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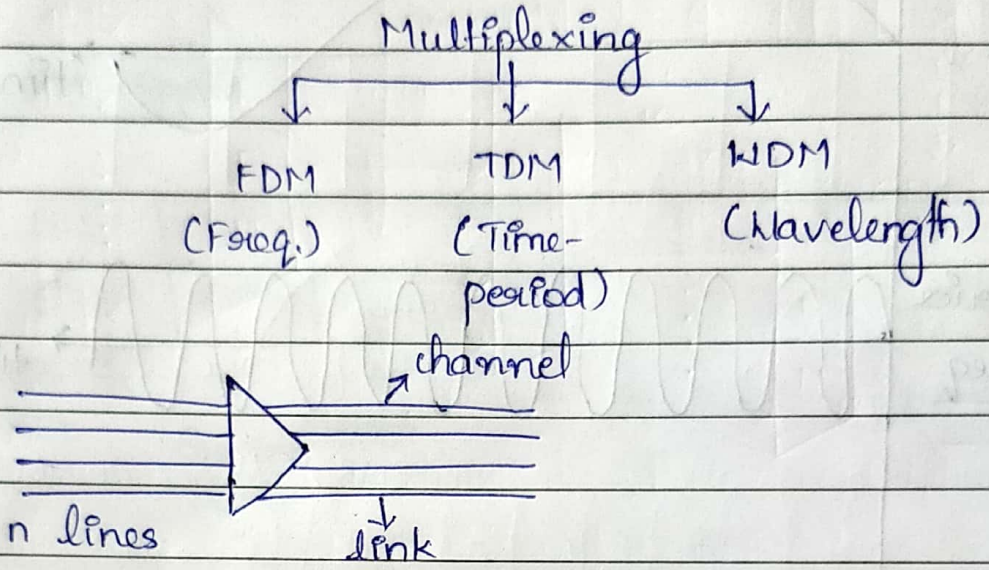
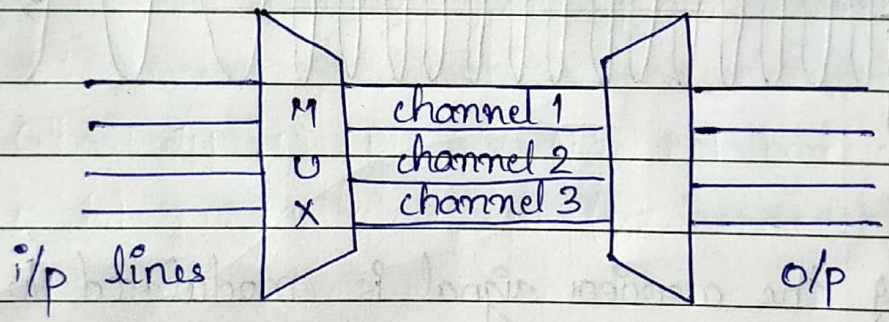
MODULE-1

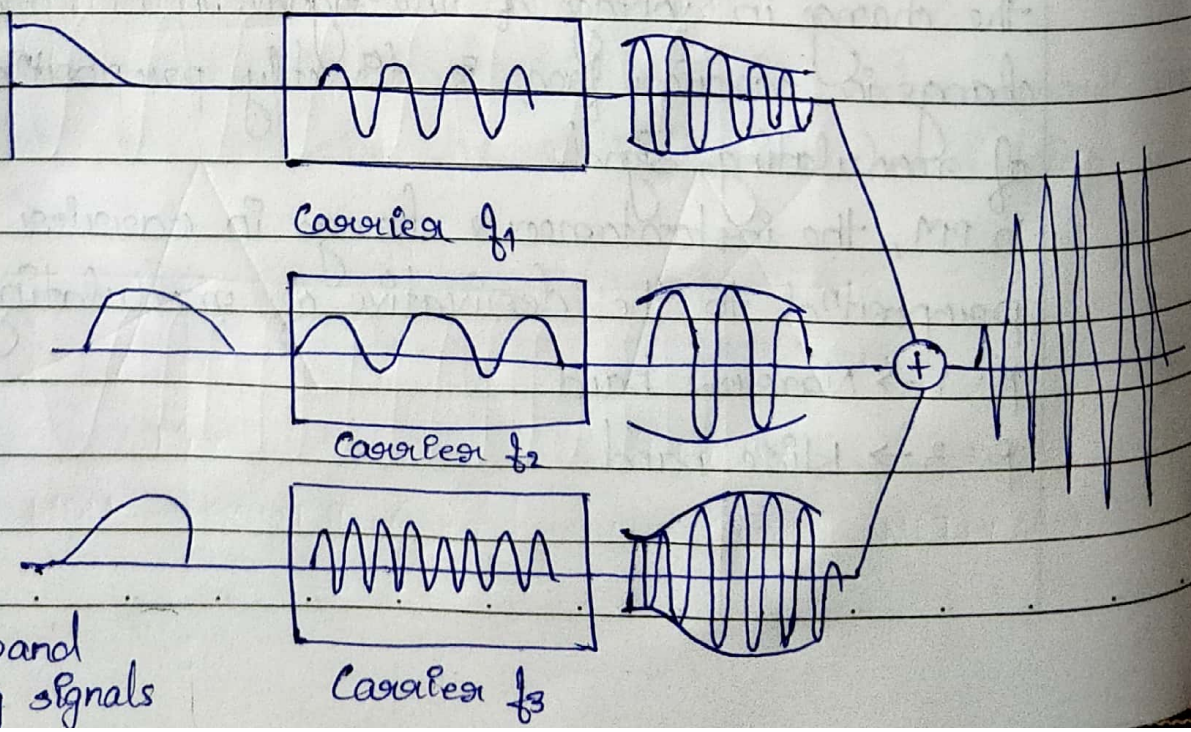
Multiplexing



(i) Freq. Division Multiplexing (FDM)



Note:- Bandwidth of the channel must be greater than that of i/p signals



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$f_1 \neq f_2 \neq f_3$ → to avoid noise & interference with channels/ links in the band.

Freq. of guard bands $\neq f_1 \neq f_2 \neq f_3$ (10 kHz)

FDM is an analog technique where the bandwidth of a link is greater than the combined bandwidth of the signals to be transmitted. In FDM, the signals generated by each sending device modulate different carrier frequencies which is then combined into a single composite signal. The carrier frequencies are separated by bandwidth to accomodate the modulated signals. The channels are separated by strips of unused bandwidths called as guard bands which prevent signals from overlapping. The guard bands must not interfere with original data frequencies. The demultiplexing process uses series of filters to decompose multiplexing signals into its components.

① 5 channels each with a bandwidth of 100 kHz are to be multiplexed together. What is the min. bandwidth if there is a guard band of 10 kHz b/w channels to prevent interference?

ans. Min. bandwidth, $B_{min} = 100 \times 10^3 \times 5 + (4) \times 10 \times 10^3 = 540$ kHz

(5-1) guard bands