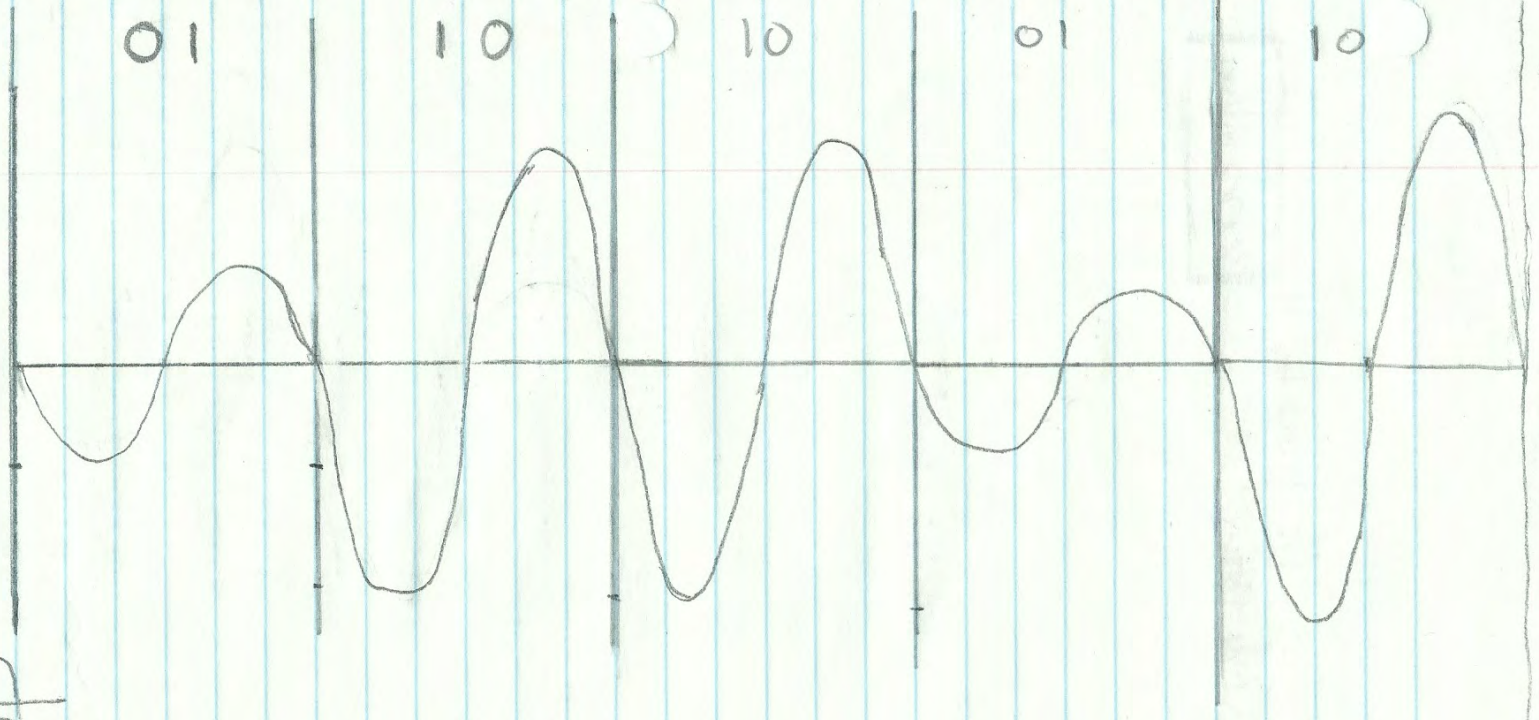


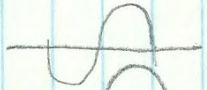
2A) a)

0110100110

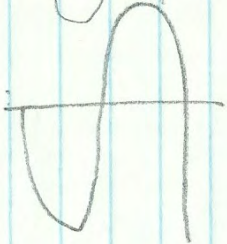
Modulation
d'Amplitude



01:



10:

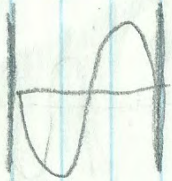


2A) b)

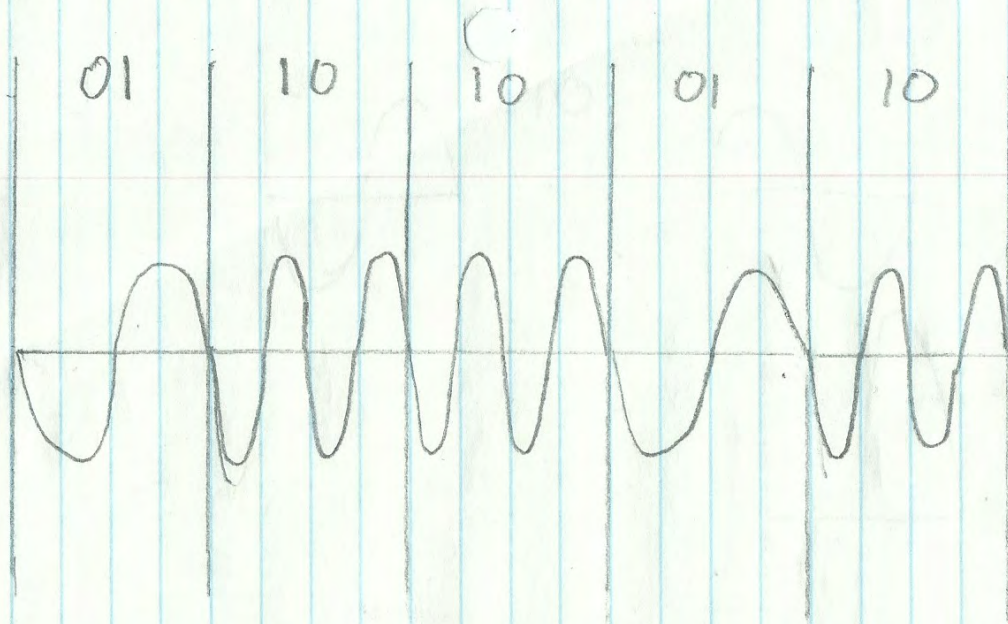
Modulation
de fréquence

0110100110

01:



10:



B

1) $R_m = 1500 \text{ bauds}$

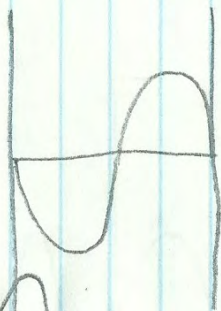
$$D = R_m \log_2 V \Rightarrow D = 1500 \log_2 4$$

où V : nombre de valeurs

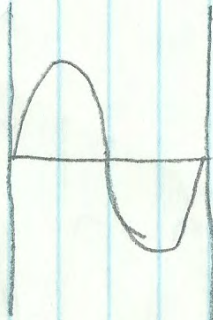
$$= \boxed{3000 \text{ bit/sec}}$$

2B 2)

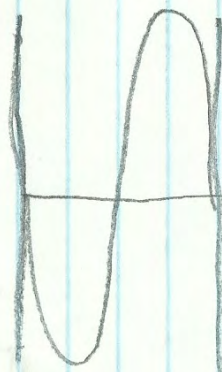
00:



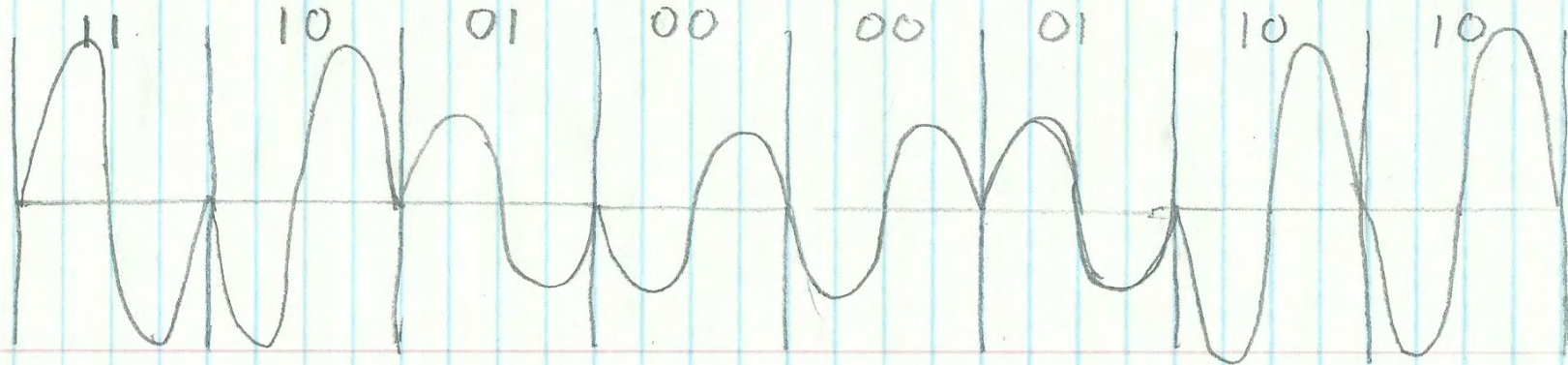
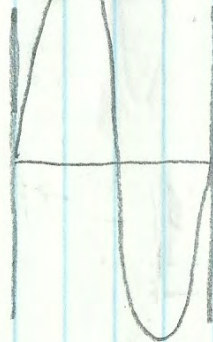
01:



10:



11:



3. a) Polynôme: $G(x) = x^5 + 1 \Rightarrow 100001$
 Degré 5: $r=5$
 Message $M = 011001011011$

$M' = 01100101101100000$
 + 5 bits à 0

CRC $\Rightarrow 1000$ ($r=5$)

01100101101100000	100001
$\oplus 100001$	11111
0100111	
100001	

~~000110101~~
~~100001~~

~~0101001~~
~~100001~~

~~001000000~~

$\oplus 100001$
~~000001000~~

$T = M + CRC$

$T = 0110010110110000$
 CRC

b) $T = 0110010110111000$ $G = 100001$

$T_{\text{errors}} = \underbrace{11001011011001}_{\text{error}} \underbrace{}_{\text{error}}$

$$\begin{array}{r}
 11100101101101 \\
 100001 \\
 \hline
 0110000 \\
 100001 \\
 \hline
 0100011 \\
 100001 \\
 \hline
 0000101011 \\
 100001 \\
 \hline
 00101010 \\
 100001 \\
 \hline
 00101101 \\
 100001 \\
 \hline
 001100
 \end{array}$$

reste 1100 \Rightarrow erreur