

Name: Key

The figure shows five different line codes. Write the name of the line codes

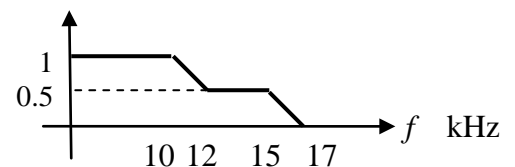
<p>1 0 1 1 0 0 0 1 1 1 0</p>		Name of the code
A	On-Off (or Unipolar) (NRZ)	
B	On-Off (or Unipolar) (RZ)	
C	Polar (RZ)	
D	Bipolar (RZ)	
E	Manchester	

Compare code **A** with **D** in all aspects.

Aspect	A	D
Bandwidth requirements	less	more
DC content	yes	no
Error detection	no	Yes
Hardware	Requires one supply	Requires two supplies
Synchronization	worse	Better for long sequences of 1's

There is no clear winner in terms of power efficiency. (equivalent)

A binary data is to be transmitted using baseband binary transmission with the pulse shape having the spectrum shown in the figure. What is the transmission rate that results in zero ISI. Explain how you got your answer.



To solve this problem you must understand Nyquist Criteria for ZERO ISI. The sum of the spectrum images shifted to R_b , $2R_b$, $3R_b$... should be constant.

This is only possible when $R_b=27k$ bits/s

Alternatively the middle point of symmetry is $13.5 k = R_b/2$

This can be verified $R = \frac{2B}{1+r} = \frac{2(17k)}{1+\frac{3.5}{13.5}} = 27k$