Quiz - 3

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Answer to the Q.n.1

(a)

It is a methodology in which many number of digital or analog signals are combined to form a single signal. When multiple signals are need to be transferred to a signal medium we need multiplexing. It divides the capacity of channel into various logical channels. For instance,

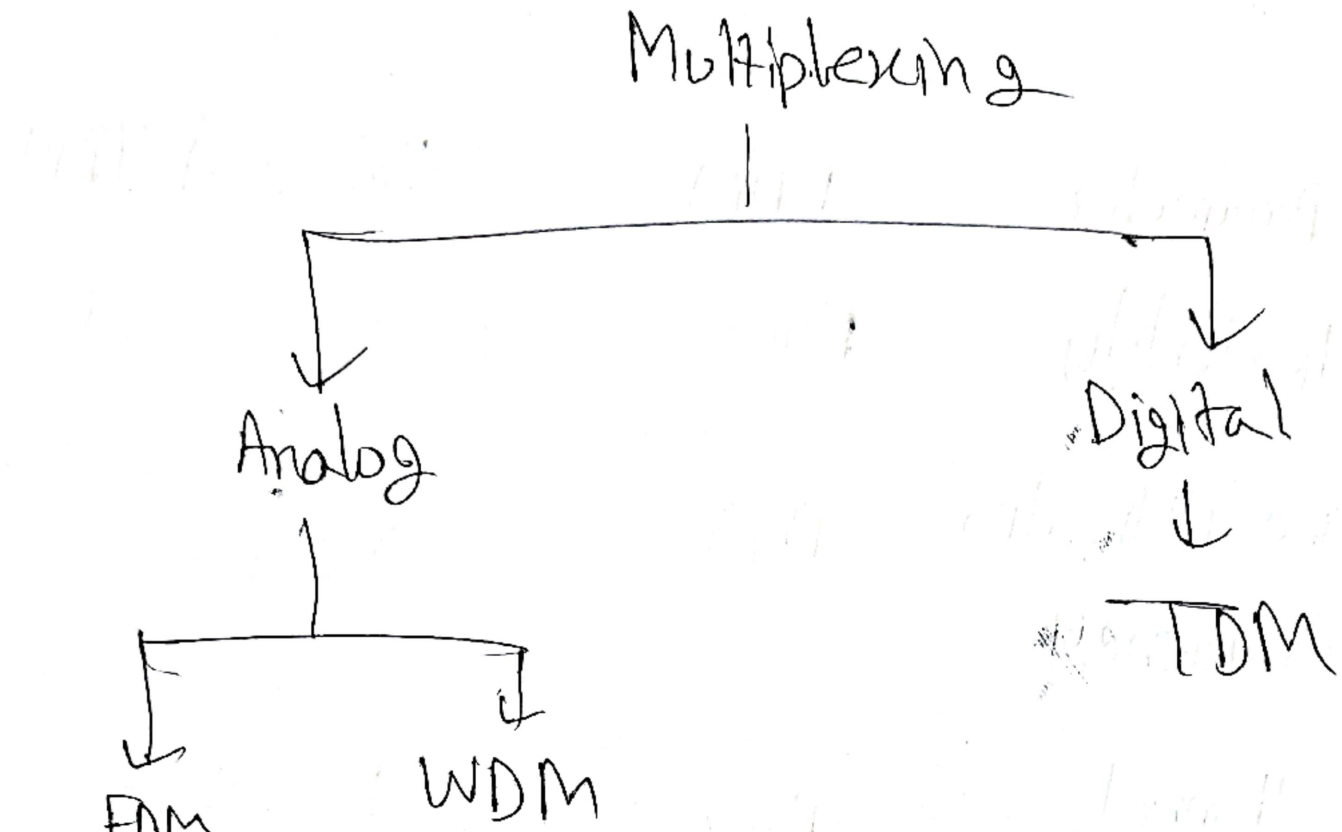
(i) Analog and digital broadcasting

(ii) Processing of video

(iii) Telegraphy

The types of various multiplexing:

1. Space - division multiplexing
2. Frequency division multiplexing
3. Time division multiplexing
4. Code " "
5. Polarization " "
6. Orbital angular momentum multiplexing



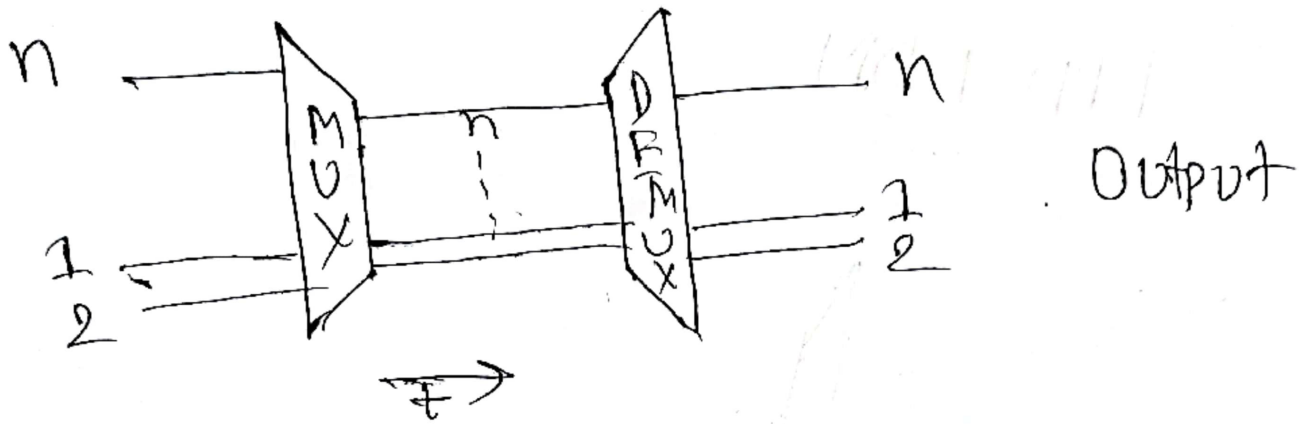
Advantage

Analog multiplexing doesn't need any battery.

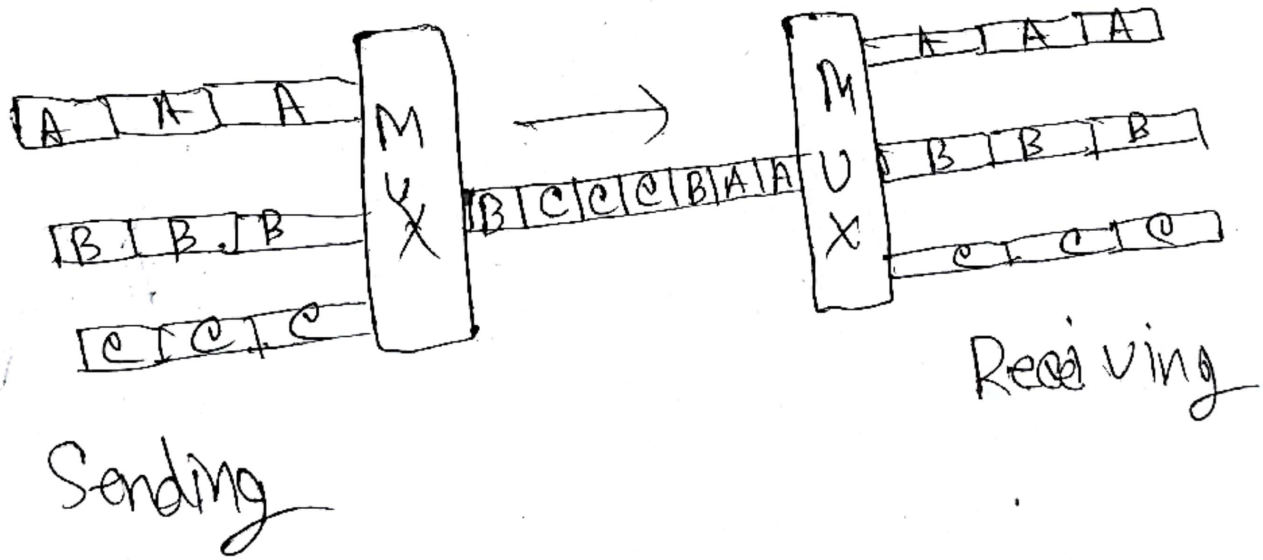
Disadvantage

Digital multiplexing has too few line it doesn't do well with fluctuation

FDM


n
MUX
n
DEMUX
n
1
2
1
2
Output
f

STDM


A A A
B B B
C C C
MUX
B C C C B A A
MUX
A A A
B B B
C C C
Sending
Receiving

Parameter	FDM	Statistical TDM
Flexibility	Poor	Very good
Line utilization efficiency	Poor	Very good
Channel capacity	Poor	Excellent
Error control	Not possible	Possible
Multidrop capacity	Very good	Possible
Transition delay	Doesn't exist	Random
cost	High	Moderate.

(c)

(i)

2 character = (2×8) bits

= 16 bits

Sources = 50

size of an output frame

= (16×50) = 800 bits.

(ii)

Bandwidth = 250 ~~Mb~~ Mbps

250×10^6 bits take 1s

16 bits take $= \frac{16}{250 \times 10^6}$ s

$= 64 \times 10^{-8}$ s

Output frame rate $= \frac{1}{6.4 \times 10^{-4}}$

$= 15.625 \times 10^{6}$ Frame

(14)

Output frame duration $= \frac{1}{\text{Frame rate}}$

$= \frac{1}{15.625 \times 10^{6}}$ p

$= 6.4 \times 10^{-4}$ p

(iv)

Output data rate =

$(64 \times 10^{-8} \times 800)$

$= 5.12 \times 10^{5}$ bps

(v)

Bandwidth = 250×10^{6} bps

Input bit duration = $\frac{1}{250 \times 10^{6}}$

$= 4 \times 10^{-9}$ s