

**B.Tech. – VIEP – COMPUTER SCIENCE AND
ENGINEERING (BTCSVI)**

Term-End Examination

June, 2014

00707

BICS-009 : LOGIC DESIGN

Time : 3 hours

Maximum Marks : 70

Note : Seven questions are required to be answered

1. (a) Explain Binary, Octal and Hexadecimal number systems. 2+2+2=6
- (b) Convert $(725.25)_8$ to its decimal, binary and hexadecimal equivalent. 4
2. (a) What are the different ways in which negative numbers are represented ? Represent -9 in all the different types of representations. 3+3=6
- (b) Using 2's complement method, perform 2+2=4
- (i) $(156)_{10} - (99)_{10}$
- (ii) $(16)_{10} - (25)_{10}$

3. What is a flip-flop ? How can a R – S flip-flop be constructed using NOR gate ? Explain its working with truth table. 2+4+4=10

4. (a) Explain Boolean variables, Boolean operations and Boolean expressions. 3

(b) What is DeMorgan's theorem ? Simplify the following logical expression by algebraic method : 2+5=7

$$\bar{X}\bar{Y} + \bar{X}Z + YZ + \bar{Y}Z\bar{W}$$

5. What is canonical form of a logic expression ? What is Sum of Products and Product of Sums ? Simplify the function 2+2+6=10

$$Y = \bar{A}\bar{B}\bar{C} + \bar{A}BC + \bar{A}\bar{B}C$$

6. What is modulus of a counter ? Discuss the working principle of a mod-3 counter. How are mod-6 and mod-12 counters realized using mod-3 counters ? 2+3+5=10

7. What is a mod-5 counter ? How is it built ? How is a decade counter realized using mod-5 counter ? 2+3+5=10

8. What is sequential circuit ? How is it different from combinational circuit ? What are the two models of sequential circuits ? Write down the design steps of sequential circuit. 1+1+2+6=10

9. What is analog to digital conversion ? Explain
A/D converter-counter method. *2+8=10*

10. Write short notes on any *two* of the
following : *5+5=10*

- (a) 7400 TTL
 - (b) 74C00 CMOS
 - (c) TTL-to-CMOS Interface
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