**(3 Hours)**   **[Total Marks:80]**

N.B.   **(1)**   Question no.1 is **compulsory.**
        (2)   Attempt **any three** from the rest.
        (3)   Make any suitable assumption wherever required.

Q.1   Answer any FOUR of following
       (a)   Give the ideal and practical values of the following parameters   5M
           a) CMRR b) Slew Rate c)) Input Resistance d) Output Resistance
           e) PSRR
       (b)   For a inverting summing amplifier if R_f= 5KΩ, R_1=1KΩ, R_2=2KΩ and R_3=5KΩ   5M
       with supply voltage of ±12V if following inputs are applied calculate the output
       voltage if
           I) V_1=3mV, V_2=4mV and V_3=6mV
           II) V_1=3V, V_2=4V and V_3=6V
       (c)   I) Simplify the following   5M

$$\overline{AB} + \overline{ABC} + \overline{\bar{A}\,B} + \overline{C}$$

       (d)   Write the output equation for following and prepare the truth table of F1 for   5M
       possible values of X,Y and Z.
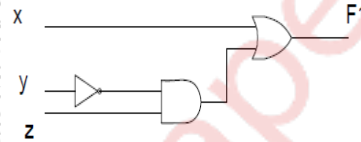
       (e)   Convert i) $(C9.A2)_{16}$ to binary, octal and decimal   5M
           ii) $(47.31)_{10}$ to hexadecimal
       (f)   Draw and explain V to I converter using Op-amp   5M

Q.2   **(a)**   Draw and explain op-amp as Integrator. Also draw its input and output   10M
       waveforms with its frequency response
       (b)   Implement the following function using 3 data select input multiplexer   10M
       $f(A,B,C,D) = \sum m(0,2,3,5, 6,8,10,14)$

Q.3   **(a)**   Give the block diagram of IC-555 and explain the function of each pin   10M
       (b)   Convert   i) JK Flip flop to T Flip flop   10M
           ii) T to D Flip flop

Q.4   **(a)**   Draw and explain First order Butterwoth Low Pass Filter with its practical   10M
       frequency response.
       (b)   Design 4 bit asychronous counter using J-K flip flop   10M

Q.5   **(a)**   How op-amp can be used as Inverting Schimitt Trigger. Explain it with neat   10M
       diagram and waveforms.
       (b)   Simplify the following using K-map implement using gates   10M
       $f(A,B,C,D) = \sum m (0,2,3,5,9,13,14) + d(4,7,10)$

Q.6   Write short note on any **TWO** of the following.   20M

       (a)   Shift Register
       (b)   Sample and Hold Circuit using Op-Amp
       (c)   Binary to Gray Code converter

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