Reg. No. | | | | | | | | | |

BCACAC 133

First Semester B.C.A. Degree Examination, April 2021
(Choice Based Credit System)
(2019 – 2020 Batch Onwards)
COMPUTER ORGANIZATION

Time : 3 Hours Max. Marks : 80

Instruction : *Answer **any ten** questions from Part – **A** and **one full** question from **each** Unit of Part – **B**.*

PART – A **(10×2=20)**

1. a) Obtain the 9's and 10's complements of the following decimal number 341.23.
   b) Obtain the 1's and 2's complements of the binary number 1110101.
   c) Write excess-3 and binary equivalent of $(845)_{10}$.
   d) Draw the logic circuit for F(X, Y, Z) = X'Y + X'Z.
   e) How to write the complement of a Boolean function ? Also write the complement of F(X, Y, Z) = X'YZ' + X'Y'Z.
   f) Write the general structure of 3 and 4 variables K-Map.
   g) What is half subtractor ? Write its truth table.
   h) What is encoder ? Write the truth table of octal to binary encoder.
   i) Write the truth table of 2 to 4 line decoder.
   j) Draw the circuit diagram of SR latch using NOR gate.
   k) Write the excitation tables of T and JK flip flop.
   l) Draw the block diagram of a sequential circuit.

PART – B

Unit – I

2. a) Perform following Subtraction
      i) $(8052)_{10} - (3250)_{10}$ using 9's complement.
      ii) $(6320)_{10} - (8659)_{10}$ using 10's complement.

P.T.O.

b) Prove the following theorems of Boolean algebra.

i) $x + x = x$

ii) $x + xy = x$.

c) Perform following conversion.

i) $(11100101.10)_2 = ()_8$

ii) $(45.B3)_{16} = ()_2$

iii) $(789)_{10} = ()_8$. **(4+5+6)**

3. d) State the postulates of Boolean Algebra.

e) Perform following subtraction.

i) $(1001)_2 - (1011)_2$ using 1's complement method.

ii) $(10011)_2 - (1001)_2$ using 2's complement method.

f) Perform following conversion.

i) $(152.A1)_{16} = ()_{10}$

ii) $(345)_8 = ()_2$

iii) $(915)_{10} = ()_{16}$. **(5+4+6)**

Unit – II

4. g) Using K-Map simplify the following expression.

$F(w, x, y, z) = \sum(8, 9, 10, 11, 12, 13, 14)$.

h) Express the Boolean function $F(A, B, C) = A + B'C$ as sum of minterm and product of maxterm.

i) Prove that NAND is universal gate. **(5+5+5)**

5. j) Implement the Boolean function $F(A, B, C, D) = D(A + B) + CD'$ using only NOR gate.

Draw the logic circuit for $F(X, Y, Z) = XY + X'Z$ using basic gates.

k) Minimize $F(A, B, C, D) = \sum (0, 3, 4, 7, 8) + \sum d(10, 11, 12, 13, 14, 15)$ using K-Map. **(5+5+5)**

Unit – III

6. l) Explain the working of full adder.

m) Design BCD to Excess-3 code converter.

n) Explain the working of 3*8 Decoder. **(5+5+5)**

7. o) Design 2 bit magnitude comparator.
   p) Design and explain BCD adder.
   q) Explain the working of 4*1 multiplexer. **(5+5+5)**

Unit – IV

8. r) Explain the working of clocked SR flip flop.
   s) Design a octal synchronous counter using JK flip flop.
   t) Design 4 bit Binary ripple counter. **(5+5+5)**

9. u) Design BCD synchronous counter using T flip flop.
   v) Explain the working of bi-directional shift register.
   w) Explain state table, state diagram and state equation using example. **(5+5+5)**
