

Roll No.

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 :

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

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- (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 32×8 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 4×1 multiplexer :

$$Z + \overline{A}BCD + \overline{A}BC\overline{D} + \overline{A}B\overline{C}D + \overline{A}B\overline{C}\overline{D} + \overline{A}B\overline{C}D + \overline{A}B\overline{C}\overline{D} + \overline{A}B\overline{C}D + \overline{A}B\overline{C}\overline{D} + \overline{A}B\overline{C}D + \overline{A}B\overline{C}\overline{D} + \overline{A}B\overline{C}D + \overline{A}B\overline{C}\overline{D} + \overline{A}B\overline{C}D + \overline{A}B\overline{C}\overline{D}$$
- (b) Explain full-adder with truth table. Construct logic diagram of full-adder using half-adder.

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- 4. Write short notes on the following :

- (a) Half subtractor
- (b) Multiplexer
- (c) Binary to BCD converter
- 5. (a) Convert RS flip-flop to T flip-flop using Excitation table.
- (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

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