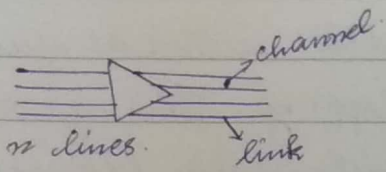
MODULE : 4

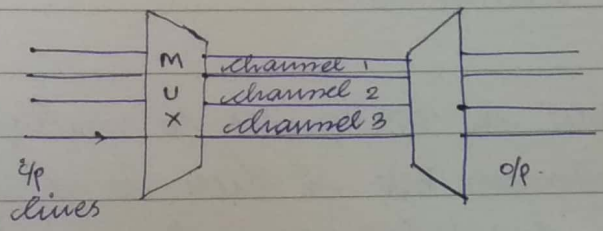
Multiplexing.

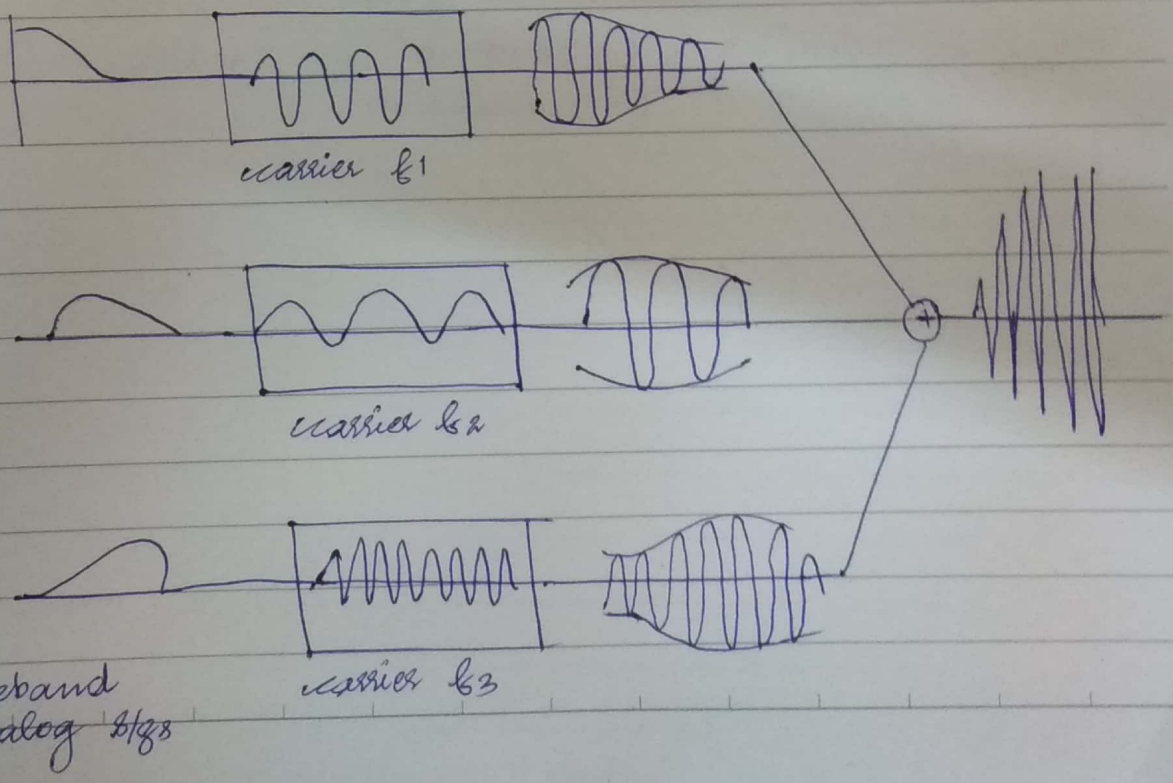
FDM (freq.) TDM (time period) WDM (wavelength)



1. Frequency division multiplexing: (FDM)

NOTE: Bandwidth of the channel must be greater than that of i/p s/gs.





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

Frequency 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 s/gs to be transmitted. In FDM, the signals generated by each sending device modulate different carrier frequencies which is then combined into a single composite s/g. The carrier frequencies are separated by bandwidth to accommodate the modulated s/gs. The channels are separated by strips of unused bandwidths called as guard bands which prevent s/gs 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.

Q1. 5 channels each with a BW of 100KHz are to multiplexed together. What is the minimum BW if there is a guard band of 10kHz b/w channels to prevent interference?

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

(5-1) guard bands.