

Ans to the Q.no: 1001

my ID = 193002101

$$x = 1$$

$$y = 0$$

We know, $DC = 10\% = 0.1$

$$DC = \frac{R_1 + R_2}{R_1 + 2R_2} \times 100\%$$

$$\Rightarrow 0.1 = \frac{R_1 + R_2}{R_1 + 2R_2}$$

$$\Rightarrow R_1 - 0.1R_1 = 0$$

$$\Rightarrow 0.1R_1 + 0.2R_2 = R_1 + R_2$$

$$\Rightarrow R_1 - 0.1R_1 = 0.2R_2 - R_2$$

$$\Rightarrow R_1(1 - 0.1) = R_2(0.2 - 1)$$

$$\Rightarrow R_1 = \frac{R_2(0.2 - 1)}{(1 - 0.1)}$$

$$\Rightarrow R_1 = -0.88R_2$$

The condition is R_1 should be -0.88 multiple of R_2

Ans to the Q. no: 2

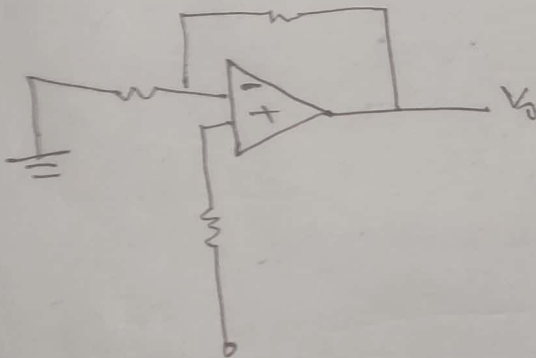
my ID: 173002101

$$x = 1$$

$$y = 0$$

~~$$x = 0.1$$~~

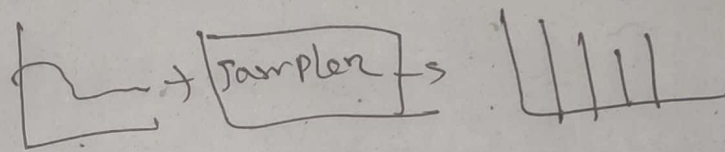
$$y_n = 0.1 \text{ volt}$$



Ans to the Q. no. 3

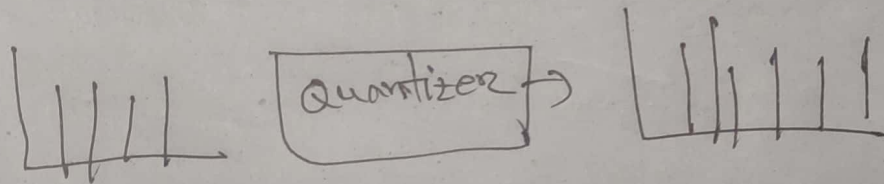
My ID = 193002101

(i) Sampling:

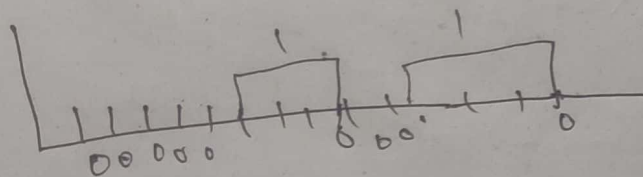


The ~~analog~~ sampling & more the need of data.

(ii) Quantization:



(iii) Line coding:



Ans to the Q. no. 4

Difference between AO/22 and OA/31 logic circuit is as follows.

AO/22 goes for a typical so called CMOS complex gate and on the other side AO/22 on the other side OA/31 circuit can get the corresponding difference in the number of transistors would require 4 for a NOR gate and 8 for an inverter each and gate 3 for a total of 20 transistors almost 3 times as expensive and logic is slow.

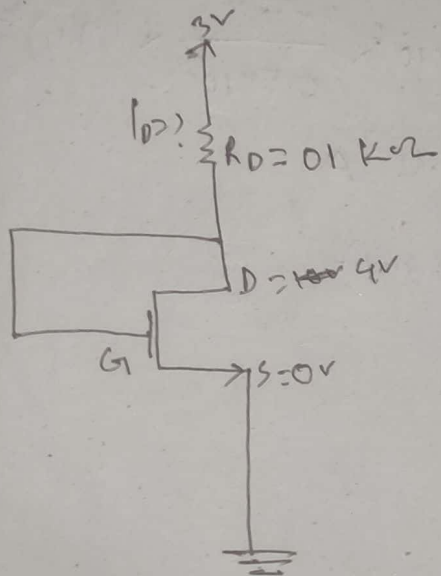
$$Y = \text{NOT} + (A \text{ AND } B) \text{ OR } C$$

Ans to the Q.no: ~~Q4~~ 5

My ID: 123002101

$$x = 1$$

$$y = 0$$



Hence,

$$V_t = 0.6V$$

$$\mu_n = 200 \mu A/V^2$$

$$L = 0.8 \mu m$$

$$W = 4 \mu m$$

$$x = 1$$

$$y = 0$$

$$I_D = ?$$

$$V_{DS} = 4V$$

Now,

V_{DS}	V_{GS}
$V_D - V_S$	$V_G - V_t$
4 - 0	4 - 0.6
= 4	
= 4	= 3.4 3.4

$\therefore V_{DS} > V_{GS}$ so the transistor is in saturation.

Ans to the Q. no: 6

Given that,

$$V_o = \frac{V_1 + V_2}{2}$$
$$= \frac{1}{2}(V_1 + V_2)$$

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Which might be the summing Amplifier.

So the both voltages are positive.

Hence,

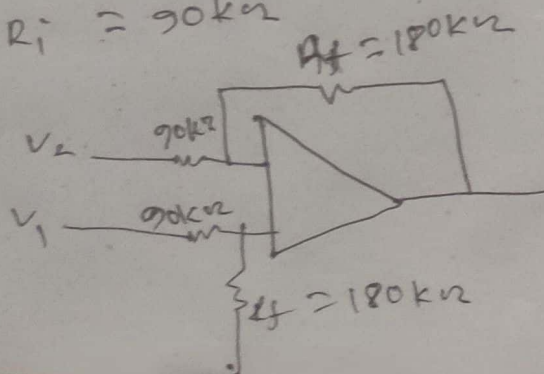
$$V_o = \frac{R_f}{R_i} (V_1 + V_2)$$

Let $R_f = 180 \text{ k}\Omega$

$$\Rightarrow \frac{R_f}{R_i} = \frac{V_o}{V_1 + V_2}$$

$$\Rightarrow \frac{180}{R_i} = \frac{1}{2}$$

$$\Rightarrow R_i = 90 \text{ k}\Omega$$



we know,

$$\begin{aligned} I_d &= \frac{B}{2} V_{GT}^2 \\ &= \frac{1}{2} \times 200 \times 10^{-6} \times \frac{4 \times 10^{-6}}{0.8 \times 10^{-6}} \times (3.4)^2 \\ &= 5.78 \times 10^{-3} \text{ A} \\ &= 5.78 \text{ mA} \end{aligned}$$