

Roll No.

BCA-202(N)

B. C. A. (Second Semester) EXAMINATION, May, 2017

(New Course)

Paper Second

DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt all questions from Section A, *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 : All questions are compulsory. Each question carries 3 marks.

1. (A) Simplify the Boolean function :

$$F = X'Y' + XY + X'Y$$

(B) Explain full adder with truth table and logic circuit diagram.

(C) Implement EX-OR Gate with NAND Gate only.

- (D) Express the Boolean function $F = P + Q' R$ in a sum of minterms.
- (E) Differentiate between Register and Latch.
- (F) Explain the working of ROM. Design 32×4 ROM structure.
- (G) Explain the working of JK Flip-Flop using logic diagram and excitation table.
- (H) How many 128×8 RAM chip are needed to provide a memory capacity of 2048 bytes ?
- (I) A 4 bit binary up/down counter is in binary state of zero. Find the next state in down mode.

Section—B

(Long Answer Type Questions)

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

2. (a) Let $F(X, Y) = X' + Y$. Simplify the expression for function :

$$F(F(A + B, B), C)$$

- (b) Simplify using K-map :

$$F(A, B, C, D) = \Sigma (1, 3, 7, 11, 15)$$

$$d(A, B, C, D) = \Sigma (0, 2, 5)$$

3. What is a multiplexer and demultiplexer ? Explain how an 8×1 multiplexer can be designed using two 4×1 multiplexers.
4. What is decoder ? Design a BCD to decimal decoder.
5. (i) Why NAND and NOR Gate is called Universal gate ? Justify with example.
- (ii) Convert RS Flip-Flop to T Flip-Flop using excitation table.

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Section—C

(Long Answer Type Questions)

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

6. Implement the following function with a multiplexer :

$$F(A, B, C, D) = \sum (0, 1, 3, 4, 8, 9, 15)$$

7. Design a counter that has repeated sequence of six States : 0, 1, 2, 4, 5, 6 and repeat using J-K Flip Flop.

8. Write short notes on the following :

- (i) 4 Bit Register with Parallel load
- (ii) Implement Full Adder circuit with a decoder and two OR gates

9. Write short notes on any *three* of the following :

- (i) Block diagram of RAM & ROM
- (ii) Cache memory
- (iii) Virtual memory
- (iv) Differentiate between static RAM and dynamic RAM

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