

BCA-202(N)

B. C. A. (Second Semester)

EXAMINATION, 2016

(New Course)

Paper Second

DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION

Time: Three Hours]

[Maximum Marks: 75

Note: Attempt all questions from Section A and two questions from Section B and two questions from Section C.

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: Attempt all questions from this Section. Each question carries 3 marks.

1. (A) Implement the following Boolean function with NAND gate only:

$$Y(A, B, C) = \sum m(0, 1, 3, 5)$$

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

$$\overline{(\bar{A} + B + \bar{C})}(\bar{A} + B + C)$$

(C) Explain half adder with truth table and logic circuit diagram.

(D) Differentiate between static RAM and dynamic RAM.

(E) Differentiate between S. O. P. and P. O. S. methods with their maxterms and minterms.

(F) What is ring counter? Explain its working.

(G) What is flip-flop ? Explain the working of RS flip-flop using logic diagram and excitation table.

(H) Explain the working of ROM. Design 32 x 8 ROM structure.

(I) Differentiate between combinational and sequential circuit.

Section-B

(Long Answer Type Questions)

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

2. (a) Explain all logic gates with truth table and logic circuit design.

(b) Simplify using k-map:

$$F(A, B, C, D) = \sum m(1, 3, 7, 11, 15) + d(0, 2, 5)$$

3. (a) Realize the following Boolean expression using 4 x 1 multiplexer :

$$Z = \overline{ABCD} + \overline{A}BC\overline{D} + A\overline{B}CD + A\overline{B}C\overline{D} + A\overline{B}\overline{C}D + ABCD$$

(b) Explain full-adder with truth table. Construct logic diagram of full-adder using half-adder.

4. Write short notes on the following:

(a) Half subtractor

(b) Multiplexer

(c) Binary to BCD converter

5. Convert RS flip-flop to T flip-flop using Excitation table. 3-bit

(b) What is modulus counter? Design 3 bit asynchronous counter using J-K flip-flop.

Section-C

(Long Answer Type Questions)

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

6. (a) Explain the basic read operation in cache memory organization.

(b) Explain the working with block diagram of RAM.

7. What is Decoder? Explain the Decoder expansion. Construct a logic diagram of 4 to 16 line decoder using 3 to 8 line decoder.

8. What is virtual memory? Discuss the technique to manage a virtual memory organization in detail.

9. Write short notes on the following:

(a) Shift register

(b) D flip-flop

(c) Divide-by-N ripple counter

(d) PROM and EPROM