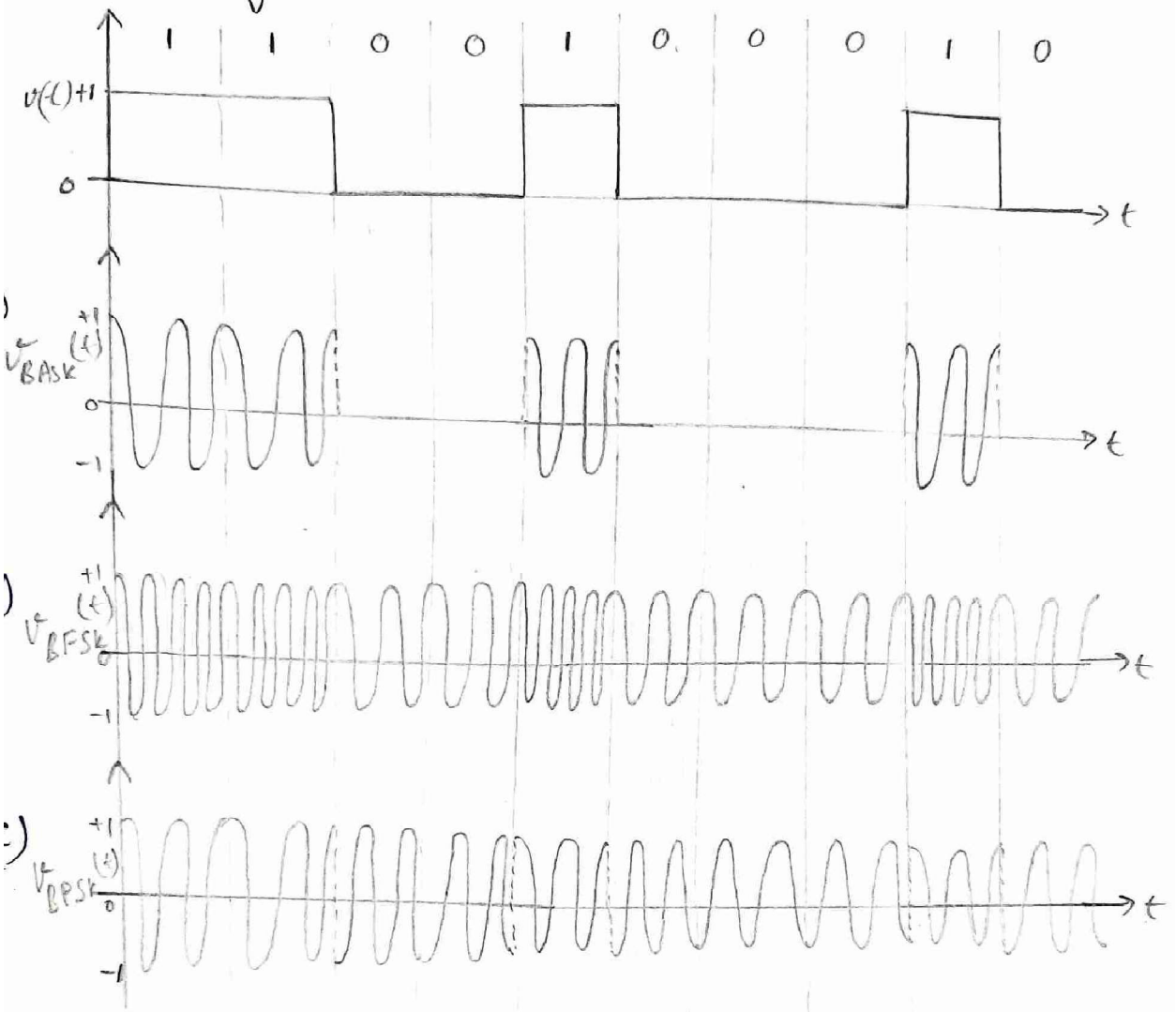
Tut - 8 Soln

Soln 1): Binary seq (1 1 0 0 1 0 0 0 1 0)



Soln 2): $f_b = 10$ kbps

Min. Bandwidth $= R_b = 10$ kHz

Soln 3): $f_m = 49$ kHz , $f_s = 51$ kHz $f_b = 2$ kbps

Peak frequency $\Delta f = |(f_m - f_s)|/2$

$= |-\frac{2}{2}|$ kHz $= 1$ kHz

Min. Bandwidth $= 2(\Delta f + f_b)$

$= 2(1000 + 2000) = 6$ kHz

Sol^n 4): $R_b = 10$ Mbps

$\min B.W = R_b = 10$ MHz

Sol^n 5): For Delta modulator

Pulse rate = Sampling rate

$R = f_s$ $\because n = 1$

So $f_s = 1000$ samples/sec.

$$\Delta_{opt} = \left.\frac{d\,m(t)}{dt}\right|_{max} \cdot \frac{1}{f_s}$$

$$= \frac{10}{1000}$$

$\Delta_{opt} = 10$ mV

Sol^n 6:) $m(t) = 6\sin(2\pi \times 10^3)t + 4\sin(4\pi \times 10^3)t$

Step size $\Delta = 0.314$ V

$$\frac{\Delta}{T_s} \geq \left.\frac{d\,m(t)}{dt}\right|_{max}$$

$$\frac{\Delta}{T_s} \geq (12\pi + 16\pi) \times 10^3$$

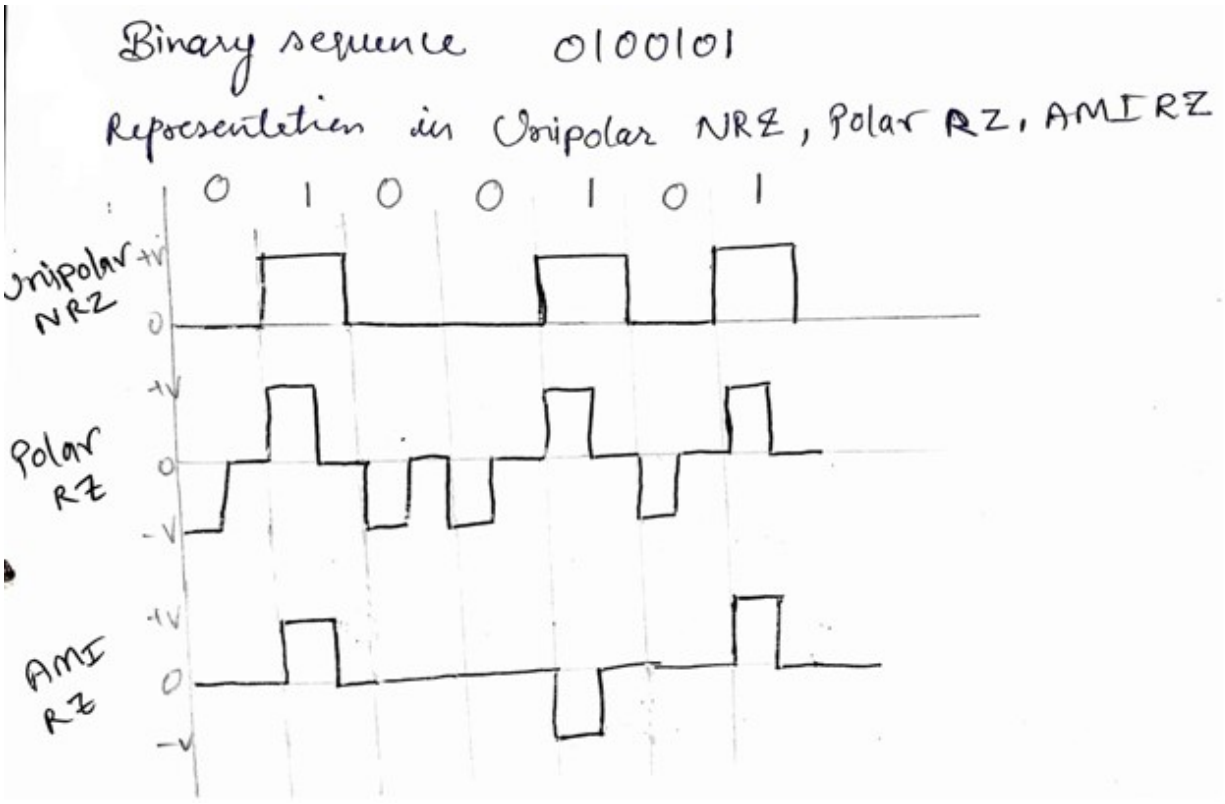
$$\Delta f_s \geq 28\pi \times 10^3$$

$$0.314\, f_s \geq 28\pi \times 10^3$$

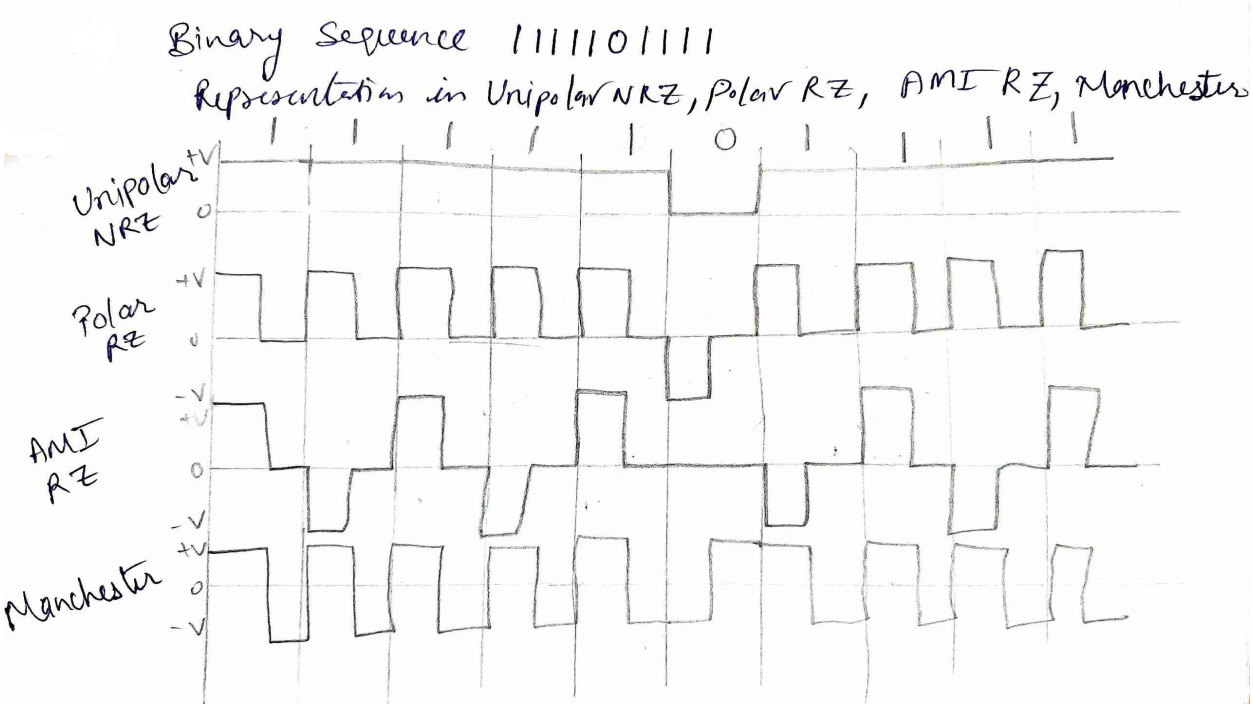
$$\frac{\pi}{10} f_s \geq 28\pi \times 10^3$$

$$f_s \geq 280 \text{ kHz}$$

Sol^n 7)


Binary sequence 0100101
Representation in Unipolar NRZ, Polar RZ, AMI RZ
0 1 0 0 1 0 1
Unipolar NRZ
+V
0
Polar RZ
+V
0
-V
AMI RZ
+V
0
-V

Sol 8)


Binary Sequence 1111101111
Representation in Unipolar NRZ, Polar RZ, AMI RZ, Manchester
1 1 1 1 1 0 1 1 1 1
Unipolar NRZ
+V
0
Polar RZ
+V
0
AMI RZ
-V
+V
0
-V
Manchester
+V
0
-V