

Computer Science

016

15/07/2025 8:30 AM- 11:30 AM

Names:
Index number:

SUBJECT: COMPUTER SCIENCE

COMBINATIONS:

- MATHEMATICS-COMPUTER SCIENCE-ECONOMICS (MCE)
- MATHEMATICS-PHYSICS-COMPUTER SCIENCE (MPC)

DURATION: 3 HOURS

S6 QUESTIONS and ANSWERS BOOKLET

**ADVANCED LEVEL NATIONAL EXAMINATIONS,
2024-2025**

Instructions to candidates:

- 1) Write your names and index number on the answer booklet as written on your registration form.
- 2) Do not open this question paper until you are told to do so.
- 3) This paper consists of **THREE** sections: **A, B** and **C**.
 - Section A:** Attempt **ALL** questions. (55 marks)
 - Section B:** Attempt any **THREE** questions. (30 marks)
 - Section C:** Attempt any **ONE** question. (15 marks)
- 4) Use only a **blue** or **black** pen.
- 5) For multiple choice questions circle the correct answer only.

FOR EXAMINER'S USE ONLY

Questions	Marks	Questions	Marks
1		16	
2		17	
3		18	
4		19	
5		20	
6		21	
7		22	
8		23	
9		24	
10		25	
11		26	
12		27	
13		28	
14		29	
15		30	

TOTAL MARKS...../100

Section A: Attempt all questions. (55 marks)

1) Choose and circle the letter corresponding to the correct answer. **(2 marks)**

What is the most important safety precaution to take when cleaning a laptop?

- a) Use harsh chemicals.
- b) Power it off and unplug it.
- c) Clean while it's running.
- d) Don't worry about safety precautions.

2) What does 'backup' refer to in computer usage?

(3 marks)

- a) Updating software regularly
- b) Storing duplicate copies of data files
- c) Restarting the computer to fix issues
- d) Deleting unnecessary files

3) Select the best answer for the following expression: **(8 marks)**

i) $1110_2 + 1111_2$

(2 marks)

- a) 11001_2
- b) 11101_2
- c) 11100_2
- d) 10101_2

ii) $10101110_2 - 1001110_2$

(2 marks)

- a) 10001000_2
- b) 10101000_2
- c) 10001100_2
- d) 10001001_2

iii) $17.125_{10} = (\quad)_2$

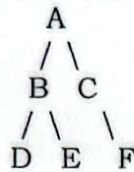
(4 marks)

- a) 11001.001_2
- b) 10011.001_2
- c) 10001.001_2
- d) 10101.001_2

4) What is the purpose of video compression in digital video editing? **(3 marks)**

- a) To increase video quality
- b) To reduce file size
- c) To add visual effects
- d) To adjust colour grading

5) The binary tree below is represented as: **(6 marks)**



Evaluate the Pre-order, In-order, and Post-order traversals of the given binary tree and select the correct option for each traversal.

Options:

i) Pre-order Traversal

- a) A, B, D, E, C, F
- b) B, D, E, A, C, F
- c) D, B, E, A, C, F
- d) A, C, F, B, D, E

ii) In-order Traversal

- a) A, B, D, E, C, F
- b) D, B, E, A, C, F
- c) B, D, E, A, F, C
- d) A, C, F, B, D, E

iii) Post-order Traversal

- a) A, B, D, E, C, F
- b) B, D, E, A, C, F
- c) D, B, E, F, C, A
- d) D, E, B, F, C, A

6) What is the purpose of database security? **(3 marks)**

- a) To ensure databases are always available
- b) To protect databases from unauthorized access and data breaches
- c) To optimize database performance
- d) To design database schemas

- 7) Which of these is a primary component of LAN architecture? **(2 marks)**
- a) Printer
 - b) NIC (Network Interface Card)
 - c) Monitor
 - d) Keyboard

- 8) Which step is part of setting up a wireless router for network connectivity? **(3 marks)**
- a) Enabling file sharing
 - b) Configuring DHCP settings
 - c) Building Ethernet cables
 - d) Installing network drivers
- 9) Select the best output of the following program, and explain why? **(5 marks)**

```
#include <iostream>
using namespace std;
int main() {
    int x = 7, y = 5;
    cout << (x == y) << endl;
    cout << (x > y) << endl;
    cout << (x != y) << endl;
    return 0; }
```

- a) 0 1 1
- b) 1 1 1
- c) 1 0 1
- d) 0 1 0

Explanation:

10) Match the HTML elements with their purposes:

(4 marks)

- | | |
|----------|--------------------------------|
| a) <h1> | i) Adds a paragraph. |
| b) <p> | ii) Defines a hyperlink. |
| c) | iii) Adds a top-level heading. |
| d) <a> | iv) Embeds an image. |

11) i) Why is the Scanner class preferred for reading user input?

(3 marks)

- a) It provides synchronized methods.
- b) It offers convenient methods for parsing primitive types and strings.
- c) It directly connects to file streams.
- d) It is faster than other input methods.

ii) What is the primary purpose of Apache Tomcat?

(2 marks)

- a) To manage databases
- b) To serve Java applications
- c) To compile Java code
- d) To design GUIs

12) i) What is the role of the Front End in a Visual Basic project?

(3 marks)

- a) To manage and store data in a database.
- b) To handle the logic and functionality of the application.
- c) To provide the user interface for interacting with the application.
- d) To optimize the performance of back-end processes.

ii) What function is used to display a message box in Visual Basic?

(2 marks)

- a) InputBox
- b) MessageBox
- c) MsgBox
- d) Print

13) Determine whether the following statements about the differences between static and dynamic web pages are **True** or **False**:

(6 marks)

- a) Static page load faster as they don't rely on back-end processes.....
- b) Static pages show fixed content, while dynamic pages update based on user input.....
- c) Static pages need server-side scripting, dynamic pages do not.
.....

Section B: Attempt any three questions. (30 marks)

Space in which to answer the chosen three questions is at the end of section C.

- 14) Determine whether the following statements about the importance of proper file space allocation strategies in operating systems are **True** or **False**:

(10 marks)

- a) Proper allocation does **NOT** significantly affect disk space or fragmentation.....
- b) Improper allocation can slow down data retrieval and increase resource use.....
- c) Efficient allocation improves system performance by reducing management overhead.....
- d) File allocation is only crucial for large systems, NOT small ones.....
- e) A good allocation strategy compromises system reliability and recovery.....

- 15) i) What is the purpose of relational algebra?

(2 marks)

Select best answer.

- a) To query databases using mathematical operations
- b) To secure databases from unauthorized access
- c) To design database schemas
- d) To manipulate data in databases

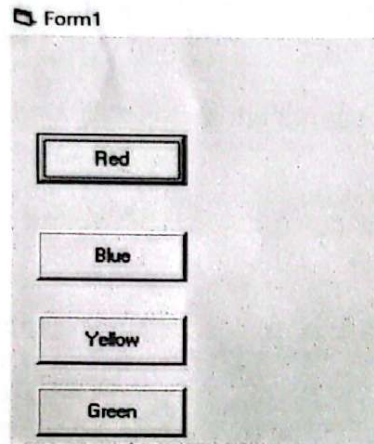
- ii) Match the following types of data integrity with their correct definitions:

(8 marks)

Type of Integrity	Definition
1) Entity Integrity	a) Restricts data type, format, or range of values allowed in a column.
2) Referential Integrity	b) Ensures foreign key values in a table correspond to primary keys in another table.
3) Domain Integrity	c) Every table row must have a unique identifier (Primary Key).
4) User-Defined Integrity	d) Enforces specific business rules outside the above categories.

- 16) Develop a VB 6.0 or VB. net application that allows user to change the background colour of the form in the sequence of red, blue, yellow, and green depending on a command button clicked as shown here below:

(10 marks)



- 17) Analyse the program given below and give its output appropriately.

(10 marks)

```
#include <iostream>
int main() {
    int arr[5] = {10, 20, 30, 40, 50};
    int *ptr = &arr[4];
    std::cout << "Elements of the array accessed using pointer:\n";
    for (int i = 0; i < 5; ++i) {
        std::cout << "Element " << sizeof(arr)/sizeof(int)-i << ": " << *(ptr-i) << std::endl;
    }
    std::cout << "\nModified elements of the array using pointer:\n";
    for (int i = 4; i >= 0; i--) {
        *(ptr-i) += 5;
        std::cout << "Element " << 5-i << ": " << arr[4-i] << std::endl;
    }
    return 0;
}
```

- 18) Draw a flowchart to add even numbers from 0 to 20.

(10 marks)

Section C: Attempt any one question. (15 marks)

- 19) Develop a Java servlet that handles HTTP GET requests and responds with a simple HTML page displaying a welcome message. **(15 marks)**
- 20) Write a C++ program using a friend function to access private data and calculate the tax on an employee's salary which is 30% of the salary. **(15 marks)**

Space in which to answer the chosen 3 questions from section B.

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.