

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2014 COURSE)  
B.Tech.Sem - VI ELECTRONIC : WINTER- 2022  
SUBJECT : VLSI DESIGN

Day : Monday

Time : 10:00 AM-01:00 PM

Date : 28-11-2022

W-13390-2022

Max. Marks : 60

**N.B.:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non-programmable **CALCULATOR** is allowed.
- 4) Draw neat and labeled diagrams **WHEREVER** is allowed.
- 5) Assume suitable data if necessary.

**Q.1** Describe VHDL primary constructs with example. (10)

**OR**

Design 4-bit shift register using VHDL. (10)

**Q.2** Describe the types of FSM with suitable example. List merits and demerits of FSM. (10)

**OR**

Design 1011...sequence detector using VHDL with Mealy machine. (10)

**Q.3** Draw the architecture of CPLD XC9500. Explore the macro cell and function block. (10)

**OR**

What is the difference between logic implemented in CPLD and FPGA? (10)

**Q.4** Describe the body effect and MOSFET capacitances. (10)

**OR**

Discuss the MOSFET structure and explain the scaling of MOS circuits. (10)

**Q.5** Describe CMOS inverter characteristics in detail. (10)

**OR**

Illustrate lambda-based design rules with neat sketches. (10)

**Q.6** Design two-input NOR gate using CMOS. (10)

**OR**

Design the CMOS logic circuit for the given expression. (10)

$$y = \overline{(A+B).(C+D)}$$

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