The Assam Royal Global University, Guwahati
Royal School of Information Technology
BCA/B.Sc.IT 1ˢᵗ Semester
Semester End Examination, January 2023
Course Title : Digital Logic & Computer Design
Course Code : CAP052C103/INT052C103

Time: 3 Hours

Maximum Marks: 70

Note: Attempt all questions as per instructions given.
The figures in the right-hand margin indicate marks.

Section – A

1. Attempt **all questions**.   2 x 8

   a. Define radix.
   b. How is a digital system different from an analog system?
   c. Define associative law in Boolean Algebra.
   d. Define a logic gate.
   e. What is a multiplexer?
   f. What is an adder circuit?
   g. What is edge triggering?
   h. Define EPROM.

Section – B

2. Attempt **any two** of the following: 6 x 2

   a. Convert the numbers into desired base.(i)$(A6BF5)_{16}$ = ( )₂, (ii)$(101.01)_2$=( )₁₀, (iii) $(7.FD6)_{16}$=( )₈, (iv)$(345)_8$=( )₁₀, (v) $(7864)_{10}$=( )₁₆
   b. Write the truth table and logic symbol of EX-OR and EX-NOR Gate. Implement the following expression in logic circuit: $ABC+\overline{AB}\overline{C} + A\overline{B}C+\overline{A}BC$
   c. Write a note on BCD codes. Convert the Gray code 111011 to binary form.

3. Attempt **any two** of the following: 7 x 2

   a. What is a Karnaugh map? Using the K-map method, simplify the following function and obtain the minimal sum of product expression: $f(w,x,y,z)=\sum(1,3,4,5,6,7,9,12,13)$.Also implement the simplified expression using basic logic gates.
   b. Explain the terms with examples: (a) Prime Implicants, (b)Input Variable, (c) Minterm and (d) Maxterm.
   c. Using the Quine McCluskey method, obtain the minimal sum of product expression of the following function: $Y=\sum(0,2,3,6,7,8,10,11,12,15)$

4. Attempt **any two** of the following: 7 x 2

   a. Explain, in details, full adder circuit, with truth table and derivation of logic expression.
   b. What is an encoder? Derive the logic expression and logic diagram for a octal-to-binary encoder.
   c. Write a note on EPROM & EEPROM.

5. Attempt **any one** of the following: 14 x 1

   a. How is a flip-flop different from a latch? Explain in details,the Master Slave flip flop.
   b. What is a counter? Mention few applications of Counters. Explain in details, the Ring Counter.