

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

Term-End Examination

June, 2017

00634

BICS-009 : LOGIC DESIGN

Time : 3 hours

Maximum Marks : 70

Note : Attempt any **seven** questions. All questions carry equal marks.

1. (a) Prove that NAND and NOR gates are universal gates. 5
- (b) What are the properties of Boolean algebra ? 5
2. (a) Show that $A \oplus B \oplus AB = A + B$. 4
- (b) Simplify the following using K-map method : 3

$$F(A, B, C, D, E) = \sum (0, 2, 4, 6, 9, 11, 13, 15, 17, 21, 25, 27, 29, 31)$$
- (c) What are the applications of HDL processing ? 3
3. (a) What is a multiplexer ? Draw the diagram for a 16-to-1 multiplexer. 6
- (b) What is a nibble multiplexer ? Draw a neat diagram. 4

4. (a) Explain the structure of PAL with a neat diagram. 6
- (b) When should a logic probe be used for troubleshooting? 4
5. (a) How would an 8-bit microcomputer process this? 5
- $$\begin{array}{r}
 18357 \\
 - 12618 \\
 \hline
 ?
 \end{array}$$
- (b) Briefly explain Half adder with a neat diagram. 5
6. (a) Use the pinout diagram for a 54/7427 triple 3-input NOR gate and show how to connect a simple RS flip-flop. 5
- (b) With the help of a neat diagram, explain the D flip-flop. 5
7. Define Parallel In Serial Out. Draw the logic diagram and explain it. 10
8. How many flip-flops are required to construct a mod-128 counter and a mod-32 counter? What is the largest decimal number that can be stored in a mod-64 counter? 10



9. (a) What is a D/A converter ? Explain with the help of a neat diagram. 7
- (b) Write the simultaneous conversion in an A/D converter. 3
10. What is a single slope A/D converter and a dual slope A/D converter ? Draw the diagrams and explain them. 10
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