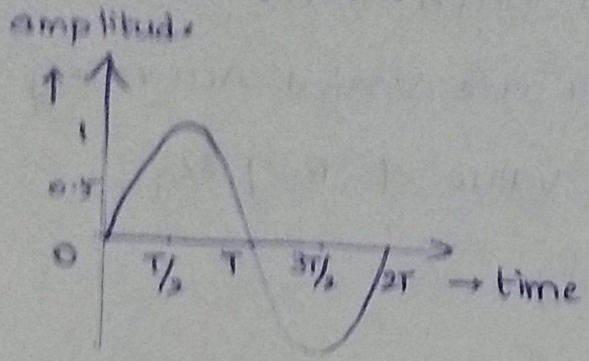
Introduction to Digital Communication

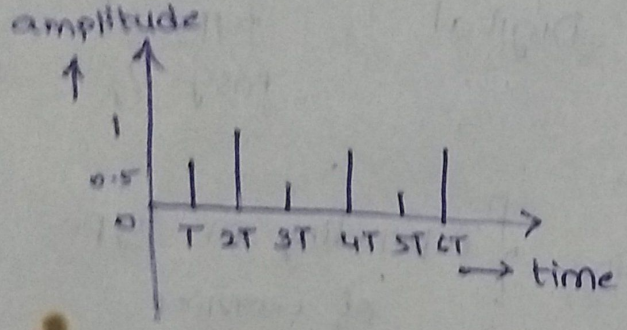
→ Analog s/g :



continuous both in time & amplitude

continuous	→	infinite no. of levels
discrete	→	finite no. of levels.

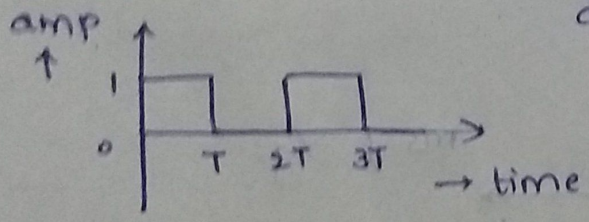
→ Discrete s/g :-



continuous in amplitude & discrete in Time

Digital s/g :-

→



discrete both in Time & amplitude

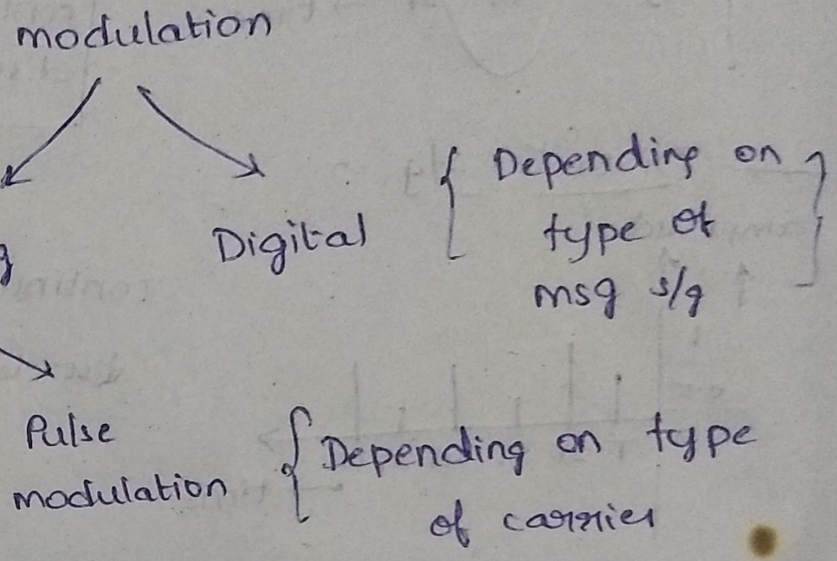
→ Sampling : fundamental operation to convert a continuous time s/g to discrete s/g

→ Quantization : Process of approximating a continuous s/g occupying large set of values by relatively small set of levels

∴ Used to reduce noise of small amplitudes.

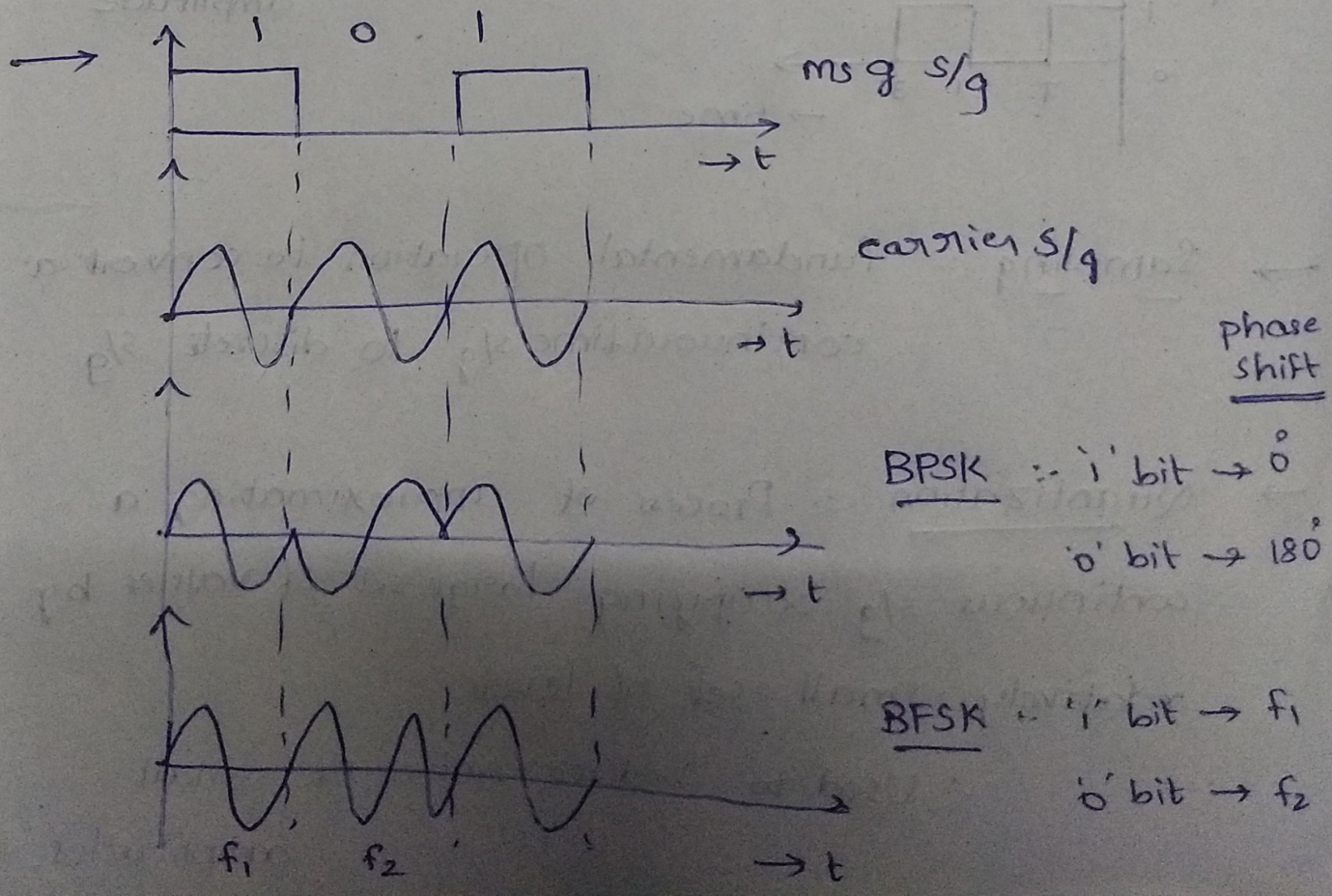
→ TDM :- Simultaneous Txion of several s/gs

→ Modulation :- Process in which some of the characteristics of carrier are varied according to the instantaneous value of msg s/g.



eg :- AM, FM

eg :- PAM



phase shift

BPSK :- '1' bit → 0°

'0' bit → 180°

BFSK :- '1' bit → f_1

'0' bit → f_2

→ M-ary : $M = 2^N$ ← No. of bits used to represent a symbol

for binary $M = 2 = 2^1 \Rightarrow N = 1$

Quadrature, $M = 4 = 2^2 \Rightarrow N = 2$

Octary, $M = 8 = 2^3 \Rightarrow N = 3$

Bit rate : No. of bits Txed per sec

Baud rate : No. of symbols Txed per sec.

→ For any communication system, the performance measures are $S/N \uparrow$

$P_e \downarrow$

Base band s/g Rxer
Optimum filter
Matched filter
correlator
} P_e.

→ Spread spectrum modulation → s/g is modulated twice
∴ requires ↑ BW
& preferred when security is more important

DS
Analogous to (BPSK)

FH
(BFSK)

eg : military application, satellite communicati

BW of s/g without modulation f_m

AM → $2f_m$

FM → $2(\beta+1)f_m = 2(\Delta f) + 2f_m$ $\left\{\beta = \frac{\Delta f}{f_m}\right\}$