BACHELOR OF TECHNOLOGY (C.B.C.S.) (2021-COURSE)
B. Tech. Sem - I CS& .E :SUMMER- 2022
SUBJECT : DIGITAL ELECTRONICS

Day : Thursday | Time : 10:00 AM-01:00 PM

Date : 21-07-2022 | **S-24021-2022** | Max. Marks : 60

N.B.:

1) All questions are **COMPUSLORY.**
2) Figures to the right indicate **FULL** marks.
3) Assume suitable data **WHEREVER** necessary.
4) Draw neat labeled diagrams **WHEREVER** necessary.

Q.1 Perform following operations: **(10)**

a) Subtract $(42-27)$ using 2's complement method.

b) Subtract $(13-9)$ using 1's complement method.

c) Multiply 101.11×111.01

d) Divide $(110110) \div (101)$

e) Determine Gray code and Excess-3 code for decimal number 12

OR

Q.1 Explain why NAND and NOR gates are called universal gates. Realize all logic gates using **only NAND** gates. **(10)**

Q.2 State and explain De-Morgan's theorem Prove that. **(10)**

a) $A+\overline{A}B=A+B$

b) $(A+B)(A+C)=A+BC$

OR

Q.2 Simplify following SOP expression using K-map and realize using logic gates. **(10)**

$F(A,B,C,D)=\sum m(1,3,4,5,6,9,13,15)+d(7,11)$

Q.3 State Rules for BCD addition. Design 4 bit BCD adder using two 4 bit Binary adders. **(10)**

OR

Q.3 Implement following Boolean function using 8:1 Multiplexer. **(10)**

$F(A,B,C,D)=\sum m(2,4,5,6,8,11,13)$

Q.4 Distinguish between Synchronous and Asynchronous counters. Design mod 7 counter and draw neat timing diagram. **(10)**

OR

Q.4 Design 3 bit up-down counter with neat circuit diagram and timing diagram. **(10)**

Q.5 Compare Moore and Mealy Models with suitable examples write state table and state equation for clocked D flip flop. **(10)**

OR

Q.5 Describe basic elements ASM chart. Explain Multiplexer controller method with suitable example. **(10)**

Q.6 Describe PLA with neat block diagram Implement following functions using PLA with 3 inputs, 3 product terms and two outputs. **(10)**

$F_1(a,b,c)=\sum m(5,6,7)$

$F_2(a,b,c)=\sum m(3,5,7)$

OR

Q.6 Describe different types of PLDs. Design 3 bit Gray to Binary code converter and Implement using PROM. **(10)**

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