



CAMBRIAN PUBLIC SCHOOL

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ASSIGNMENT Set 2

Subject: Computer Science (083)

Class: XI

Part A: Multiple Choice Questions (15 Marks)

- 1) Which bus in computer architecture is unidirectional and carries location addresses from the CPU to memory/IO devices?
 - a) Data Bus
 - b) Address Bus
 - c) Control Bus
 - d) Power Bus
- 2) The 2's complement representation of binary number 10102 is:
 - a) 01012
 - b) 01102
 - c) 11012
 - d) 00112
- 3) Which truth table representation corresponds to a NOR gate?
 - a) Output 1 only when all inputs are 0
 - b) Output 1 only when all inputs are 1
 - c) Output 0 only when all inputs are 0
 - d) Output 1 when inputs are different
- 4) What will be the result of the Python expression `3 ** 2 ** 3`?
 - a) 512
 - b) 6561
 - c) 729
 - d) 18
- 5) Which keyword is used in Python to define an alternative branch when using conditional statements?
 - a) elseif
 - b) else if
 - c) elif
 - d) then
- 6) Which portion of the Operating System resides continuously in primary RAM memory during execution?
 - a) User Interface
 - b) Kernel
 - c) Compiler
 - d) Device Drivers
- 7) How many total unique characters can be represented using 7-bit ASCII encoding?
 - a) 64
 - b) 128
 - c) 256
 - d) 512
- 8) What is the output of `range(5, 1, -1)` when converted to a list `list(range(5, 1, -1))`?
 - a) [5, 4, 3, 2, 1]
 - b) [5, 4, 3, 2]
 - c) [4, 3, 2, 1]
 - d) [5, 4, 3]
- 9) Which operator performs bitwise AND in Python?
 - a) `&&`
 - b) `and`
 - c) `&`
 - d) `|`
- 10) Convert octal number 1758 to binary:
 - a) 00111111012
 - b) 111101012
 - c) 101111012
 - d) 0011101012

- Part B: Short Answer Questions (10 Questions x 2 Marks = 20 Marks)**

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if a > 10 and b < 20:
    print("Condition 1")
elif a == 12 or b == 10:
    print("Condition 2")
else:
    print("Condition 3")

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- 24) [Looping]** Write a Python while loop code that calculates and prints the sum of digits of a user-entered number (e.g., input 123 → output 6).
- 25) [Looping]** What is an infinite loop? Write one example of a while loop that creates an infinite execution state, and explain how to prevent it.

Part C: Case-Based Questions (5 Questions x 4 Marks = 20 Marks)

26) Case Study 1: Computer Booting & System Architecture

When a user powers on a computer, a sequence of events occurs before the desktop screen appears.

- What is the full form of BIOS and where is it stored inside the computer system?
- Explain the purpose of the POST (Power-On Self-Test) process.
- Describe the transfer of operating system components during the booting process between secondary storage and primary memory.
- Differentiate between Cold Booting and Warm Booting.

27) Case Study 2: Digital Systems & Binary Arithmetic

Digital systems process fractional and integer numbers using binary number logic.

- Convert Octal number 2648 to Decimal number system.
- Convert Hexadecimal number AF16 into Binary.
- Compute binary subtraction using 2's complement method: 11012–10012.
- Express 1 Gigabyte (1 GB) in terms of Bytes using power of 2 (2N).

28) Case Study 3: Python Operators & Precedence Evaluation

Consider the following expression evaluation problem in Python:

Python

x = 10

y = 3

z = 2

res1 = x + y * z**2 // y - x % z

res2 = x > y and y < z or not (x == y)

- Evaluate res1 step-by-step showing operator precedence order.
- Evaluate res2 step-by-step showing logical operator evaluation.
- What will be the value and data type of x / y in Python 3?
- Rewrite x = x + 5 using augmented assignment operator.

29) Case Study 4: Utility Billing System Automation

An electric power utility charges residential customers based on monthly unit consumption according to the slab rules:

First 100 Units: ₹ 3.0 per unit

Next 200 Units (101 to 300): ₹ 5.0 per unit

Above 300 Units: ₹ 8.0 per unit

- a) Write a complete Python program that prompts the user for total units consumed and computes the total bill amount.
- b) Include a flat surcharge of 10% on the total calculated amount if total consumption exceeds 400 units.

30) Case Study 5: Number Analysis using Loops

A mathematical utility program needs to analyze integer properties such as checking whether a given number is a **Prime Number** or an **Armstrong Number**.

- a) Write a Python program to check whether a given positive integer N is a **Prime Number** using a loop.
- b) Write a Python program to check whether a given 3-digit positive integer is an **Armstrong Number** (e.g., $153 = 1^3 + 5^3 + 3^3$).
