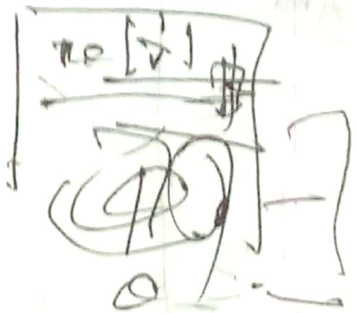
20-06-2022



Bipolar encoding: Three voltage levels - positive, negative & zero.

Alternative mark inversion

- AMI
  - bit 0 → zero volt.
  - bit 1 → alternate between +V & −V.
- Pseudo ternary
  - bit 1 → zero volt.
  - bit 0 → Alternate between +V & −V.

Multi level schemes :

mBnL

- m → length of Data elements
- B → Binary
- n → no of signal elements.
- L → Levels of signals

001 → m = 3.

2 bit এ পাওয়া

Quarternery = 4

$2^m = 2^2 = 4$

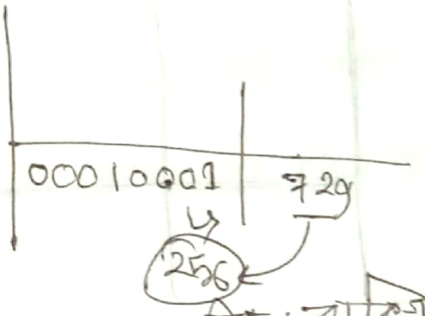
$L^n = 4^1 = 4$

00
01
10
11

ternary = 3.

8 bit.

$2^8 = 256$ $3^6 = 729$.

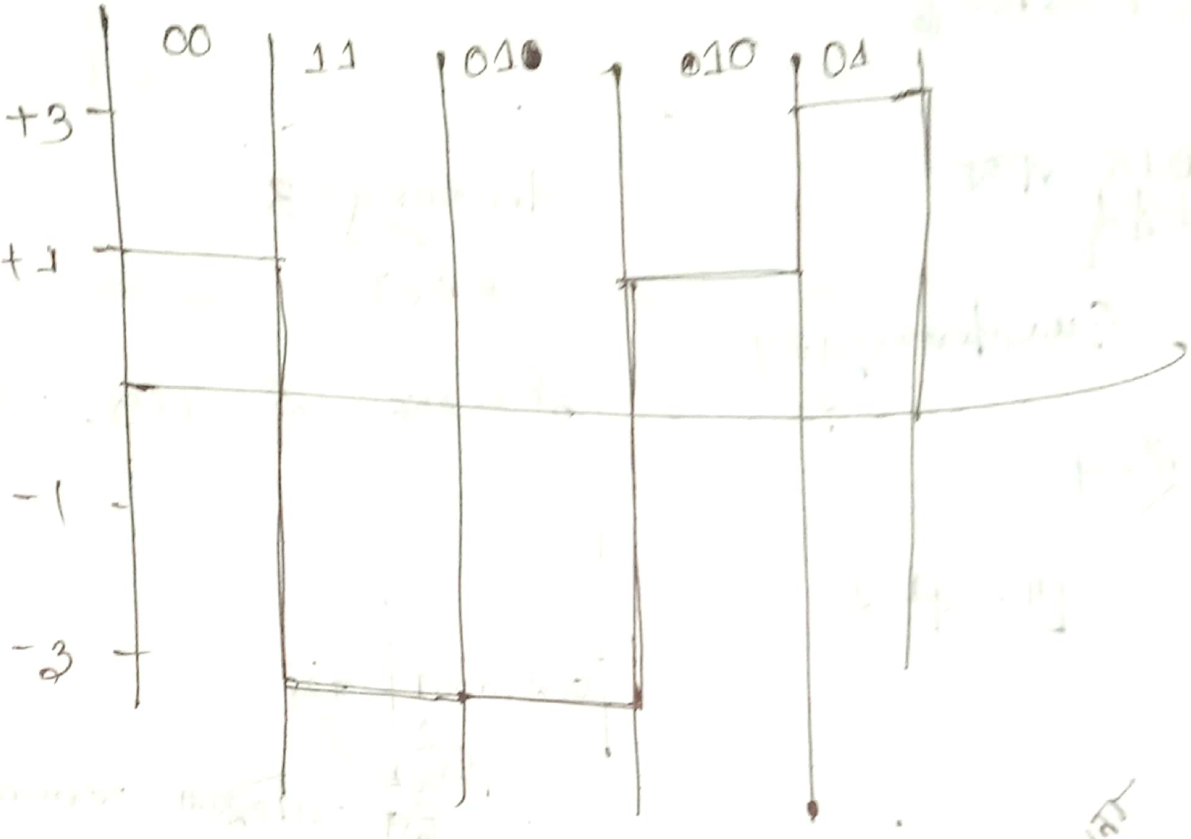


নিচে বাকিগুলো error detection এর জন্য ব্যবহার করে.

Previous level (+) → Next level

Previous level negative → Next level.

Next bits	Next level	Next level.
00	+1	-1
01	+3	-3
10	-1	+1
11	-3	+3



যদি previous level বলে দেওয়া না থাকে- তখন

8B6T

$n=6 \quad T=3$

$m=8$

+, −, 0.

$2^8 = 256 = d$

$L^n = 729 = \text{Signal}$

$3^6 = 729$

প্রতিক্ষেত্রে data e signal e fixed.

00011000 ——— (+ − 0 − − +)
                  X

DC weight calculation 0X = −1 বা 0 হলে কি আছে charge বসাও

+ → 2 .

(−) — ওটা .

2 − 3 = −1 .

3 − 2 = (+1) যদি ধরা হয় .

পরপর দুইটা SE (+1) রাখা যাবে না ।

+1 ——→

(+ + 0 − − +) invert করে .
+1 হলে

(− − 0 + + − −) ← receiver আবার শুরু

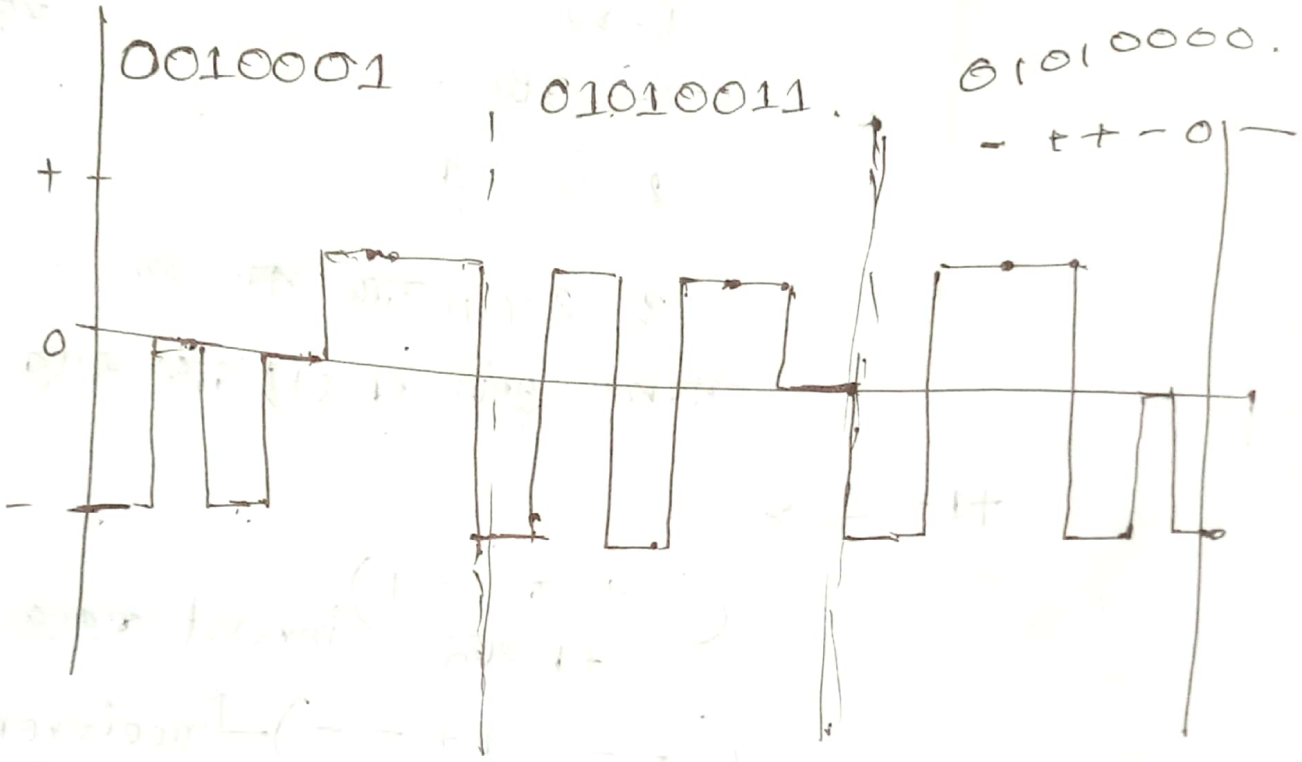
(+1) (+1)
বসা যাবে না ।

যদি +2 আসে তবে সেটা control sequence দ্বারা সমন্বয় করতে ।
d.c.w.

00010001 → −0−0++ = 0

01010011 → −+−++0 = +1

01010000 → +−−+0+ = +1.



(+1) (+1) DC component problem ~~হচ্ছে~~, frequency almost 0 ~~হচ্ছে~~, DC weight (+1) (+1) ~~হওয়া~~ ~~উচিত~~ না।

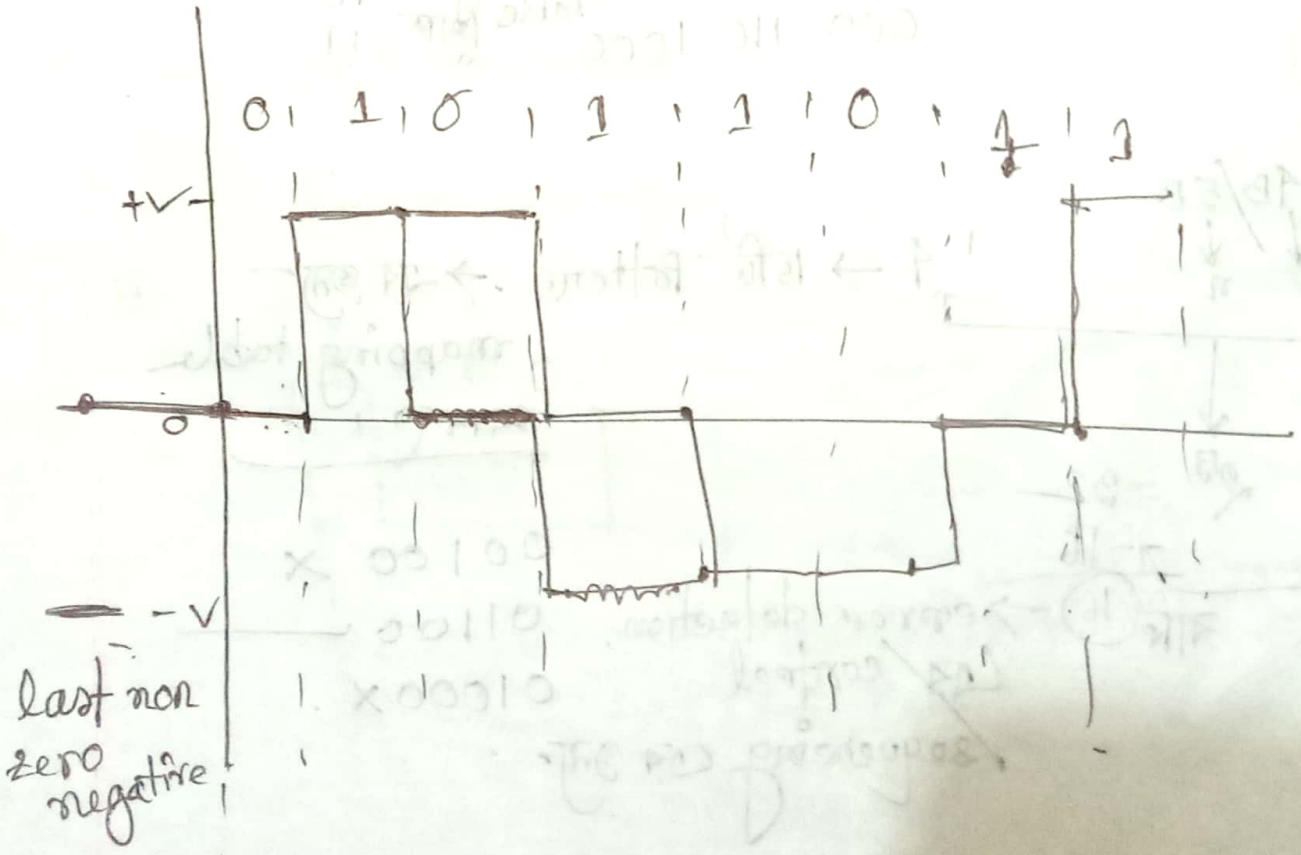
Multiline transmission (MLT-3)

Three voltage level.
$-V, 0, +V$.

(1) If the next bit is 0, no ~~transmission~~ transition. (0)

(2) If the next bit is 1, and the current level is not 0, next level is 0.

(3) If the next bit is 1, current level is 0, the next level is opposite to the last non zero level.



Transmission modes সম্পর্কে হবে।

27-06-2022

Digital to Analog Signal

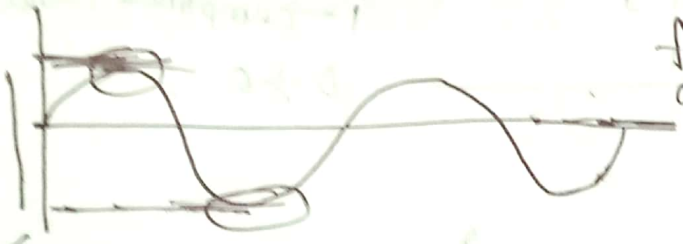
Digital → Analog

1 0 0 1 1 → modulator → demodulator

transmission medium.

Carry করে

Carrier signal → sine wave.



f → high
amp → high.

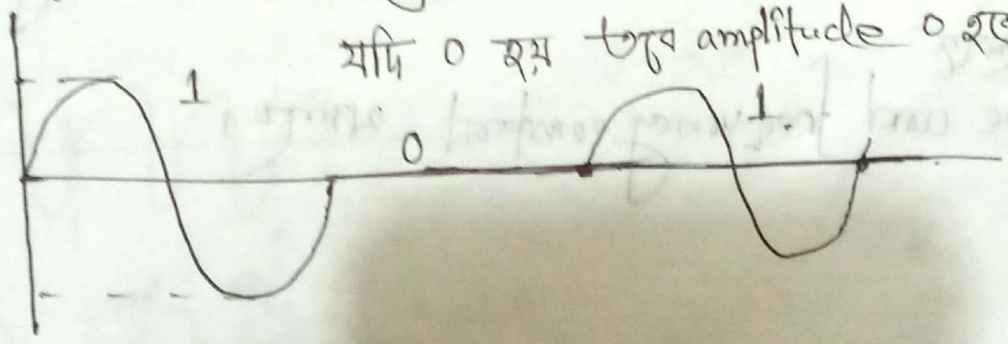
sine wave. parameter

amplitude, frequency, phase → carrier signal এর change করে Digital Data এর উপর নির্ভর করে।

digital data.

1 হলে carrier signal same হবে।

যদি 0 হয় তবে amplitude 0 হবে।



তিনভাবে—

Modulation/shifting → carrier → signal change করা হয়।

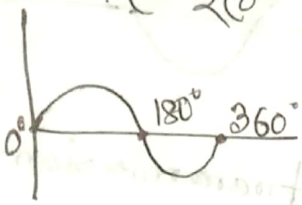
↓

① ASK → amplitude → 1 same 0

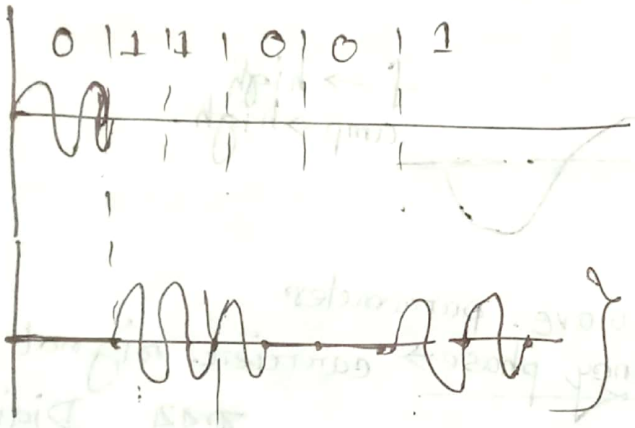
② FSK → frequency →

③ PSK → phase →

**Math করলে হবে



ASK



1 → amplitude same

0 → 0

level দুইটা

OOK

↓

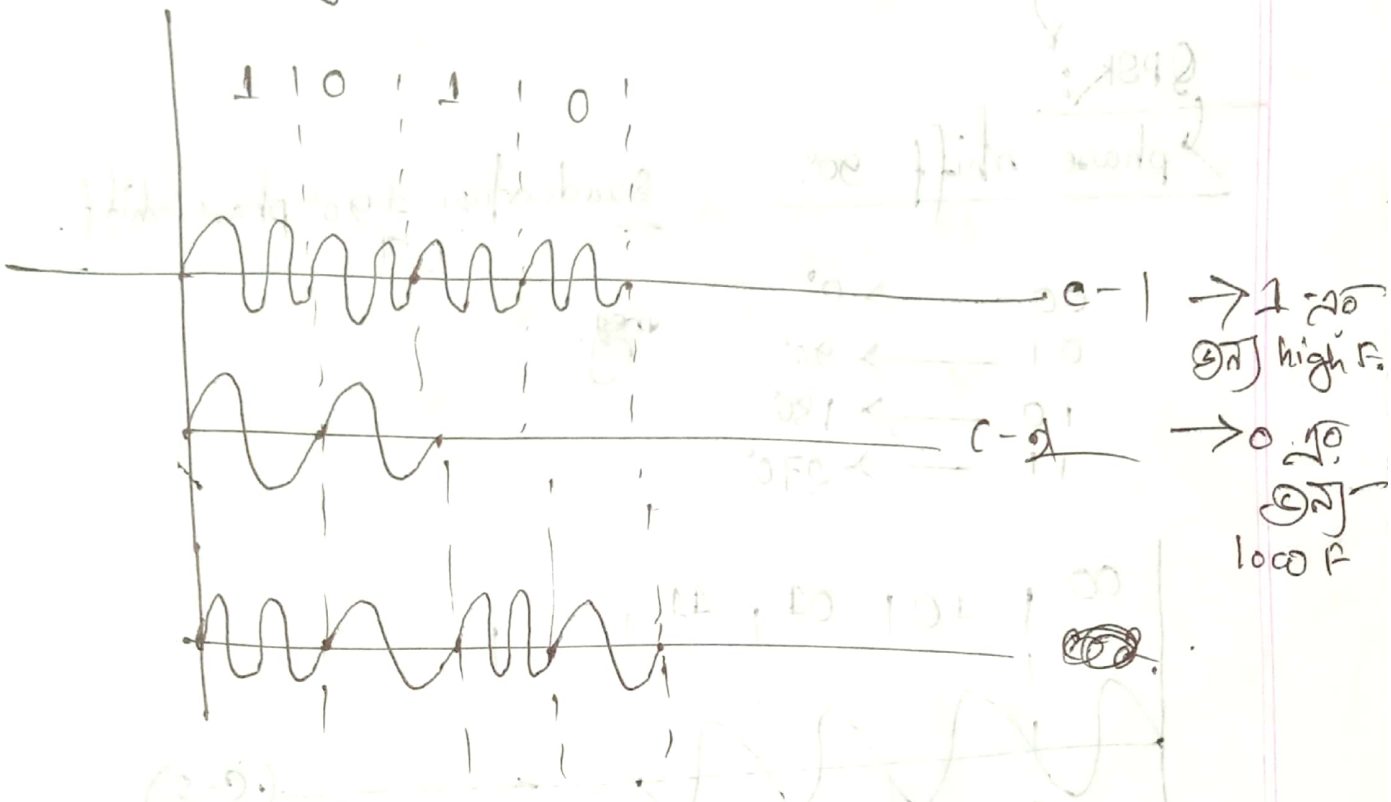
On off key.

বিকল্প

* Phase and frequency constant থাকতে।

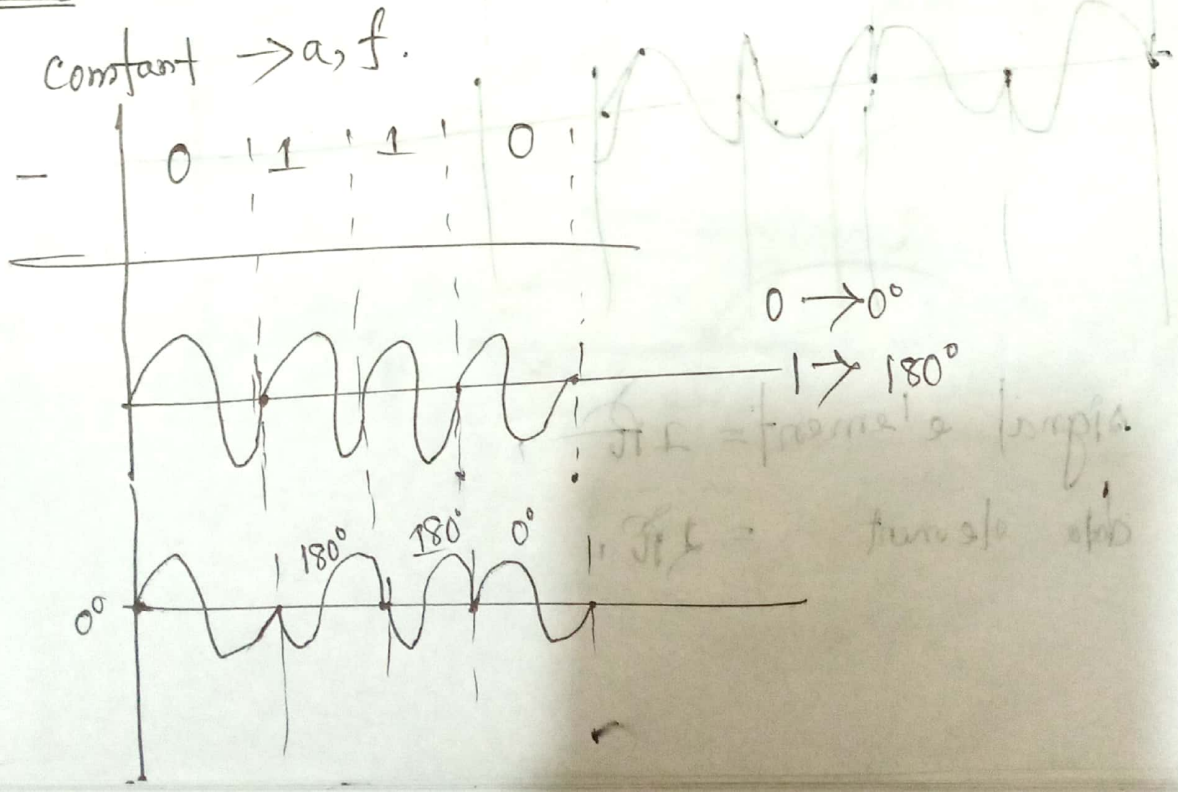
FSK: A, P → Constant

Carrier signal २ टो.



PSK:

Constant → a, f.



Single bit →

Double bit পাঠালে →

2

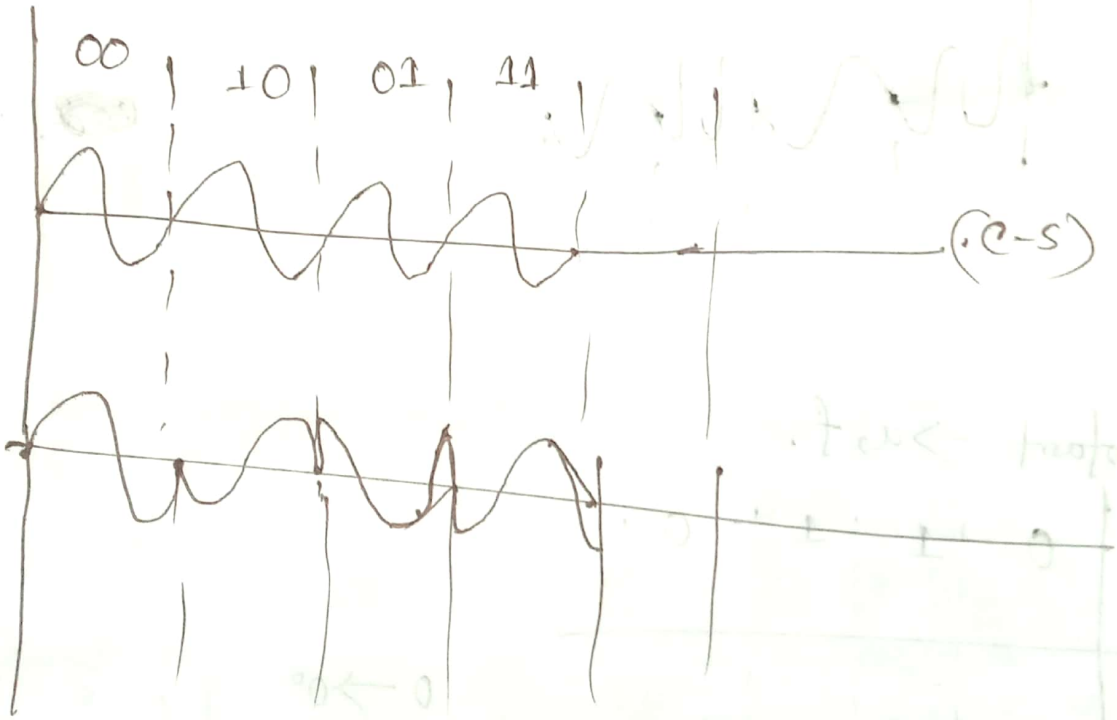
QPSK:

↳ phase shift 90°.

Quadrature ±90° phase shift.

↳

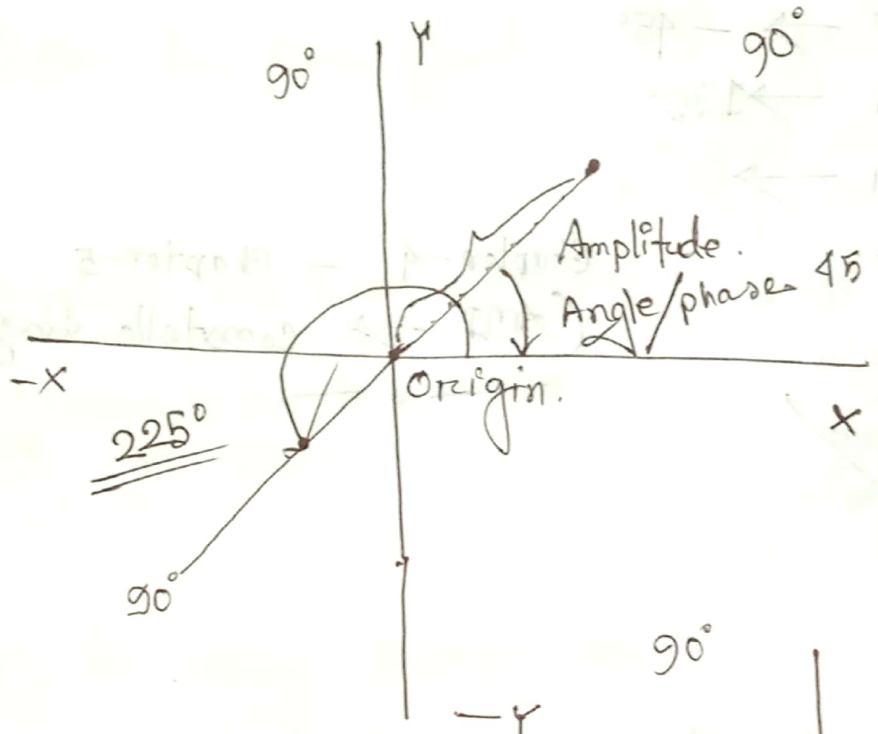
00 ⟶ 0°
01 ⟶ 90°
10 ⟶ 180°
11 ⟶ 270°

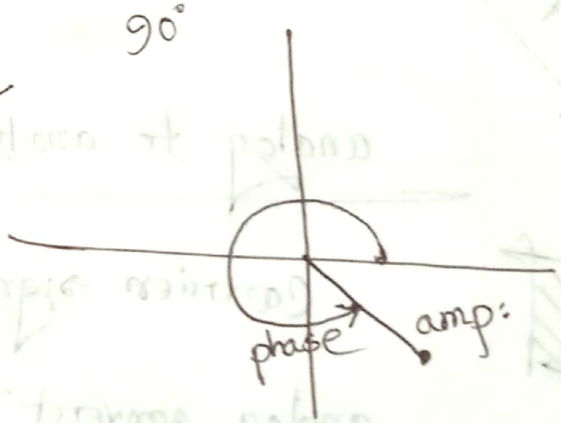


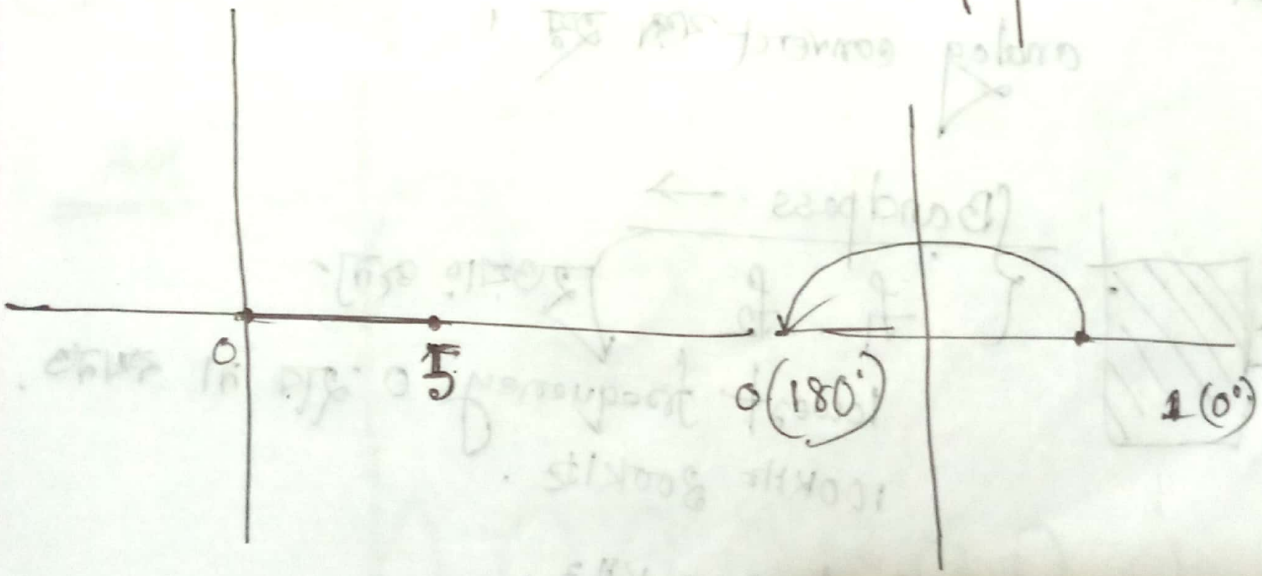
signal element = 1 bit,

data element = 2 bit.

Constellation diagram:







ASK

BPSK