	Language	Level
1950		
1972		
1995		

47. Low vs High Level Table (2m)

Compare **low-level** and **high-level** languages in terms of:

- Ease of use
- Machine dependence
- Portability

48. IDE Diagram (2m)

Draw a **diagram of an IDE interface** showing:

- Editor
- Debugger
- Compiler
- Output console

49. Paradigm Benefits (2m)

State TWO **benefits of functional programming** in modern software development.

_____

_____

50. Extended Response (4m)

Explain how knowledge of **programming concepts** (terminologies, language levels, paradigms, evolution) helps a software developer create **efficient and maintainable software**.

_____

_____

_____

_____

3.2 PROGRAM DEVELOPMENT

1. Define **algorithm**. (2m)

2. State TWO characteristics of a **good algorithm**. (2m)

3. Define **pseudocode**. (2m)

4. Give TWO **keywords used in pseudocode**. (2m)

5. Define **flowchart**. (2m)

6. Name TWO **standard symbols used in flowcharts**. (2m)

7. Explain **problem definition** in program development. (2m)

8. Define **program design** in the program development cycle. (2m)

9. Define **coding** in the program development cycle. (2m)

10. Define **testing** in the program development cycle. (2m)

11. Define **implementation** in the program development cycle. (2m)

12. Define **documentation** in the program development cycle. (2m)

13. Define **maintenance** in the program development cycle. (2m)

14. Give ONE example of a real-life problem that can be solved using an algorithm. (2m)

15. State TWO benefits of using algorithms in problem solving. (2m)

16. Define **input** in an algorithm. (2m)

17. Define **output** in an algorithm. (2m)

18. Define **processing** in an algorithm. (2m)

19. Explain the meaning of **finite** in relation to an algorithm. (2m)

20. Explain the meaning of **effective** in relation to an algorithm. (2m)

SECTION B: STRUCTURED QUESTIONS

21. Stages of Program Development (6m)

List and briefly explain the **seven stages of program development**. Use a table to show **Stage | Description | Example**.

22. Algorithm Characteristics (4m)

Complete the table:

Characteristic	Description	Example
Input		
Output		
Finite		
Effective		

23. Pseudocode Writing (6m)

Write a **pseudocode** for calculating the average of three numbers. Include **start, input, processing, output, end** keywords.

_____

_____

24. Flowchart Symbols (4m)

Draw and label **four flowchart symbols** and indicate their purpose:

- Start/End
- Input/Output
- Process
- Decision

25. Flowchart Construction (4m)

Using the pseudocode from Question 23, **draw a flowchart** illustrating the calculation of the average of three numbers.

26. Real-Life Algorithm (4m)

Design an algorithm (flowchart or pseudocode) for **calculating the total cost of items purchased in a supermarket**. Include input, processing, and output.

_____

_____

_____

_____

_____

_____

27. Scenario Question (4m)

A student wants to create a program to **convert temperatures from Celsius to Fahrenheit**:
(a) Write a **pseudocode** to achieve this. (2m)

_____

_____

(b) Draw a **flowchart** representing the same process. (2m)

28. Algorithm Importance (4m)

Explain TWO reasons why **using algorithms improves problem solving**.

_____

_____

29. Decision Symbol Usage (4m)

Draw a **flowchart segment** to check if a number is **even or odd** using a decision symbol.

30. Loop Algorithm (4m)

Write a pseudocode to **print numbers 1 to 10** using a loop structure.

_____

_____

31. Error Identification (4m)

Examine the pseudocode below and identify errors:

Start

Input num1, num2

total = num1 + num2

Print total

End

32. Problem Definition (4m)

Explain the importance of **defining the problem clearly** before starting program development.

_____

_____

33. Testing Scenario (4m)

Explain how **testing** ensures that a program works correctly. Provide a simple example.

_____

_____

34. Documentation Importance (4m)

State TWO reasons why **program documentation** is important.

_____

_____

35. Algorithm Representation (4m)

Compare **pseudocode vs flowchart** in representing algorithms. Provide ONE advantage for each.

_____

_____

_____

_____

_____

_____

36. Maintenance Scenario (4m)

Give ONE example of **program maintenance** and explain why it is necessary.

_____

_____

37. Input/Output Algorithm (4m)

Design a **pseudocode** that asks a user to **enter a number and displays whether it is positive, negative, or zero**.

38. Flowchart Practice (4m)

Draw a **flowchart** to solve the same problem as in Question 37.

_____

_____

39. Algorithm Table (4m)

Complete the table for a simple addition program:

Step	Action	Pseudocode
1	Input numbers	_____
2	Add numbers	_____
3	Output result	_____

40. Algorithm Simulation (4m)

Simulate the execution of an algorithm for **finding the largest of three numbers**. Fill in a table showing **Step | Operation | Output**.

SECTION C:

41. Real-Life Problem (4m)

Design a **pseudocode and flowchart** for **calculating total marks and grade for a student** based on five subjects.

42. Conditional Algorithm (2m)

Write a pseudocode to **determine if a student has passed or failed** based on a passing mark of 50.

43. Loop Flowchart (2m)

Draw a flowchart that **prints all even numbers between 1 and 20**.

44. Scenario Analysis (2m)

Explain how an algorithm could **reduce errors** when managing a small store's inventory.

_____

_____

_____

_____

45. Algorithm Table Completion (2m)

Fill in the blanks for this algorithm:

Step	Action	Symbol Used
1	Start program	
2	Enter number	
3	Check if >0	
4	Display message	
5	End program	

46. Debugging Scenario (2m)

Explain **how testing helps in debugging** a pseudocode program that calculates the sum of two numbers.

_____

_____

47. Flowchart Conversion (2m)

Convert the following pseudocode into a **flowchart**:

Start

Input radius

Area = 3.14 * radius * radius

Print Area

End

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48. Algorithm Discussion (2m)

State TWO advantages of using **algorithms before coding**.

_____

_____

49. Real-Life Simulation (2m)

Design a **pseudocode** for **calculating the fare for a taxi ride given distance and rate per km**.

50. Extended Response (4m)

Explain **how using pseudocode and flowcharts in program development** improves understanding, reduces errors, and makes programming more efficient.

_____

_____

_____

_____

3.3 IDENTIFIERS AND OPERATORS

1. Define the term **identifier** in programming.

2. State TWO differences between **variables** and **constants**.

3. Define a **variable** in a programming language.

4. Define a **constant** in a programming language.

5. Give TWO examples of **reserved words** in Python.

6. Explain the role of **identifiers** in a computer program.

7. Define **operator** in programming.

8. List TWO **categories of operators** used in programming.

9. Give an example of an **arithmetic operator**.

10. Give an example of a **relational operator**.

11. Give an example of a **logical operator**.

12. Give an example of an **assignment operator**.

13. Give an example of an **increment operator**.

14. Give an example of a **decrement operator**.

15. Explain the importance of **data types** in variable declaration.

16. List TWO types of **input statements** in a high-level programming language.

17. List TWO types of **output statements** in a high-level programming language.

18. Explain the difference between **arithmetic** and **assignment operators**.

19. State TWO examples of **invalid identifiers** in programming.

20. Explain **operator precedence** with one simple example.

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SECTION B: STRUCTURED QUESTIONS

21. Variable Declaration (4m)

Write a program snippet (in Python) that declares **three variables** to store a student's name, age, and marks.

_____

_____

22. Constant Declaration (4m)

Declare a constant PI with a value of 3.14159 and use it to calculate the area of a circle with radius 5.

_____

_____

23. Input and Output Statements (4m)

Write a program in Python to:

- Ask the user to enter two numbers
- Print the sum of the numbers

24. Using Arithmetic Operators (4m)

Write a program to calculate the **area and perimeter of a rectangle** using arithmetic operators.

25. Using Relational Operators (4m)

Write a program that compares two numbers entered by the user and prints whether the **first number is greater than, less than, or equal to the second**.

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26. Using Logical Operators (4m)

Write a program that checks whether a student has passed a test. A student passes if **marks >=50 AND attendance >=75%**.

27. Using Assignment Operators (4m)

Write a program snippet that uses += and -= operators to **update a variable storing account balance**.

28. Using Increment/Decrement Operators (4m)

Demonstrate the use of increment (++) and decrement (--) operators to **count the number of items in a list**.

29. Data Types (4m)

Complete the table:

Variable	Data Type	Example Value
Name	_____	"Alice"
Age	_____	18
Marks	_____	75.5
IsPassed	_____	True

---

30. Identifiers and Reserved Words (4m)

State whether the following are valid identifiers or reserved words:

- if
- student_name
- 3marks
- for

31. Operator Precedence (4m)

Given the expression: x = 5 + 3 * 2

- Calculate the value of x
- Explain the order of evaluation

32. Mixed Operators (4m)

Write a program that calculates the **total cost** of buying n items at price p each and adds **tax of 5%**.

33. Real-Life Scenario (4m)

Design a program to **determine if a person is eligible to vote** (age >=18). Include **input, processing, and output**.

34. Syntax Errors (4m)

Examine the following program and identify the **syntax errors**:

```
name = input("Enter your name)

print("Hello " + name)

age = input("Enter age")
```

35. Output Statements (4m)

Write a program to display the following output using a single print statement:

Welcome to Python Programming!

Enjoy learning!

36. Using Multiple Operators (4m)

Write a program to **calculate the result of (a + b) * c / d** where a, b, c, and d are inputs from the user.

37. Identifier Rules (4m)

State the rules for naming identifiers in Python. Provide **two valid and two invalid examples**.

_____

_____

38. Input Validation (4m)

Write a program that asks the user to enter a **positive number** and checks whether the input is valid.

39. Using Constants (4m)

Write a program that calculates **circumference of a circle** using a declared constant for PI.

40. Logical Operators in Decision Making (4m)

Design a program that **checks if a number is divisible by 2 or 3**. Print appropriate messages.

SECTION C:

41. Complex Expression (4m)

Calculate and print y for the formula: $y = (x^2 + 5(x - 10)/2$ for a user input x.

42. Multiple Inputs (2m)

Write a program to accept **first name, last name, and age** and display in this format:
Hello <FirstName> <LastName>, your age is <Age>

43. Operator Precedence Scenario (2m)

Explain the output of:

x = 10

y = 5

$z = x + y^2$

print(z)

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44. Increment/Decrement Simulation (2m)

Simulate the value of x after the following operations:

x = 5

x += 3

x -= 2

45. Real-Life Problem (2m)

Write a program to **compute the total marks and average** of five subjects and print **pass/fail** if average >=50.

46. Nested Operators (2m)

Write a program to **calculate the area of trapezium** using formula:
Area = 1/2 (a + b) h

47. Input/Output Practice (2m)

Design a program that **asks for a number and prints its square and cube**.

48. Constants and Variables (2m)

Identify constants and variables in this program snippet:

```
PI = 3.14159
radius = float(input("Enter radius: "))
area = PI ×radius ×radius
print("Area:", area)
```

49. Relational Operators (2m)

Write a program to **check if a number is positive, negative, or zero** using relational operators.

50. Extended Response (2m)

Explain the **importance of identifiers and operators in programming**, giving **two examples each**.

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3.4 CONTROL STRUCTURES

1. Define the term **control structure** in programming.

2. List the **three main types of control structures**.

3. Explain the importance of **sequential control** in programming.

4. Explain the importance of **selection control** in programming.

5. Explain the importance of **iteration control** in programming.

6. Define the term **decision statement** in programming.

7. List TWO examples of **conditional statements** in Python.

8. Define the term **loop** in programming.

9. Differentiate between a **while loop** and a **for loop**.

10. Explain the function of the **break statement** in loops.

11. Explain the function of the **continue statement** in loops.

12. What is a **nested control structure**?

13. State TWO benefits of using control structures in programming.

14. List TWO common errors in writing control structures.

15. Define **Boolean expression** and give an example.

16. Explain the difference between **single-selection** and **double-selection** statements.

17. State TWO applications of iteration structures in real-life programming.

18. Define the term **infinite loop** and how to avoid it.

19. Explain the term **loop counter** with an example.

20. Give TWO examples of **decision-making operators** in Python.

_____

_____

SECTION B: STRUCTURED QUESTIONS

21. Sequential Control (4m)

Write a Python program that **adds two numbers** and displays the result.

22. Single-Selection Structure (4m)

Write a program to check if a number entered by the user is **positive**. Print a message if it is positive.

23. Double-Selection Structure (4m)

Write a program to determine if a student **passed** or **failed** given a mark. Pass if mark >=50.

24. Multiple-Selection (if-elif-else) (4m)

Write a program that **assigns grades** based on marks:

- 80–100 → EE
- 60–79 → ME
- 50–59 → AE
- <50 → BE

25. While Loop (4m)

Write a program that prints all **even numbers from 1 to 20** using a while loop.

26. For Loop (4m)

Write a program to display the **multiplication table of 5** using a for loop.

27. Nested Loops (4m)

Write a program to display a **right-angled triangle pattern** of asterisks (*) using nested loops:

28. Break Statement (4m)

Write a program that asks the user to enter numbers and **stops input when the number 0 is entered**.

29. Continue Statement (4m)

Write a program to display **all numbers from 1 to 10 except 5** using a loop and continue statement.

30. Loop Counter Example (4m)

Write a program that calculates the **sum of the first 10 natural numbers** using a loop counter.

31. Boolean Expression (4m)

Write a program that asks a user to enter a number and prints whether it is **even or odd**.

32. Nested if Statement (4m)

Write a program to check a person's age and gender to print:

- "Adult Male"
- "Adult Female"
- "Minor Male"
- "Minor Female"

33. Infinite Loop Scenario (4m)

Explain what an **infinite loop** is and **correct the following code snippet**:

```
i = 1
while i <= 5:
    print(i)
```

34. User-Defined Loop Limit (4m)

Write a program that asks the user to enter a number n and prints all numbers from 1 to n.

35. Loop with Condition (4m)

Write a program to **sum all positive numbers entered by the user** until a negative number is entered.

36. Program Flow Diagram (4m)

Draw a **flowchart** for a program that checks if a number is divisible by 3 and 5.

37. Application Scenario (4m)

A shop sells goods and gives a 10% discount for bills above 1000. Write a program to calculate the **final price**.

38. Comparison Operators (4m)

Write a program to determine the **largest of three numbers** entered by the user.

39. For Loop with Condition (4m)

Write a program that prints all numbers **divisible by 3 between 1 and 30**.

40. Multi-Condition Loop (4m)

Write a program that prints numbers from 1 to 20 but **skips numbers divisible by 4**.

SECTION C:

41. Real-Life Problem: Attendance (2m)

Write a program to check if a student's **attendance is above 75%** and prints "Eligible for Exam" or "Not Eligible".

42. User Menu Simulation (2m)

Design a menu-driven program that allows the user to choose between **adding, subtracting, or multiplying two numbers**.

43. Nested Loops Pattern (2m)

Write a program that prints the following pattern using nested loops:

44. Grade Assignment with Loops (2m)

Write a program that takes **marks of 5 students** and prints the **grades** for each using loops and if-elif-else.

45. Break Statement Application (2m)

Write a program that repeatedly asks for **password input** and stops when the correct password is entered.

46. Continue Statement Application (2m)

Write a program to **print numbers from 1 to 15 but skip prime numbers** using continue.

47. Multi-Level Selection (2m)

Write a program to classify **temperature input by the user**:

- <0 → Freezing
- 0–15 → Cold
- 16–25 → Moderate
- 25 → Hot

48. Loop with Mathematical Calculation (2m)

Write a program to calculate **factorial of a number** using a loop.

49. Decision-Making with Operators (2m)

Write a program to check if a number is **divisible by both 2 and 3**.

50. Extended Response (2m)

Explain the importance of **control structures in programming**. Include examples of **selection and iteration**.

3.5 DATA STRUCTURES

1. Define the term **data structure** in programming.
2. List **five types of containers** used in programming.
3. Differentiate between **mutable** and **immutable** data structures.
4. Give TWO examples of **linear data structures**.
5. Give TWO examples of **non-linear data structures**.
6. Define the term **array** and give an example in Python.
7. Define the term **list** and give an example.
8. Explain the difference between a **tuple** and a list.
9. What is a **dictionary** in programming?
10. Give an example of a **set** and state its unique property.
11. Define **class** in programming and give an example of its use.
12. Explain what **abstract data type (ADT)** means.
13. Differentiate between **one-dimensional and two-dimensional arrays**.
14. Explain the importance of **containers in programming**.
15. Define **sequential search**.
16. Define **binary search**.
17. Give TWO advantages of using **binary search** over sequential search.
18. List TWO sorting techniques used in data structures.
19. Explain the difference between **bubble sort and insertion sort**.
20. State the significance of **data structures in software development**.

SECTION B: STRUCTURED QUESTIONS

(21–40) 40 Marks

21. List Declaration (4m)

Write a Python program to create a **list of 5 fruits** and display them.

22. Accessing List Elements (4m)

Given the list:

colors = ["red", "blue", "green", "yellow", "orange"]

Write a program to print the **third element**.

23. Modifying List Elements (4m)

Change the second element in the above list to **"purple"** and display the updated list.

24. Tuple Usage (4m)

Declare a **tuple of 5 numbers** and display the **sum of its elements**.

25. Set Operations (4m)

Create a set of numbers {1, 2, 3, 4, 5} and perform the following:

- Add 6
- Remove 3
- Display the final set

26. Dictionary Usage (4m)

Create a dictionary storing **names of 3 students and their marks**. Display the mark of a student named "John".

27. One-Dimensional Array (4m)

Write a Python program to store **5 temperatures** in a list and **calculate their average**.

28. Two-Dimensional Array (4m)

Create a **2x3 matrix** to store student marks and display all elements using nested loops.

29. Sequential Search (4m)

Write a program to search for the number **50** in the list:

numbers = [10, 25, 50, 75, 100]

30. Binary Search (4m)

Given a sorted list: [10, 20, 30, 40, 50, 60], write a program to find **40 using binary search**.

31. Bubble Sort (4m)

Write a Python program to **sort the list [5, 2, 9, 1, 5, 6] in ascending order** using bubble sort.

32. Insertion Sort (4m)

Sort the list [8, 3, 6, 2, 9] using **insertion sort** and display the result.

33. Selection Sort (4m)

Sort the list [7, 4, 9, 1, 5] using **selection sort** and print the sorted list.

34. Quick Sort Concept (4m)

Explain how **quick sort** works using a **diagram**.

35. Multi-Dimensional Array Usage (4m)

Create a **3x3 grid** representing a tic-tac-toe board and display it.

36. Accessing Dictionary Elements (4m)

Given the dictionary:

student_marks = {"Alice": 80, "Bob": 75, "Clara": 90}

Write a program to **update Bob's mark to 85** and display the dictionary.

37. Adding Elements to List (4m)

Write a program to append a new student name to a **list of student names**.

38. Removing Elements from List (4m)

Write a program to **remove an element** from a list at index 2.

39. Iterating Through a Set (4m)

Write a Python program to **display all elements of a set** using a loop.

40. Nested Loops with Arrays (4m)

Write a program that prints all elements of a **2x2 matrix** in row-wise order.

SECTION C:

41. Real-Life Problem: Student Marks (2m)

Write a program to store **marks of 5 students in a list** and find the **highest mark**.

42. Contact Book Using Dictionary (2m)

Create a **dictionary storing contact names and phone numbers.** Display all names and numbers.

43. Remove Duplicate Elements (2m)

Write a program that removes **duplicate values from a list** using a set.

44. Sort and Display (2m)

Write a program to **sort a list of names in alphabetical order**.

45. Multi-Dimensional Array – Seating Chart (2m)

Create a **3x3 seating chart** with student names and display it using nested loops.

46. Binary Search in Dictionary (2m)

Given a sorted list of student marks [20, 40, 50, 70, 90], write a program to find **mark 70** using binary search.

47. Data Structure for Inventory (2m)

Create a **dictionary to store product names and quantities**. Write a program to update quantity for one product.

48. Sorting a Dictionary by Value (2m)

Write a program that **sorts a dictionary of student marks in ascending order**.

49. Application Scenario – Voting System (2m)

Use a dictionary to store **candidate names and votes**. Display the **candidate with the highest votes**.

50. Extended Response (2m)

Explain the **importance of data structures** in programming and **give examples** of where different types of containers can be used.

MODULAR PROGRAMMING / FUNCTIONS

1. Define **modular programming**.
2. State TWO advantages of modular programming.
3. Differentiate between a **user-defined function** and a **built-in function**.
4. Give TWO examples of **built-in functions** in Python.
5. Give an example of a **user-defined function**.
6. Define **parameter** in the context of functions.
7. What is a **formal parameter**?
8. What is an **actual parameter**?
9. Explain the **scope of a variable** in programming.
10. Differentiate between **local** and **global** variables.
11. Define **function return type**.
12. Explain the purpose of a **function prototype/signature**.
13. State TWO characteristics of a well-written function.
14. Give the **general syntax** of a function in a programming language.
15. Explain the importance of **modularity in debugging**.
16. Describe how **functions improve code reusability**.
17. Define **parameter passing by value**.
18. Define **parameter passing by reference**.
19. State TWO disadvantages of not using modular programming.
20. Explain the role of **functions in structured programming**.

SECTION B: STRUCTURED QUESTIONS

21. Simple User-Defined Function (4m)

Write a user-defined function in Python to **add two numbers** and display the result.

22. Function with Return Value (4m)

Write a function that **calculates the square of a number** and returns it. Use the function to display the square of 7.

23. Function with Parameters (4m)

Create a function to **multiply two numbers** passed as parameters. Demonstrate with numbers 5 and 6.

24. Function without Parameters (4m)

Write a function that **prints "Hello, World!"** when called.

25. Using Built-In Functions (4m)

Write a Python program that uses the **len()** function to display the number of characters in a string: "Computer Science".

26. Variable Scope – Local Variables (4m)

Write a function with a **local variable x = 10**. Display the value inside the function and attempt to display it outside. Comment on the result.

27. Variable Scope – Global Variables (4m)

Create a global variable count = 5. Write a function that **adds 10** to it and prints the value inside the function. Display the value outside the function.

28. Function Calling Another Function (4m)

Write two functions: greet() prints "Good Morning" and welcome() calls greet() before printing "Welcome to Class".

29. Using Return Values (4m)

Write a function to **compute the sum of three numbers** and return it. Display the returned value using a print statement.

30. Parameter Passing by Value (4m)

Write a function to **increment a number by 5**. Pass a variable to it and display its value after the function call to illustrate **pass by value**.

31. Parameter Passing by Reference (4m)

Write a Python program using a **list**. Create a function that **adds a number to each element** of the list. Display the original list after function execution.

32. Function with Default Parameters (4m)

Write a function that **prints a greeting**. Use a default parameter "Student" to greet by name.

33. Function with Keyword Arguments (4m)

Create a function with parameters name and age. Call the function using **keyword arguments**.

34. Function with Arbitrary Arguments (4m)

Write a function that **accepts any number of numbers** and prints their **sum** using *args.

35. Function with Arbitrary Keyword Arguments (4m)

Write a function that prints **student details**. Use **kwargs to pass name, age, and class.

36. Modular Program Example (4m)

Design a **modular program** with three functions:

- input_numbers() → takes two numbers from the user
- add_numbers() → adds them
- display_result() → displays the result

37. Recursive Function (4m)

Write a recursive function to **compute the factorial of 5**.

38. Combining Built-In and User-Defined Functions (4m)

Write a program to **convert a string to uppercase** using the built-in function upper() inside a user-defined function convert_upper().

39. Function Documentation (4m)

Write a Python function with a **docstring** describing its purpose. Call the function and print its docstring.

40. Flowchart (4m)

Draw a **flowchart** showing a function that **calculates the area of a rectangle** (inputs: length, width; output: area).

SECTION C:

41. (2m)

Write a program with functions to **deposit, withdraw, and check balance** in a bank account.

42. (2m)

Create functions to **calculate total marks, average, and grade** of a student. Display the results.

43. (2m)

Write a program with functions to **convert Celsius to Fahrenheit** and **Fahrenheit to Celsius**.

44. (2m)

Write a program with functions to **calculate monthly and total payments** for a loan.

45. Using Modules (2m)

Demonstrate **importing a Python math module** and using the sqrt() function to calculate the square root of 144.

46. Function Error Handling (2m)

Write a function to **divide two numbers** and handle division by zero using a try-except block.

47. Function with Multiple Return Values (2m)

Write a function that **accepts length and width** and returns **both area and perimeter** of a rectangle.

48. (2m)

Create a program with a function that **finds maximum, minimum, and average** of a list of numbers.

49. (2m)

Design a modular program with functions to **add items, remove items, and display cart items**.

50. (2m)

Explain the **importance of modular programming** and **give real-life examples** of where functions make programming easier and more maintainable. Include illustrations or diagrams if possible.