QUESTION 1
The channel coding allows to:

Click on the bullet corresponding to the good answer

- A: Fight against the noise introduced by the propagation channel without increasing the power of the transmitted signal
- B: Increase the power of the transmitted power to obtain a better BER
- C: Reduce the bandwidth occupied by the signal to transmit
- D: Increase the communication channel spectral efficiency.

BAD ANSWER

Click [here](#) to CHANGE YOUR ANSWER

GOOD ANSWER

Click here for the FOLLOWING QUESTION

The principle of the channel coding is to introduce some redundancy to the information in order to increase the communication channel robustness against the noise introduced by the propagation channel, without increasing the transmitted power.

Some part of the bandwidth allocated to the transmission is then used to transmit the introduced redundancy and not the information.

So, the channel coding is not used to reduce the signal bandwidth and won't allow to increase the spectral efficiency.

QUESTION 2

Source coding allows to:

- A Fight against the noise introduced by the propagation channel by adding some redundancy to the information
- B Increase the spectral efficiency
- C Increase the power efficiency

BAD ANSWER

Click here to CHANGE YOUR ANSWER

This is the role of the channel coding.

GOOD ANSWER

Click here for the FOLLOWING QUESTION

Indeed, the source coding is used to reduced the spectrum occupancy of the transmitted signal.

QUESTION 3

A baseband signal is a signal:

A Generated by a basic modulator: binary symbols and rectangular shaping filter,

B Whose power spectral density is around frequency 0,

C A signal with a very narrow bandwidth.

BAD ANSWER

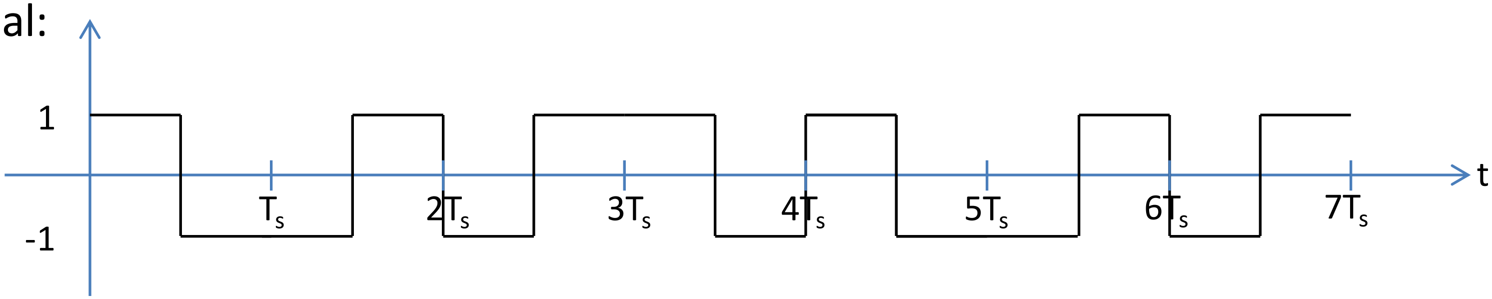
Click here to CHANGE YOUR ANSWER

GOOD ANSWER

Click here for the FOLLOWING QUESTION

Series of bits to transmit: 1001100

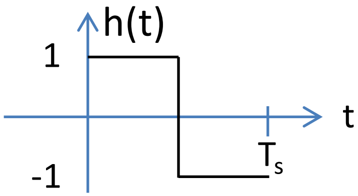
Generated signal:



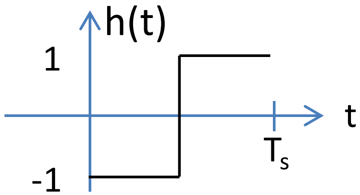
QUESTION 4

The mapping and the shaping filter impulse response used to generate this signal are:

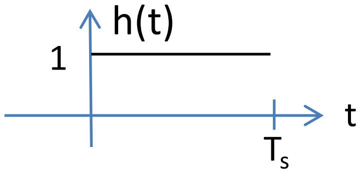
A Mapping : 0 -> -1, 1 -> +1



B Mapping : 0 -> +1, 1 -> -1



C Mapping : 0 -> -1, 1 -> +1



D Not enough elements to answer the question

BAD ANSWER

Click here to CHANGE YOUR ANSWER

GOOD ANSWER

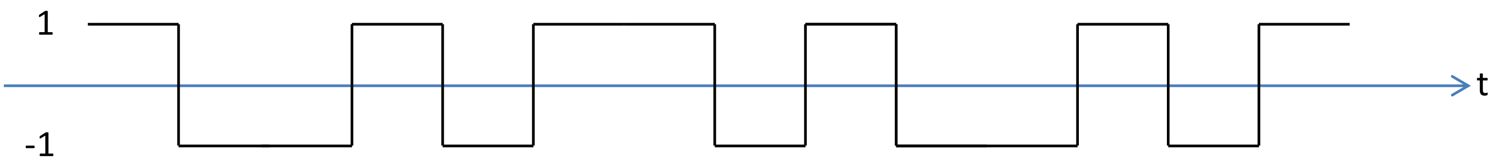
BE CAREFUL TWO GOOD ANSWERS FOR THIS QUESTION

Click here to find the SECOND ANSWER

Click here for the FOLLOWING QUESTION

Mapping : 0 -> -1, 1 -> +1

Generated signal:



QUESTION 5

The binary information transmitted by the generated signal is:

A 10010110100101

B 1001100

C 0110011

D Not enough elements to answer the question

BAD ANSWER

Click [here](#) to CHANGE YOUR ANSWER

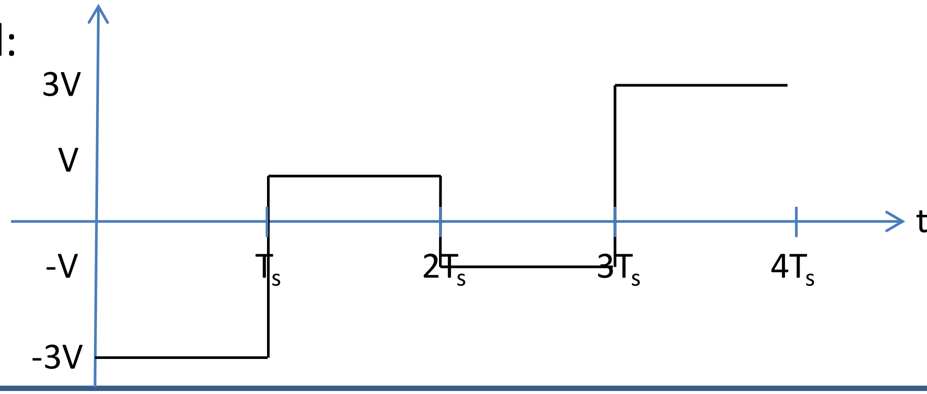
GOOD ANSWER

Click here for the FOLLOWING QUESTION

Without the knowledge of the symbol period T_s,
It is impossible to answer the question

Series of bits to transmit: 00100111

Generated signal:



QUESTION 6

The symbol rate will be:

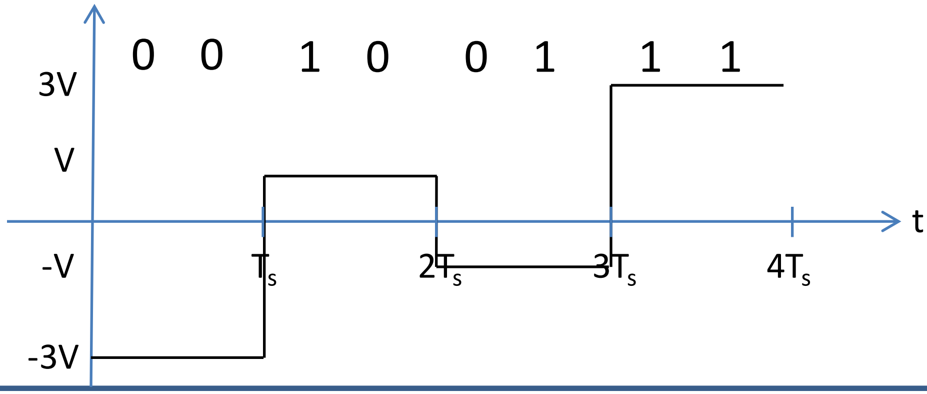
- A Equal to the bit rate
- B Higher than the bit rate
- C Lower than the bit rate
- D Not enough elements to answer the question

BAD ANSWER

Click here to CHANGE YOUR ANSWER

Series of bits to transmit: 00100111

Generated signal:



GOOD ANSWER

Click here for the FOLLOWING QUESTION

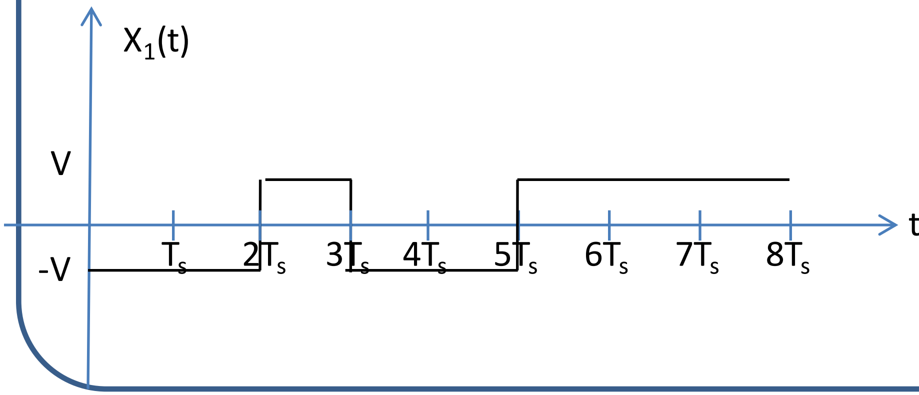
One symbol carries here 2 bits => the symbol duration $T_s=2T_b$, if T_b represents the bit duration
The symbol rate $R_s=1/T_s$ is so lower than the bit rate $R_b=1/T_b$: $R_s=R_b/2$

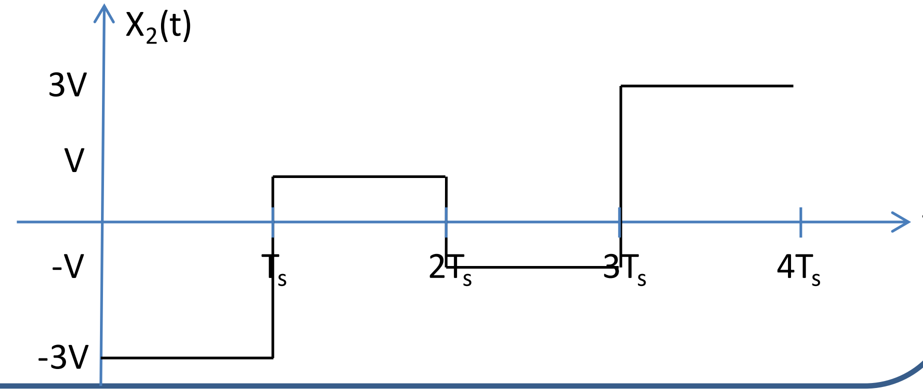
More generally, if one symbol codes n bits => the symbol duration is $T_s=nT_b$,
The symbol rate $R_s=1/T_s=R_b/\log_2(M)$ if $M=2^n$ represents the number of possible symbol (modulation order).

Here $M=4=2^2$ (4 possible symbols -3V, -V, +V, +3V each one carrying 2 bits : 00,10,01,11)

Series of bits to transmit: 00100111

Generated signals:





QUESTION 7

To transmit a same bit rate, with a same given transmitted power, the necessary bandwidth to transmit $x_1(t)$ will be :

A Higher than the one needed to transmit $x_2(t)$

B Smaller than the one needed to transmit $x_2(t)$

C The same as the one needed to transmit $x_2(t)$

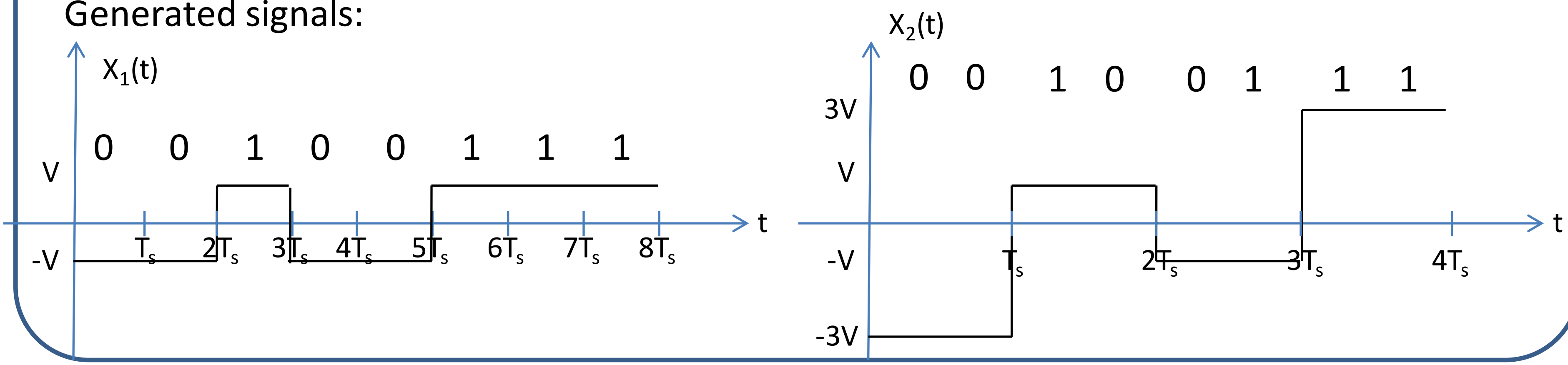
D Not enough elements to answer the question

BAD ANSWER

Click here to CHANGE YOUR ANSWER

Series of bits to transmit: 00100111

Generated signals:



GOOD ANSWER

Click here for the FOLLOWING QUESTION

The bandwidth necessary to transmit a signal is always proportional to the symbol rate R_s, the proportionality coefficient depends on the used shaping filter.

Here:

- **The used shaping filter is the same for both signals (rectangular impulse response of length), thus same proportionality coefficient in both cases (for a same kept power(1)).**
- **But the symbol rate is higher for the signal $x_1(t)$: $T_s = T_b$, and thus $R_s = R_b$, for signal $x_1(t)$, while $T_s = 2T_b$, and thus $R_s = R_b/2$, for signal $x_2(t)$.**

To transmit the same bit rate R_b, the bandwidth necessary to transmit $x_1(t)$ will then be higher to the one necessary to transmit $x_2(t)$.

(1) To transmit a NRZ signal, theoritically an infinite bandwidth is required. In practice it will be truncated to keep x % of the total signal power.. Typical values are from 98 to 99 %.

QUESTION 8

The transmission spectral efficiency is defined by:

- A The needed bandwidth to transmit a given bit rate
- B The needed transmission power to obtain a given bit error rate,
- C The DSP efficiency.

BAD ANSWER

Click here to CHANGE YOUR ANSWER

The needed transmitted power to obtain a given bit error rate is related to the power efficiency.

BAD ANSWER

Click here to CHANGE YOUR ANSWER

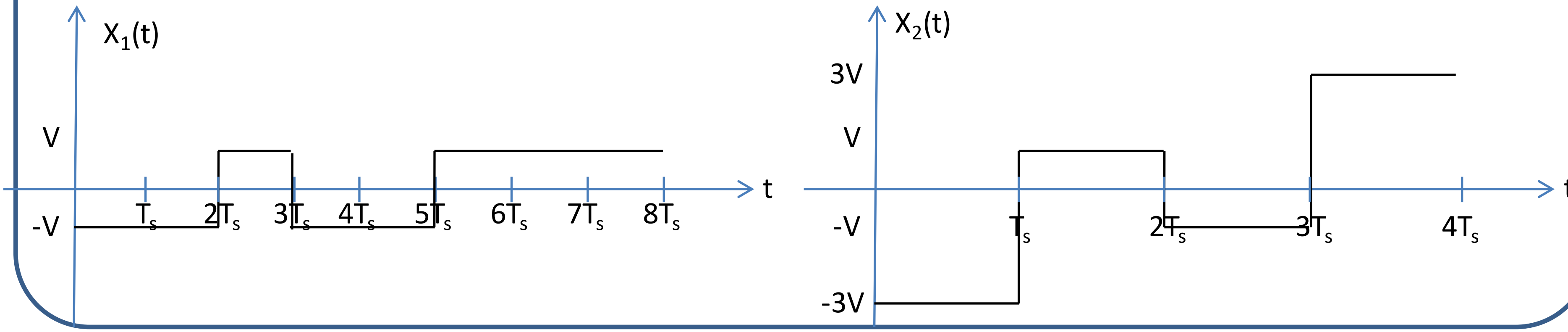
The PSD efficiency means nothing.

GOOD ANSWER

Click here for the FOLLOWING QUESTION

Series of bits to transmit: 00100111

Generated signals:



QUESTION 9

The transmission spectral efficiency will be:

A. Better if we transmit signal $x_1(t)$

B. Better if we transmit signal $x_2(t)$

C. The same if we transmit signal $x_1(t)$ or signal $x_2(t)$

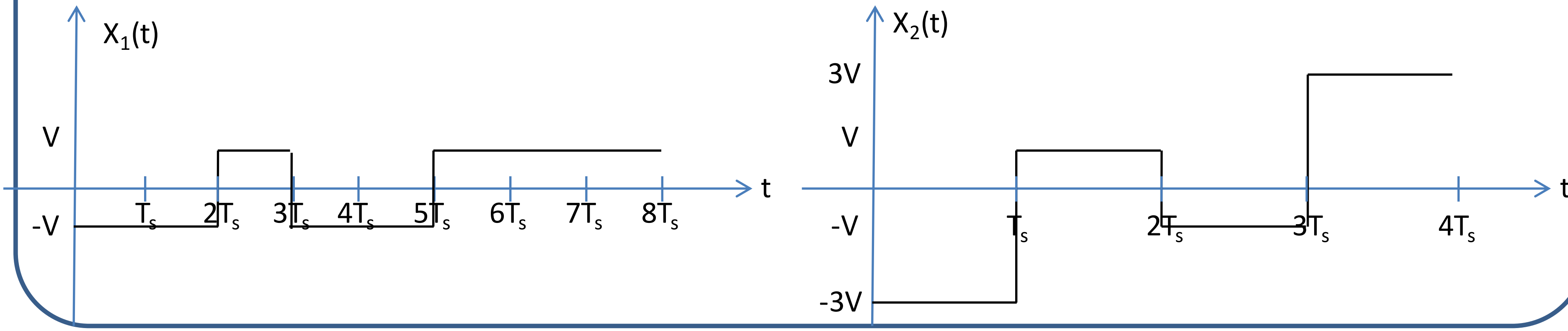
D. Not enough elements to answer the question

BAD ANSWER

Click here to CHANGE YOUR ANSWER

Series of bits to transmit: 00100111

Generated signals:



GOOD ANSWER

Click here for the FOLLOWING QUESTION

We saw, in a previous question, that, for the same bit rate R_b, the necessary bandwidth to transmit signal $x_1(t)$ was higher than the one necassary to transmit signal $x_2(t)$.

To transmit a given bit rate we need a given frequency bandwidth. For a given bit rate to be transmitted, the transmission spectral efficiency is improved when the signal occupied bandwidth is reduced.

The transmission spectral efficiency is so better here if we transmit the signal $x_2(t)$ because we will need less bandpass to transmit a same bit rate.

Series of bits to transmit: 00100111

Mapping : –V –V +V –V –V +V +V +V

QUESTION 10

By using a square root raised cosine shaping filter, the obtained spectral efficiency will be:

A Higher than the one obtained with a rectangular shaping filter

B Lower than the one obtained with a rectangular shaping filter

C The same as the one obtained with a rectangular shaping filter

D Not enough elements to answer the question

BAD ANSWER

Click here to CHANGE YOUR ANSWER

GOOD ANSWER

Click here for the FOLLOWING QUESTION

The bandwidth necessary to transmit a signal is always proportional to the symbol rate R_s, the proportionality coefficient depends on the used shaping filter.

Here what will give the occupied bandwidth is the used shaping filter:

- **Using a rectangular shaping filter leads theoretically to an infinite occupied bandwidth (truncated in practice to keep x% of the signal total power).**
- **Using a square root raised cosine filter leads to generate a signal with a finite bandwidth (including the total signal power): $B=(1+\alpha)/2Ts$ for baseband transmissions, with $0<\alpha<1$.**

Considering a same transmitted power, the signal generated using a square root raised cosine filter will be more spectrally efficient, because it will require a lower bandpass to transmit the same bit rate.

THE QUIZ IS FINISHED