

**END TERM EXAMINATION****SECOND SEMESTER [BCA] MAY JUNE 2017****Paper Code: BCA-106****Subject: Digital Electronics  
(Batch 2011 onwards)****Time: 3 Hours****Maximum Marks: 75****Note: Attempt any five questions including Q.no.1 which is compulsory.  
Select one question from each unit.**

- Q1 Attempt **any five** from the following:- (5x5=25)
- Design full subtractor circuit using NAND gate only.
  - Explain how transistor as a switch works? Give its use in logic circuits.
  - Define fan-in, fan-out, propagation delay, noise margin and voltage parameters.
  - Explain decoder and demultiplexer. Give their applications.
  - State the De Morgan's theorem and prove them with an example.
  - Define synchronous and asynchronous counters with their merit and demerits.

**UNIT-I**

- Q2 Simply the expressions:-
- $AB + \bar{A}\bar{C} + A\bar{B}C(AB + C)$  (3)
  - Explain the operation and advantages of CMOS. (6.5)
  - Prove  $A + \bar{A}B = A + B$  (3)
- Q3
- Design a combinational circuit whose input is three bit number and whose output is equal to square of input and implement it using basic gates. (6.5)
  - Explain briefly the BCD to seven segment decoder. (6)

**UNIT-II**

- Q4
- Design a full adder circuit using Multiplexer. (6.5)
  - Implement the Ex-OR gate equation with NAND gates only. (6)
- Q5
- Draw the logic diagram of parity checker and generator/checker. Explain its operation with the help of truth table. (6.5)
  - Design a binary multiplier for following: A=1011, B=111 (6)

**UNIT-III**

- Q6
- Define edge triggering in flip-flops. Explain Master slave JK flip-flop that solves the problem of Race-around condition, with diagram. (7)
  - Design JK flip-flop using SR flip-flop. (5.5)
- Q7
- Explain the bidirectional shift register with diagram, truth table and clock pulse. Give their applications. (7.5)
  - Differentiate Static RAM and Dynamic RAM. (5)

**UNIT-IV**

- Q8
- Design Modulo 7 counters with truth table and logic diagram. (7.5)
  - Give the application of PLA and PLD. (5)
- Q9
- Design a combinational circuit with PLA, having three inputs, four product terms and two outputs: (7.5)  
 $F1(A,B,C)=\Sigma(3,5,6,7)$ ,  $F2(A,B,C)=\Sigma(0,2,4,7)$
  - Explain Johnson's counter with truth table and clock pulses. (5)

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