# B.Tech. – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

## Term-End Examination

00290 **December, 2014**

## BIEL-003 : DIGITAL ELECTRONICS

*Time : 3 hours* *Maximum Marks : 70*

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

**1.** (a) Using 4 variable K map, find all the prime implicants of the following function : *6*

$f(w, x, y, z) = \sum (0, 1, 2, 5, 7, 8, 9, 10, 13, 15)$.

(b) Determine the binary numbers represented by the following decimal numbers : *4*

(i) 0·6875

(ii) 25·5

**2.** (a) Prove the following equations using the Boolean algebraic theorems : *8*

(i) $A + \bar{A} . B + A . \bar{B} = A + B$

(ii) $\bar{A} BC + A \bar{B} C + AB \bar{C} + ABC = AB + BC + AC$

(b) Verify that the NAND operation is commutative. *2*

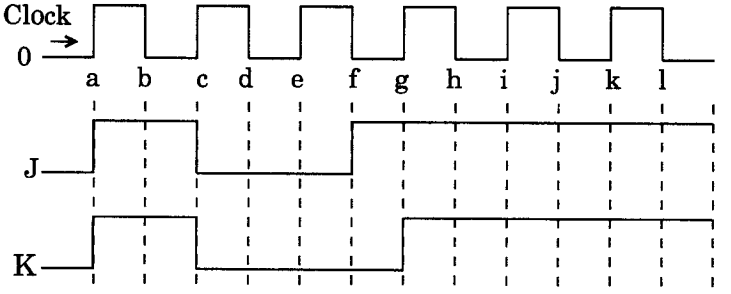
3. Discuss in detail, the working of Full Adder logic circuit and extend your discussion to explain a binary adder, which can be used to add two binary numbers (each having four bits). *10*

4. (a) What is a digital comparator ? Explain the working of a 2-bit digital comparator with the help of truth table. *5*

   (b) What is a decoder ? Draw the logic circuit of a 3-line to 8-line decoder and explain its working briefly. *5*

5. What is a flip-flop ? Write the truth table for a clocked J-K flip-flop which is triggered by the positive edge of the clock signal. Explain the operation of this flip-flop for the following conditions :

   Initially all inputs are zero and assume the 'Q' output to be 1. *10*




6. (a) Using D-flip-flops and waveforms explain the working of a 4-bit SISO shift register. *6*

   (b) Distinguish between combinational logic circuits and sequential logic circuits. *4*

7. (a) Give the circuit of a TTL NAND gate and explain its operation in brief. *6*

(b) Explain the following characteristics for digital ICs : *4*

(i) Propagation delay

(ii) Power dissipation

8. (a) Describe CMOS inverter and state the advantages of CMOS. *6*

(b) Mention the various IC logic families. *4*

9. Differentiate between static and dynamic RAM. Draw the circuits of one cell of each and explain its working. *10*

10. Write short notes on any ***two*** of the following : *2×5=10*

(a) Concept of PLA

(b) Pseudo Random Binary sequencing generator

(c) Design of ALU