

Total No. of Questions : 10] [Total No. of Printed Pages : 3

Roll No.

303(N)

B. E. (Third Semester) EXAMINATION, Feb., 2010

(New Scheme)

(Common for CS, EI & BM Engg. Branch)

DIGITAL CIRCUITS AND SYSTEMS

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt any *one* question from each Unit. All questions carry equal marks. Assume and mention suitable missing data if any.

Unit – I .

1. (a) Minimize the following function using K-map and implement the reduced expression using NAND gates only : 10

$$Y = \overline{A}\overline{B}\overline{C} + A\overline{C}\overline{D} + A\overline{B} + A\overline{B}\overline{C}\overline{D} + \overline{A}\overline{B}C$$

- (b) Reduce the following expression using Boolean algebra : 10

(i) $\overline{A\overline{B} + ABC} + A(B + \overline{A\overline{B}})$

(ii) $AB + \overline{A}B + A\overline{B} + \overline{A}\overline{B}$

Or

2. (a) Obtain $M - N$ using 1's complement and 2's complement if : 10

(i) $M = 10110101, N = 00101101$

(ii) $M = 00101101, N = 11101011$

P. T. O.

- (b) (i) Convert the Gray code 110101 to binary form. 10
 (ii) Multiply $(1AB)_{16}$ by $(89)_{16}$.

Unit – II

3. (a) Implement a full adder circuit using two half adders and an OR gate. 10
 (b) Simplify the following function using NOR-gates : 10
 (i) $ABCD + A'BD + AB'C'$
 (ii) $ABC + A'B + AC$

Or

4. (a) Design a 4-bit adder with carry look ahead. 10
 (b) Design and explain the working of 4-bit BCD adder. 10

Unit – III

5. (a) Show the circuit of a four input NAND gate using CMOS transistor. 10
 (b) Sketch circuit of Schmitt trigger and explain its operation. What is hysteresis ? 10

Or

6. (a) In an astable multivibrator, the base resistor are of $12.5 \text{ k}\Omega$ and the capacitors are of $0.01 \mu\text{F}$. Determine the PRR (pulse repetition ratio). 10
 (b) Calculate the noise margin of the ECL gate. 10

Unit – IV

7. (a) Design a counter with the following repeated binary sequence : 0, 1, 2, 4, 6. Use D flip-flops. 10
 (b) What is a shift register ? Explain serial in parallel out shift register. 10

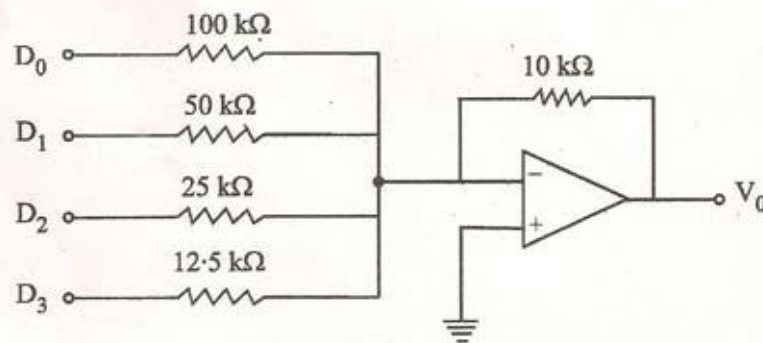
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Or

8. (a) What is ROM ? Explain the meaning of (32×8) ROM and describe it. 10
- (b) Construct a 4-to-16-line decoder with five 2-to-4-line decoders with enable. 10

Unit – V

9. (a) Discuss the performance characteristics of D to A converter. 10
- (b) Fig. below shows a D to A converter along with Op-Amp. Find the output of Op-Amp, if the input digital signal is 1011. Assume that binary 1 represents 5 V. 10



Or

10. (a) Explain in detail successive approximation analog to digital converter. 10
- (b) Determine the output voltage caused by each bit in a 16-bit ladder if the input levels are $0 = 0\text{ V}$ and $1 = +16\text{ V}$.
Determine the resolution and full-scale output of this circuit. Find out the voltage from the above ladder for a digital input of 101011. 10