

II B. Tech II Semester Supplementary Examinations, February - 2022**DIGITAL ELECTRONICS**

(Electrical and Electronics Engineering)

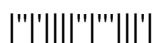
Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions each Question from each unitAll Questions carry **Equal** Marks

~~~~~

- 1 a) Express the Boolean function  $F(p, q, r) = (pq+r)(q+pr)$  in a sum of minterms and a product of maxterms. [7M]  
 b) Obtain the 9's and 10's complement of  $(389.61)_{10}$ . [8M]
- Or
- 2 a) What do you understand by minterm and maxterm. What is the difference between canonical form and standard form? [7M]  
 b) Realize 2 input X-OR gate and 2 input X-NOR gates using NOR gates only. [8M]
- 3 a) Prove the following identity (i)  $AB + A(B + C) + B(B + C) = B + AC$  (ii)  $AB + A'B + A'B' = A' + B$  (iii)  $AB'C + A'BC + ABC = AC + BC$  [7M]  
 b) Simplify the following function using K – map,  $F = ABCD + AB'C'D' + AB'C + AB$ . [8M]
- Or
- 4 a) Explain Boolean algebra with Boolean theorems. [7M]  
 b) Simplify the function  $F(A, B, C, D, E) = \sum m(0, 2, 4, 6, 9, 11, 13, 15, 17, 21, 25, 27, 29, 31)$  using Karnaugh map. [8M]
- 5 a) draw logic diagram of a look-ahead carry generator and describe 4-bit full adder with look-ahead carry in detail. [7M]  
 b) Implement the following function with a multiplexer:  $F(A, B, C, D) = \sum (0, 1, 3, 4, 8, 9, 15)$ . [8M]
- Or
- 6 a) Implement Boolean function  $F(A, B, C, D) = \sum m(0, 1, 3, 4, 8, 9, 15)$  using 8x1 multiplexer. [7M]  
 b) With neat sketch explain 4-bit binary subtractor. [8M]
- 7 a) Convert S R flip flop into J K flip flop and also draw excitation table. [7M]  
 b) Explain BCD ripple counter with logic diagram and timing diagram. [8M]
- Or
- 8 a) Explain Master- Slave flip flop with circuit design. [7M]  
 b) Design a counter that has repeated sequence of six states 0, 1, 2, 4, 5, 6 using JK flip flop. [8M]



- 9 a) With neat sketch explain about Moore FSM. [7M]  
 b) For the given mealy machine transition table Convert into moore machine.

| Present State | Next State |        |       |        |
|---------------|------------|--------|-------|--------|
|               | a = 0      |        | a = 1 |        |
|               | State      | Output | State | Output |
| → q0          | q3         | 0      | q11   | 1      |
| q10           | q0         | 1      | q3    | 0      |
| q11           | q0         | 1      | q3    | 0      |
| q20           | q21        | 1      | q20   | 0      |
| q21           | q21        | 1      | q20   | 0      |
| q3            | q10        | 0      | q0    | 1      |

[8M]

Or

- 10 a) Compare Mealy and Moore machine. [7M]  
 b) With neat sketch explain State diagram, state table and state assignment. [8M]

