



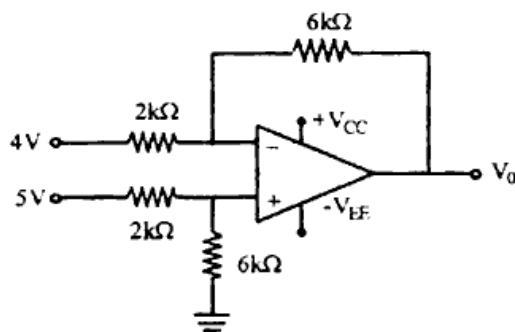
- Notes :
1. Assume suitable data wherever necessary.
 2. Illustrate your answer necessary with the help of neat sketches.
 3. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

1. a) Draw the circuit diagram for Schmitt Trigger using op-amp and explain its operation with waveforms. 7
b) Draw and explain the circuit of differential amplifier using op-amp and derive the expression for output voltage. 6

OR

2. a) Draw the circuit of inverting amplifier and Non-inverting amplifier using op-amp and obtain the expression for their output voltage. 7
b) Determine the output voltage for the configuration shown below. 6



3. a) Explain the working of timer IC 555 as saw tooth generator. 7
b) Discuss the application of PLL IC LM-565 as (i) Frequency multiplier. 6
(ii) AM Detector.

OR

4. a) Draw the internal architecture of timer IC 555 and explain the operation of each pin. 7
b) Determine frequency and duty cycle for the astable multivibrator output for $C = 0.01\mu\text{F}$, $R_A = 6\text{k}\Omega$, $R_B = 4\text{k}\Omega$. 6
5. a) Convert the following numbers. 8
i) $(B9F.AE)_{16} = (\quad)_8$.
ii) $(5497.6875)_{10} = (\quad)_8$.
iii) $(2598.675)_{10} = (\quad)_{16}$.
iv) $(367.52)_8 = (\quad)_2$.
b) Explain Gray code and Excess -3 code with example. Give application of gray code. 6

OR

6. a) Express the following numbers into BCD and Excess-3 code. 8
i) $(192.5)_{10}$ ii) $(1001001)_2$
iii) $(5C7)_{16}$
b) Find 8's complement of following numbers. 6
i) $(3287.5)_{10}$ ii) $(010110.011)_2$

SECTION – B

7. a) Simplify the following Boolean function using Quine McCluskey method. 10
 $F(A, B, C, D) = \sum m(0, 1, 2, 3, 5, 7, 8, 9, 11, 14)$.
b) Minimize the logic function of given equation in POS form. 4
 $F(A, B, C, D) = \pi m(4, 6, 10, 12, 13, 15)$.

OR

8. a) Three square wave A, B & C of frequency 4kHz, 8kHz & 16kHz respectively are to be 8
i) AND ed ii) OR ed
iii) XOR ed
Draw the resultant waveform in each case.
b) Simplify the following expression using Boolean theorem. 6
i) $F = \overline{(A + \overline{BC})}(A\overline{B} + ABC)$ ii) $F = (A \oplus B) \oplus AB$
9. a) Design 40:1 multiplexer using 8:1 multiplexers. 7
b) What is full adder? Give the truth table for it. Realize the full adder using minimum 6
number of NAND gates.

OR

10. a) What is BCD adder? Draw the diagram of BCD adder and explain its operation. 7
b) Implement the following function using 4 line to 16 line decoder. 6
 $F_1 = \sum m(0, 1, 2, 5, 7)$
 $F_2 = \sum m(7, 9, 10, 11, 12)$
 $F_3 = \sum m(8, 11, 13, 14, 15)$
11. a) With the help of neat diagram, explain the working of 4bit ring counter, also give the 7
timing diagram.
b) What is Race around condition in JK Flip-Flop? Explain how it can be overcome. 6

OR

12. a) Design and implement BCD counter with T Flip-Flop. 7
b) Draw and explain the operation of a 4-bit Bidirectional shift Register. 6
