

BCA

(SEM. II) EXAMINATION, 2017

BCA – 202 (N) : DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION

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

3. (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 chips 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.

4. (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.
 - (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

SECTION – C (Long Answer Type Questions)

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

6. Implement the following function with a multiplexer.
 $F(A, B, C, D) = \Sigma(0, 1, 3, 4, 6, 9, 15)$
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 and ROM
 - (ii) Cache memory
 - (iii) Virtual memory
 - (iv) Differentiate between static RAM and dynamic RAM

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