'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

BCA Major 1st Semester Examination, 2023

UBCAMAJ11001-BACHELOR OF COMPUTER APPLICATION

DIGITAL ELECTRONICS

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.

GROUP-A

1. Answer any ***five*** questions from the following: 1×5 = 5

   (a) What are the different logic gates available?
   (b) Define a flip flop.
   (c) Convert $(10001101)_2$ into its decimal equivalent.
   (d) State De Morgan's theorem.
   (e) Write down two applications of a multiplexer.
   (f) What is a ripple counter?
   (g) Write down the characteristic equation of a D flip flop.
   (h) Expand CMOS.

GROUP-B

2. Answer any ***three*** questions from the following: 5×3 = 15

   (a) Minimize the given function using K-map

   $f(A,B,C) = \Sigma\,(1, 2, 3, 5, 7)$

   (b) (i) Prove that $(A+B)(\overline{A}\,\overline{C}+C)(\overline{\overline{B}+AC}) = \overline{A}B$.

   (ii) Add $(11110111)_2$ with $(10011111)_2$

   (c) Implement a half adder using two full adders.
   (d) What is a decoder? Explain with the help of a truth table and circuit diagram.
   (e) What is a S-R flip flop? Explain. How can we convert it to a D-flip flop?

GROUP-C

3. Answer any ***two*** questions from the following: 10×2 = 20

   (a) What are universal gates? Name one and explain why it is called a universal gate.
   (b) Discuss the working of a J-K flip flop with a proper diagram. What is the problem faced in a J-K flip flop?
   (c) What are shift registers? What are the different types of shift register? Explain.
   (d) What is a 16×1 multiplexer? Implement a 16×1 multiplexer using two 8×1 multiplexers.

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