

17086(N)

B. Tech 3rd Semester Examination

Digital Electronics (CBS)

EC-302

Time : 3 Hours www.epaper.tk **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt any one out of two questions in section A, B, C and D. All parts of section E are compulsory.

SECTION - A

1. (a) Perform subtraction on the following binary number using 2's compliments of the subtrahend. Where the result should be negative, 2's compliment it and affix a minus sign.
(i) $101011-110101$ (ii) $1011-110000$
(b) Determine Hamming code sequence with odd parity for 11001010 to make it an error correcting code. (10)
2. (a) Determine the base of number in each case for the following operation to be correct: (i) $14/2 = 5$; (ii) $54/4 = 13$.
(b) Explain, Fan in and Fan out of Logic Gates. (10)

SECTION - B

3. (a) Minimize the following function by using Karnaugh map and write the expression in product of sum form:
 $F(a,b,c,d) = \Sigma(0,1,2,5,8,9,10,11,13,14)$
(b) Design and realize BCD to Grey code converter circuit by using minimum number of NAND gates. (10)
4. Draw and explain the logic circuit of Inverter and NOR gate using NMOS. (10)

SECTION - C

5. (a) Design a circuit for the conversion of S-R to T flip flop.
 (b) Write short note on Multiplexer and Demultiplexer and hence realize the following function using 4:1 multiplexer while connecting variable a and b to the select lines:

$$F(a,b,c,d) = \sum m(0,1,2,4,5,7,9,10,12,15) \quad (10)$$
6. Design a circuit for BCD to seven segments Decoder circuit. (10)

SECTION - D

7. (a) Design a 4-bit right shift register using S-R flip-flop.
 (b) Design a 3-bit asynchronous counter using j-k flip-flop. (10)
8. List the PLA programming table for the following two Boolean functions and implement in PLA:

$$F_1(a,b,c) = \sum m(0,1,2,4)$$

$$F_2(a,b,c) = \sum m(0,5,6,7) \quad (10)$$

SECTION - E (Compulsory)

9. Write short note on following:
- Write the truth table of AND gate in negative logic.
 - Convert binary 1011 to grey code.
 - Define min and max terms.
 - What is race around condition?
 - Draw excitation table of j-k flip-flop.
 - How many flip-flops are required to implement decade counter circuit?
 - What is the difference between Asynchronous and Synchronous counter circuit?
 - What are universal registers?
 - Explain, difference between ROM and RAM.
 - What is UP- Down counter circuit? (10×2=20)