



**I Semester B.C.A. Degree Examination,
October/November 2019**

(Choice Based Credit System)

(2019-20 Batch Onwards)

Computer Organization

Time : 3 Hours]

[Max. Marks : 80

Instructions : Answer **any ten** questions from Part A and one full question from each unit in Part B.

PART – A

1. Answer **any ten** of the following :

(10 × 2 = 20)

- Find the 9's and 10's complement of $(789)_{10}$.
- Draw the Venn diagram for $x = xy + x$.
- Convert $(465.0423)_8$ to Binary.
- Draw the logic circuit of $F = A \bar{B} + BC$.
- Write the logical symbol and truth table of AND gate.
- Prove that $x + xy = x$.
- What is Half Subtractor? Write its truth table.
- Draw the logical circuit of OR function using NAND gate.
- What is an Encoder?
- Write the Excitation table of RS flip-flop.
- Define state diagram and state equation.
- What is a Register? Write the block diagram of 4 bit register.



(4 × 15 = 60)

Answer **any four** questions :

2. (a) Perform the following conversion.
- $(CEF)_{16} = ()_{10}$
 - $(675.54)_{10} = ()_{10}$
 - $(11001)_{16} = ()_2$
- (b) Perform the following subtraction using 9's and 10's complement methods.
- $(8765)_{10} - (1432)_{10}$
 - $(87634)_{10} - (12321)_{10}$
- (c) State and prove DeMorgan's theorems for two variables. **(5 + 6 + 4)**
3. (a) Perform the following conversion.
- $(134.12)_{10} = ()_{16}$
 - $(675.54)_8 = ()_{10}$
 - $(1010011011001.0101011)_2 = ()_{16}$
- (b) Perform the following subtraction using 1's and 2's complement methods.
- $(110101)_2 - (100111)_2$
 - $(1001)_2 = (11011)_2$
- (c) State any four postulates of Boolean Algebra. **(5 + 6 + 4)**

UNIT - II

4. (a) Using K-Map simplify the following expression and draw the logic circuit for the simplified expression.
- $$F(A,B,C,D) = \sum(0,1,2,4,5,6,8,9,12,13)$$
- (b) Write the logical circuit for the Boolean function.
- $$F = XY'Z + X'Z' + XY$$
- (c) Find the complements of :
- $F_1 = PQ'R + PQ'R$
 - $F_2 = (A+B)'(A'+B'+C)$
- (6 + 4 + 5)**



5. (a) Express the Boolean function $F(x,y,z) = x'(y+z')$ as sum of minterms and product of maxterms.
- (b) Implement the Boolean function $F(A,B,C,D) = AB + CD + E$ using only basic gates.
- (c) Using K-map simplify the following expression. **(5 + 5 + 5)**
 $F(A,B,C,D) = \sum(0,1,3,7,8) + \sum d(2,10,11,12,13,14,15)$

UNIT - III

6. (a) What is a Full adder? Explain its working.
- (b) Design and explain the working of 4 to 1 line multiplexer.
- (c) Explain the working of 2 bit Magnitude Comparator. **(6 + 5 + 4)**
7. (a) Design a BCD to Excess-3 Code Converter.
- (b) What is a Binary Parallel Adder? Draw the block diagram of a 4-bit binary parallel adder and explain its working.
- (c) Explain the working of 3 to 8 line decoder. **(7 + 4 + 4)**

UNIT - IV

8. (a) Explain the working of clocked RS flip-flop.
- (b) Design mod-6 synchronous counter using T-flip-flop.
- (c) What is a Shift Register? Explain with a neat diagram. **(5 + 5 + 5)**
9. (a) Explain the working of JK Flip-Flop.
- (b) Explain the working of 4-bit Ripple Counter.
- (c) Explain the working of Bidirectional Shift Register. **(5 + 5 + 5)**