Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_

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**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18EC3027** | **Duration :** | **3hrs** |
| **Sub. Name :** | **CMOS VLSI DESIGN** | **Max. Marks :** | **100** |

**ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Describe the construction, working and characteristics of enhancement mode MOSFET with the relevant figure. Compare the characteristics of this MOSFET with depletion mode MOSFET. | CO1 | 10 |
| b. | Define the body effect in MOSFET. Derive the MOSFET current equation in different regions of operations. | CO3 | 6 |
|  |  |  |  |  |
| 2. | a. | What is stick diagram? Sketch the stick diagram for 2 input NAND gate. | CO2 | 4 |
| b. | Why various color coding is used in stick diagram? | CO2 | 2 |
| c. | Design the function *Y* = (*A*+*B*+*C*). *D* using CMOS compound gate function and draw the stick diagram. | CO6 | 10 |
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| 3. | a. | What are the different operating modes of transistor? | CO1 | 2 |
| b. | Discuss the advantages of power reduction in CMOS circuits. | CO5 | 4 |
| c. | Describe the CMOS inverter and derive its DC characteristics. | CO5 | 10 |
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| 4. | a. | If load capacitance increases, what will happen to CMOS power dissipation? | CO2 | 3 |
| b. | Write short note on pass transistor logic. | CO1 | 3 |
| c. | Derive the expressions for effective resistance and capacitance estimation using Elmore’s RC delay model. | CO6 | 10 |
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| 5. |  | Classify circuit design considerations of full adder and explain any two adders. | CO3 | 16 |
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| 6. | a. | Describe in detail the functions of static latches and registers used in sequential logic design. | CO5 | 10 |
| b. | Wth an example, explain in detail the bi-stability principle used in multiplexer based latches. | CO1 | 6 |
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| 7. | a. | Briefly explain C2MOS logic style. | CO1 | 10 |
| b. | Design a D-latch using transmission gate. | CO6 | 6 |
| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8. | a. | What is a Wallace tree multiplier? | CO3 | 4 |
| b. | Give a short note on barrel shifters. | CO3 | 4 |
| c. | Explain in detail the array multipliers and carry save multipliers. | CO2 | 12 |