No. of Printed Pages : 3 **BIEE-017**

B. TECH. VIEP-ELECTRICAL ENGINEERING (BTELVI)

Term-End Examination

June, 2019

BIEE-017 : DIGITAL ELECTRONICS

Time : 3 Hours *Maximum Marks : 70*

Note : *Attempt any seven questions. All questions carry equal marks. Missing data, if any, may be suitably assumed. Use of scientific calculator is allowed.*

1. Simplify the following using Boolean algebra : $2\frac{1}{2}$ each

   (a) $AB + A\overline{B}C + B\overline{C} = AC + B\overline{C}$

   (b) $A\overline{B}C + B + B\overline{D} + AB\overline{D} + \overline{A}C = B + C$

   (c) $A[B + \overline{C}\,\overline{(AB + A\overline{C})}]$

   (d) $\overline{(A + B\overline{C})}\,(A\overline{B} + ABC)$

2. (a) Reduce the expression $f = \Sigma\, m\ (0, 2, 3, 4, 5, 6)$ using mapping and implement it in NAND logic. 5

(b) Minimize the output function : 5

$$f_1 = \Sigma m\ (0, 2, 6, 10, 11, 12, 13) + d\ (3, 4, 5, 14, 15)$$

and $f_2 = \Sigma m\ (1, 2, 6, 7, 8, 13, 14, 15) + d\ (3, 5, 12)$

3. (a) Realize a full-subtractor using NAND gate only. 5

(b) Implement the function F $(a, b, c) = ab + \bar{b}c$ using 4 : 1 MUX. 5

4. (a) With the help of a gate level logic diagram and a truth table. Explain decimal to BCD encoder. 5

(b) Implement the function F with two level forms AND-NOR : 5

$$F\ (A, B, C, D) = \Sigma\ m\ (0, 1, 2, 3, 4, 8, 9, 12)$$

5. (a) For what minimum value of propagation delay in each flip-flop will a 10 bit ripple counter skip a count when it is clocked at 10 MHz. 5

(b) Design a synchronous 3-bit down counter using J-K flip-flop. 5

6. Draw and explain the architecture of 8086 microprocessor. 10

7. Write short notes on any *two* of the followings : 5 each

   (i) Synchronous and Asynchronous counter

   (ii) Programmable Logic Array (PLA)

   (iii) Race round condition in flip-flop

8. Explain the following terms : 2 each

   (i) Propagation delay time

   (ii) Setup time

   (iii) Power dissipation

   (iv) Pulse width

   (v) Hold time

9. With the help of diagrams, explain the working of 4-bit universal shift registers. 10

10. Explain the interrupts and flags in 8085 microprocessors. 10