



Class Test

Student ID : Program:.....Semester: Spring/Summer/Fall/Year:

Course Code : Course Title:.....Section:.....Date:.....

Class Test No : 02.....

Signature of the Course Teacher:.....

Time: 40 minutes

Marks: 15

1.	Design a circuit from the given Boolean expression. Simplify it and verify your result using a truth table: $F = A\bar{B} + (\bar{A} + \bar{B} + C \cdot \bar{C})$	5
2.	A smart irrigation system is installed in the DIU Agricultural Research Garden to control the water supply automatically. The system uses two input signals: one indicates whether the soil moisture level is sufficient, and the other indicates whether the water tank is full. The system follows a specific rule: the water pump remains ON unless both input signals are ON simultaneously. When both conditions are satisfied, the pump turns OFF to prevent unnecessary water supply. In every other combination of input signals, the pump remains ON. Identify the logic gate used in the above scenario and illustrate its logic circuit diagram and a truth table.	5
3.	When a desktop computer in a bank is powered on, it first executes a set of built-in instructions to check hardware components and prepare the operating system for loading. These instructions are permanently stored inside the system and remain available even when the power is turned off. After startup, the computer uses a fast working memory to store the banking application, customer records, and ongoing transactions so they can be processed efficiently. While processing a transaction, the processor temporarily stores the current instruction, memory addresses, intermediate calculation results, and data in a very small storage area located inside the CPU for immediate execution. To further improve processing speed, the processor also relies on a very small, ultra-fast memory located close to it that stores frequently used data and instructions, reducing repeated access to the main working memory. When the computer is shut down or power is interrupted, all temporary data is lost, while the built-in startup instructions remain unchanged. Based on the above scenario, identify the memory components and explain their main functions in processing.	5

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