සියලු ම හිමිකම් ඇවිරිණි / முழுப் பதிப்புரிமையுடையது / All Rights Reserved]

කලීෆානියාස් Khalifa Niyas

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2025
கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீடசை, 2025
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තොරතුරු හා සන්නිවේදන තාක්ෂණය	II
தகவல், தொடர்பாடல் தொழினுட்பவியல்	II
Information & Communication Technology	II

20 E II

Part B

05.

A. A circuit has three inputs (A, B, C) and Z as the output. The circuit produces 0 as output when binary combination of the value is a triangular number. In other cases, its value is 1

I. Draw a truth table and K-map to extract the most simplified SOP expression.
II. Draw the logic circuit by using NOR gates only.

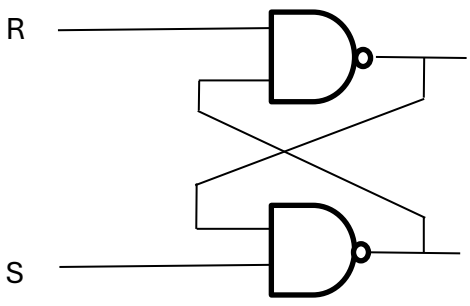
B. An alarm system was designed to install in a hospital ICU to monitor the white blood cells(A), Red blood cells(B) and platelets (C) when it gets lower than the level.

The Boolean input takes the value 1 when all of above 3 inputs are lower than 10000 and when alarm rings it take value of 1.

- The alarm rings when platelets are below 10000.
- The alarm rings when white blood cells are higher than 10000 and red blood cells are lower than 10000
- In all other situations it doesn't ring.

I. Prove that the Boolean expression derived is equivalent to C + AC + A'BC' by clearly stating the Boolean laws used.
II. Draw the above using only NOR gates.

C. Consider the following Flip-Flop.



I. Draw the truth table for the above flip flop
II. State two advantages of using Flipflops.

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06.

Musaeus College has issued **Two** ID cards to students of the college, which includes a QR code and its being read by using bar code reader machines. First ID card is used to enter to the school premises from the main gate (ID- 01) and the second ID card is used to enter the IT lab (ID-02) and it has been issued to only those who are doing IT as a subject.

Temperature is being checked at each entrance and in order to proceed temperature should be lower than 37℃ (temp < 37℃)

Temperature	Input type
<37℃	0
>37℃	1

In order to attend an IT class a student must have either one of the above-mentioned ID cards and temperature should be as mentioned.

I. Construct a truth table to represent the above scenario.

II. Derive the boolean expression to represent the truth table constructed in section (a) above.

III. Since the new variants of Covid-19 spreading fast the vaccination card is checked at the entrance of the IT lab. Even though the above requirements are fulfilled if a person without fully vaccinated cannot enter the lab.
Re-write the boolean expression including the fourth input.

IV. Design the logic circuit for the simplified SOP above (III) part using universal gates only.

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