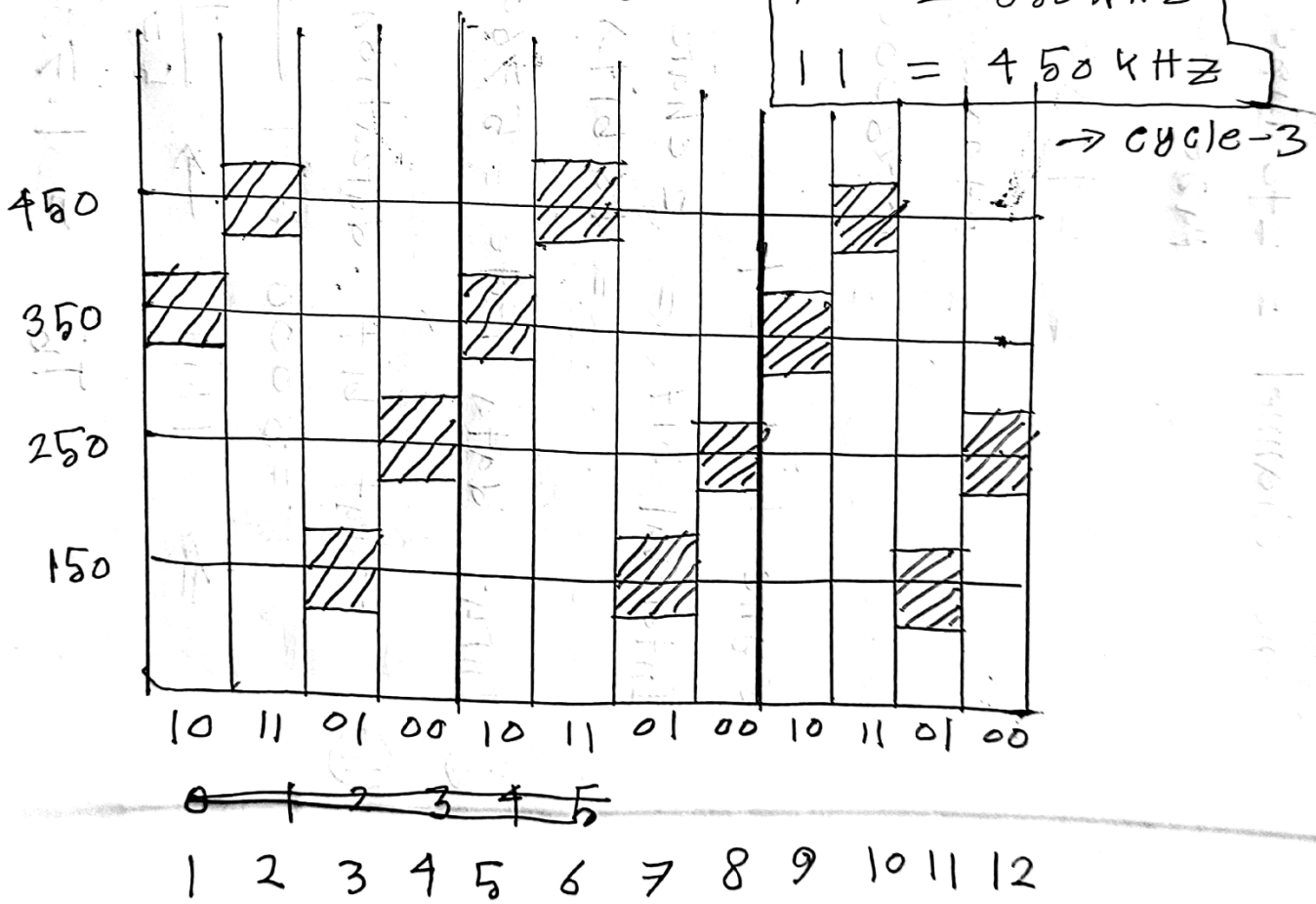
k bit = 10 11 01 00

| | | |
|---|---|---|
| 00 | = | 250 kHz |
| 01 | = | 150 kHz |
| 10 | = | 350 kHz |
| 11 | = | 450 kHz |

(1)




Fall 22

(2) 10 channels

one channel = 240 Page and each page 300 characters

$= 240 \times 300$ char/s

$= 240 \times 300 \times 8$ bit/s

$= 576000$ bps

Sync bit = 1

Interval bit = 2 char

= 16 bits

(I) Input data rate = 576000 bps

(II) Input bit duration,

576000 bit $\longrightarrow$ 1s

$\Rightarrow$ 1 bit $\longrightarrow \dfrac{1}{576000}$

$T_b = 1.736 \times 10^{-6}$

(iv) Frame duration / Input slot duration,

$1 \text{ bit} \rightarrow 1.736 \times 10^{-6}$

$\Rightarrow 16 \text{ bit} \rightarrow 1.736 \times 10^{-6} \times 16$

$T_s = 2.778 \times 10^{-5} s$

(iii) Frame rate,

$2.778 \times 10^{-5} s \rightarrow 1 \text{ frame}$

$\Rightarrow 1s \rightarrow \frac{1}{2.778 \times 10^{-5}} \text{ frame}$

$= 36000 \text{ frame}$

$\therefore 36000 \text{ fps}$

(v) output datarate = Frame rate × Frame size

$\boxed{\text{Frame size} = 10 \times 16 + 1 = 161 \text{ bits}}$

$= 36000 \times 161$

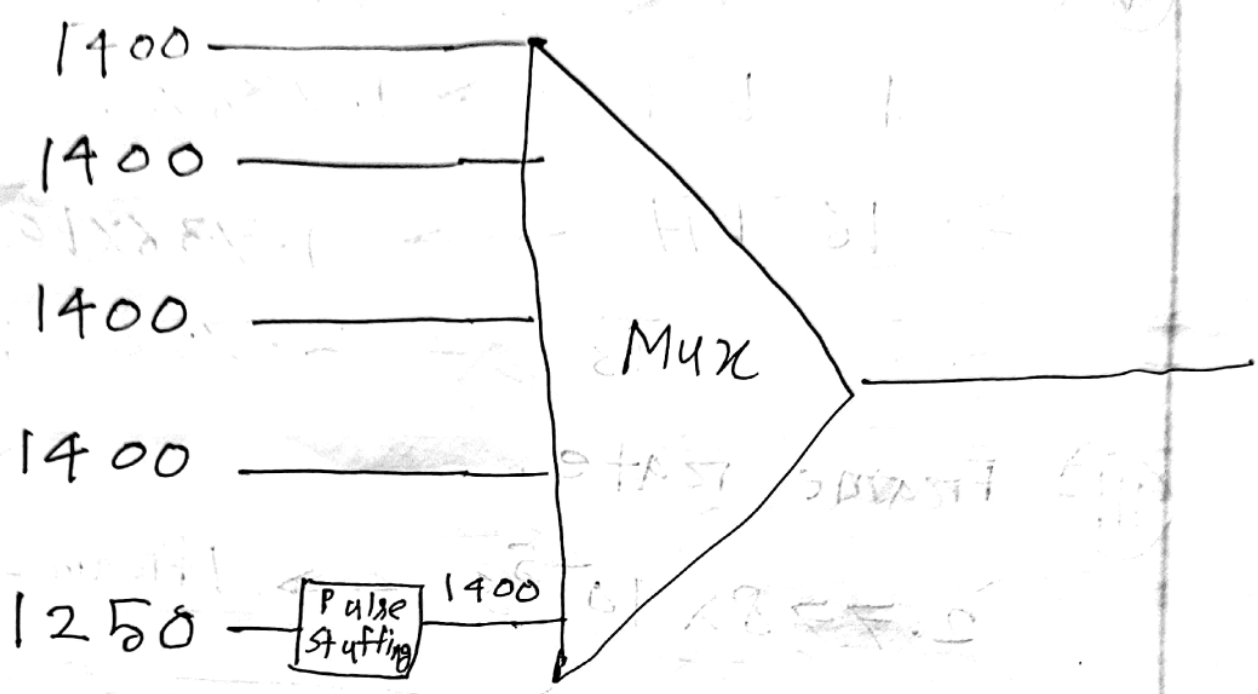
$= 5796000$

(vi) output bit duration, $\frac{T_b}{\text{num of channel}}$

$= 1.736 \times 10^{-6} / 10$

$= 1.736 \times 10^{-7}$

(b)




(3) 00 1 1 1 1 0 0 0 0 0 0 1 0 1 1 1

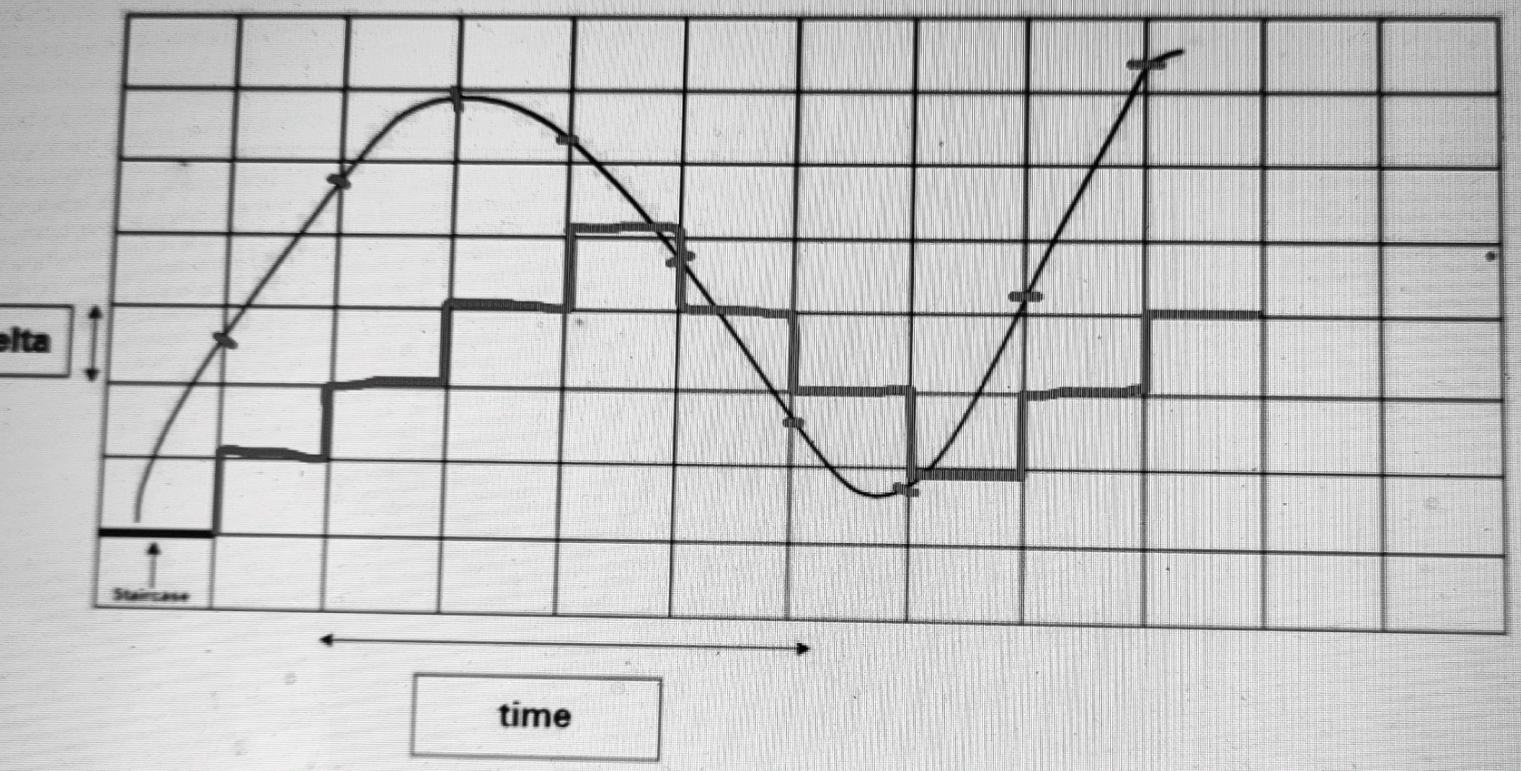
(4) (I) Twisted - Pair cable

(II) Radio wave

(III) Fiber optic/Co-axial

(IV) Bluetooth / Radio frequency

Follow me




1 1 1 1 1 0 0 0 1 1

(5) $(55E)_{16}, (B2)_{16}, (95)_{16}, (DD)_{16}$

sum after 16 bit conversion,

$(55E)_{16} \Rightarrow (055E)_{16}$

$(B2)_{16} \Rightarrow (00B2)_{16}$

$(95)_{16} \Rightarrow (0095)_{16}$

$(DD)_{16} \Rightarrow (00DD)_{16}$

$(0782)_{16}$

After ~~one's~~ 1's compliment $= (F87D)_{16}$

checksum $= (F87D)_{16}$

Reciever :

Hexadecimal sum + checksum

sum After 16 bit conversion

$(55E)_{16} \Rightarrow (055E)_{16}$

$(C0)_{16} \Rightarrow (00C0)_{16}$

$(95)_{16} \Rightarrow (0095)_{16}$

$(E1)_{16} \Rightarrow (00E1)_{16}$

~~check~~ sum = 0794

checksum F87D

(+)

10011

→ 1

0012

After 1's compliment = FFED