CA-202(N)

B. C. A. (Second Semester)

EXAMINATION, May, 2018

(New Course)

Paper Second

DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION

Time: Three Hours]   [Maximum Marks: 75

Note: Attempt questions from all Sections as directed.

Inst. The candidates are required to answer only in serial order. If there are many parts of a question, answer them in continuation.

Section-A

(Short Answer Type Questions)

Note: All questions are compulsory. Each question carries 3 marks.

(A) State the absorption law of Boolean Algebra.

(B) State and prove the De-Morgan's theorem and simplify the expression:

[((AB)'C)'D]'

(C) Find the minterms of the logical expression :

Y = A' B' C + A' B'C+ABC+ ABC'

(D) Find the base (or radix) of the number system such that the following equation holds: $\frac{312}{20} = 13.1$.

(E) What is Cache memory ? Design 32×8 RAM structure.

(F) How many 256 x 8 RAM chips are needed to provide a memory capacity of 2048 bytes ? Also find the number of address lines and data lines.

(G) Express the boolean function F = x + y' z as a product of max term.

(H) What is flip-flop? Explain the working of RS flip-flop using logic diagram.

(I) Represent decimal number 8620 in BCD and Excess-3 code.

Section-B

(Long Answer Type Questions)

Note: Attempt any two questions. Each question carries 12 marks.

2. (a) Implement EX-OR gate with NOR gate only.

(b) Simplify the following Boolean function: F (P, Q, R, S) ε = (2, 3, 4, 5, 6, 7, 11, 14, 15) and implement of means of NAND Gate.

(c) Differentiate between combinational sequential circuit.

3. Design a BCD to excess-3 code converter.

4. (a) Design a MUX for the function of time variable:

F (A, B, C) ε = (1, 3, 5, 6)

Draw the implementation table.

(b) What is decoder? Show the logic circuit of 3 × 8 decoder.

5. Write short notes on any two of the following:

(i) 'Full Adder circuit

(ii) Simplify the Boolean function:

F (w. x, y, z) = ε (0, 1, 2, 3, 7, 8, 10)

d (w, x, y, z) = ε (5, 6, 11, 15)

(iii) Virtual memory

Section-C

(Long Answer Type Questions)

Note: Attempt any two questions. Each question carries 12 marks.

6. What is Encoder? Explain.

Construct a logic diagram of 4 x 16 line decoder using 3 x 8 line decoder.

7. What is counter? Explain.

Design a counter that has repeated sequence of six states 0, 1, 2, 4, 5, 6 using JK flip-flop.

8. (a) Explain the working of RS and D flip-flops.

(b) Implement the following function with NAND gates:

F (x, y, z) = ε (0,6)

9. Design a logic construction of 32 x 4 ROM. What is the size of decoder used?