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Daffodil International University

Class Test| 15 Marks | Set - A

Student ID :.....Name:.....Program: BSc in SWE Semester: Summer 2026

Course Code: **SE213 Course** Title: **Digital Electronics and Logic Design** Section: **46-L** Time: **30 Minutes** Date: **23.06.2026**

Class Test No: 02 Course Teacher: Md. Saimim Islam Khan Hamim (SIK)

1. In Planet Auron, agricultural scientists have developed an advanced smart greenhouse system to protect rare cosmic plants. You are assigned to design a logic-based control system to determine whether the Greenhouse Alert (A) should be activated.

Inputs (Sensors):

M: Moisture Level (M = 1 if soil moisture is low (dry), M = 0 otherwise)

L: Light Intensity (L = 1 if light level is too high, L = 0 otherwise)

C: CO_2 Level (C = 1 if CO_2 concentration is high, C = 0 otherwise)

Output:

A: Greenhouse Alert (A = 1 if the alert should activate, A = 0 otherwise)

Alert Conditions:

- The alert will activate if soil is dry and CO_2 level is high simultaneously, regardless of light conditions.
- The alert will also activate if soil is dry and light intensity is high, even if CO_2 is normal.
- If soil is not dry, the alert will still activate when both light intensity and CO_2 level are high together.

Based on the above rules, Express the logic design for the Greenhouse Alert (A) Construct the truth table for all possible input combinations (In the order MLC). Derive the Boolean expression for output A. Draw the corresponding simplified logic circuit using basic logic gates. **10**

2. **a)** Apply a 7 bits parallel full adder to compute (A + B) for the following operation, along with a diagram. Where A = 111110 and B = 10011. **5**

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