Solution For (CE)
SE/Electrical/QP Code: 39121.

Q2/b.

$m(t) = 10\cos(2\pi \times 10^3 t)$.

$V_m = 10V$.

$F_m = 10^3 Hz$.

$c(t) = 50\cos(2\pi \times 10^5 t)$

$V_c = 50V$.

$f_c = 10^5 Hz$.

$$m = \frac{V_m}{V_c} = \frac{10}{50} = \underline{\underline{0.2}}$$

$$P_c = \frac{V_c^2}{2R} = \frac{(50)^2}{2 \times 50}$$

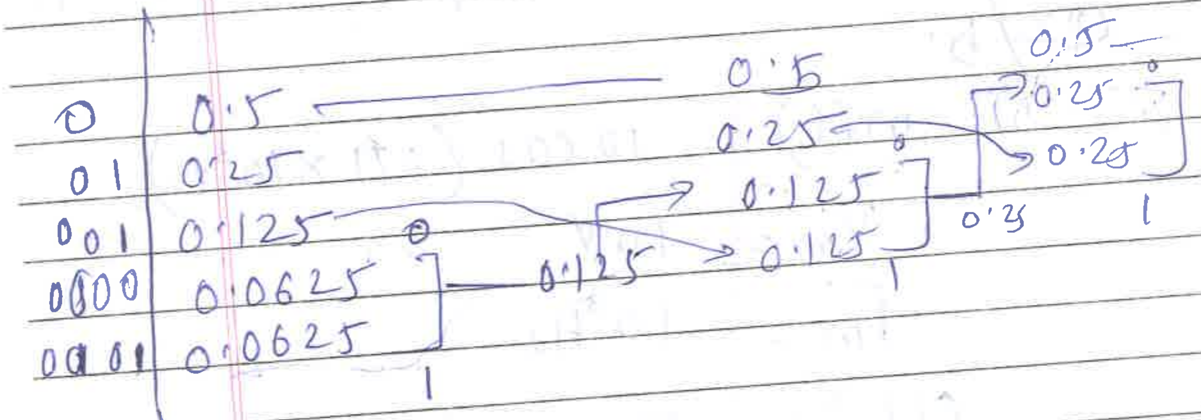
$$= \underline{\underline{25 \text{ watts}}}$$

$$P_t = P_c\left(1 + \frac{m^2}{2}\right)$$

$$= 25\left(1 + \frac{0.2^2}{2}\right)$$

$$= \underline{\underline{25.5 \text{ watts}}}$$

Q 3) a.



Average code word length.

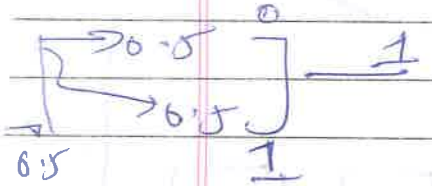
$L = \Sigma n_i P_i$

$L = 0.5 \times 1 + 0.25 \times 2 + 0.125 \times 3$
$+ 0.0625 \times 4 + 0.0625 \times 4$

$= 1.875$

$H = 0.5 \log_{10} (1/0.5)$
$+ 0.25 \log_{10} (1/0.25)$
$+ 0.125 \log_{10} (1/0.125)$
$+ 0.0625 \log_{10} \left(\frac{1}{0.0625}\right)$
$+ 0.0625 \log_{10} \left(\frac{1}{0.0625}\right)$

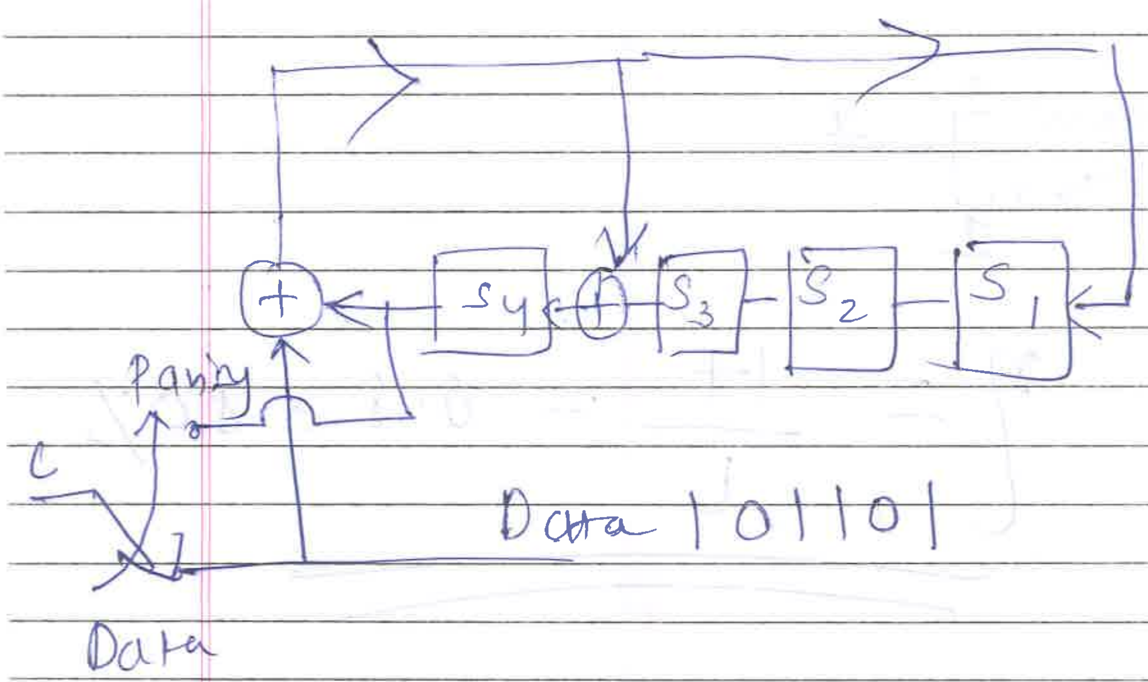
$= 1.5$



$$\eta = \frac{H}{L} = 0.8 = 80\%$$

Q4|a.

04



$S_4 = \text{prev } S_3 \oplus \text{Data} \oplus \text{prev } S_4.$

$S_3 = \text{prev } S_2$

$S_2 = \text{Prev } S_1.$

$S_1 = \text{Data} \oplus \text{prev } S_4.$

05

Page No.
Date

S_4	S_3	S_2	S_1	
0	0	0	0	
1	0	0	1	1
1	0	1	1	0
0	1	1	0	1
0	1	0	1	1
1	0	1	0	0
0	1	0	0	1

$$C = \underbrace{101101}_{\text{Data}}\underbrace{0100}_{\text{Parity}}$$

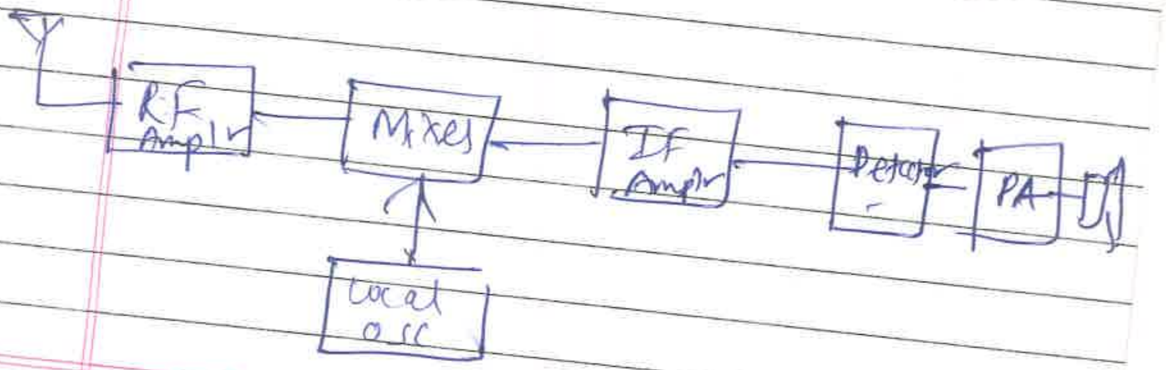
Q1/a.

$$F_s \geq 2 f_{max}$$

f_{max} → $\overset{\text{Max}}{}$ Signal Freq

F_s → Sampling Freq.

Q1/b.



06

Page No.
Date

Q 1/ C.

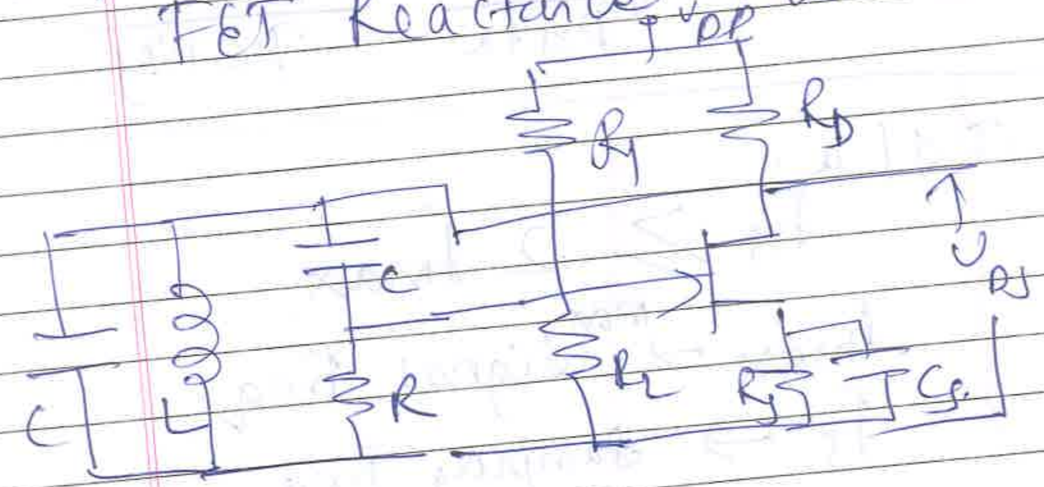
① Increases Range of communication

② Reduces Antenna height

③ Avoids mixing Of signal

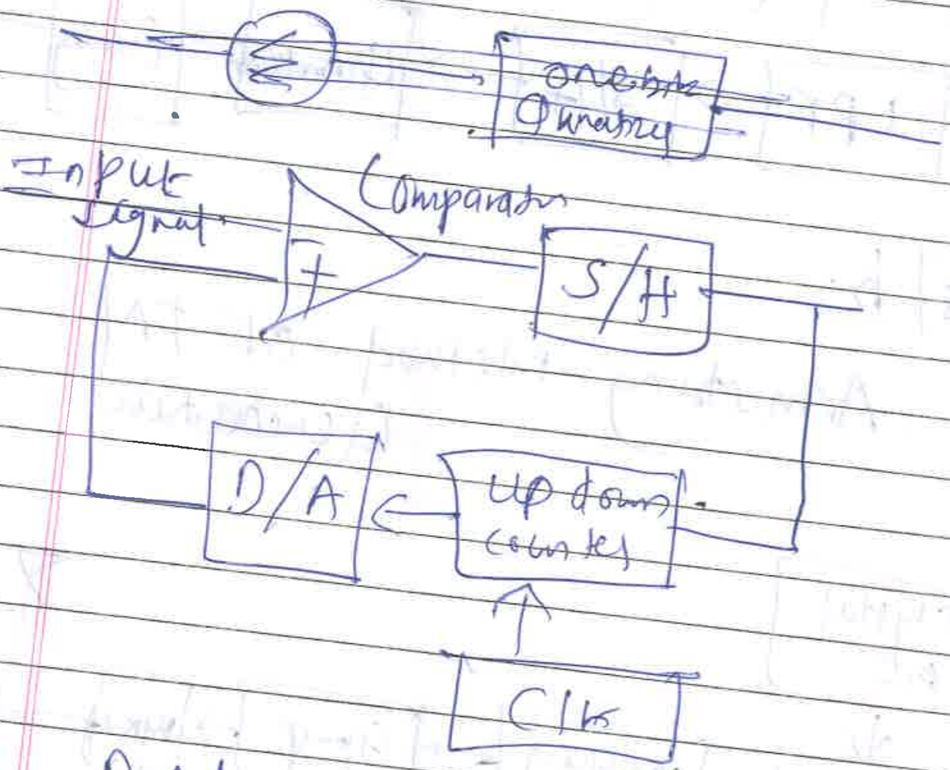
Q 2/a.

FET Reactance Modulator

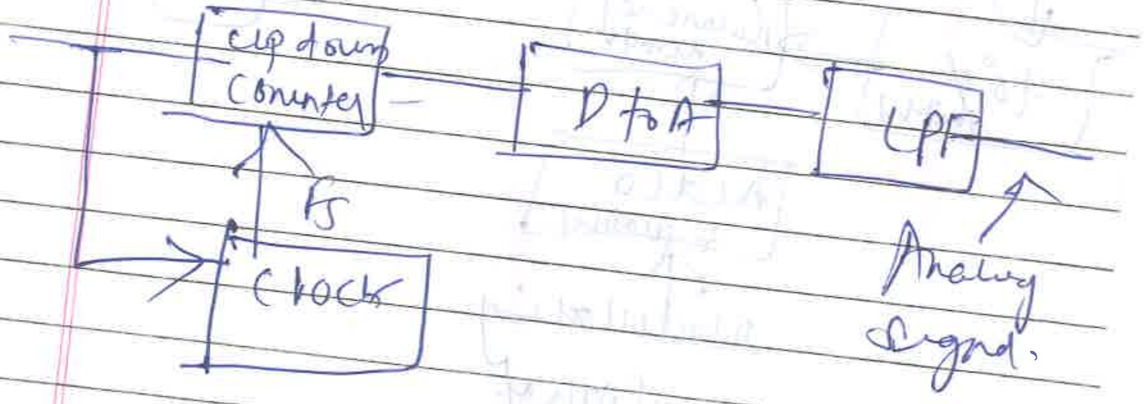


Q3/b.

D M Transmitter.

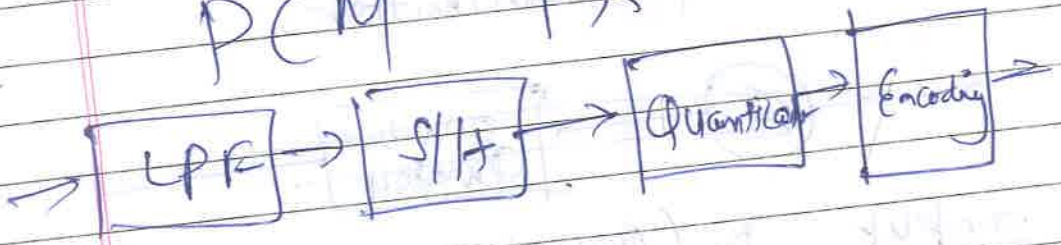


D.M Rx.



Q4 b.

PCM TX,



Q5/b.

Armstrong Method of FM Generation