Code No.: EC744PE | R20 | H.T.No. | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
IV–B.TECH–I–Semester End Examinations (Regular) - November- 2024
DIGITAL CMOS IC DESIGN
(ECE)

[Time: 3 Hours] **[Max. Marks: 70]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(20 Marks)**

1. a) Define Rise Time and Fall Time. [2M]
   b) Draw the Pseudo NMOS realization of exclusive OR function. [2M]
   c) Draw the symbol of CMOS transmission gate. [2M]
   d) What are the advantages of CMOS logic? [2M]
   e) What are the characteristics of SR Latch? [2M]
   f) Draw the D Latch using CMOS Logic. [2M]
   g) Draw the synchronous dynamic Pass Transistor Circuit. [2M]
   h) Write the definition of Voltage Bootstrapping. [2M]
   i) Define a single bit Dynamic RAM cell. [2M]
   j) Explain the Principle of SRAM. [2M]

PART-B **(50 Marks)**

2. Perform the Rise time and Fall time analysis of Pseudo NMOS Inverter logic with one example. [10M]

OR

3. Define Threshold Voltage of CMOS Inverter. Express threshold voltage and discuss the dependency of V_T on various parameters. [10M]

4. Design and implement AOI and OIA logics using CMOS . [10M]

OR

5. Realize the following Boolean expression Y = (AB + BC + CA)' by using CMOS logic. [10M]

6. Write short notes on SR latch in sequential MOS logic. [10M]

OR

7. Explain Clocked SR Flip Flop operation using appropriate circuit diagram. [10M]

8.a. Write a short note on any one of the High performance Dynamic CMOS circuits. [4M]
   b. Explain about Synchronous dynamic pass transistor circuit with an example. [6M]

OR

9. Realize CMOS Dynamic Latch using transmission gate and explain the Set and Reset conditions of the Latch. [10M]

10.a. Write about the leakage currents in SRAM. [5M]

b. Draw the circuits of SRAM and DRAM. [5M]

OR

11. Draw the DRAM cell and explain its Read and Write operation and compare DRAM cell with SRAM cell. [10M]

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