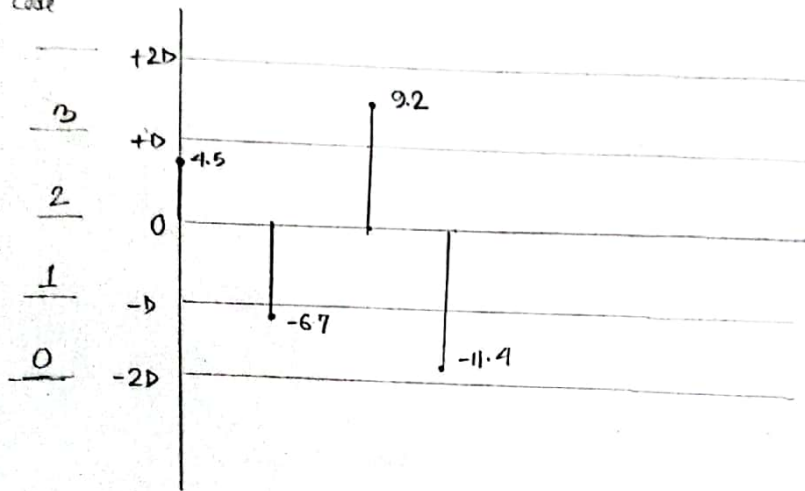1.

$$L = 2^2 = 4$$

$$D = \frac{V_{max} - V_{min}}{L} = \frac{12 - (-12)}{4} = 6$$
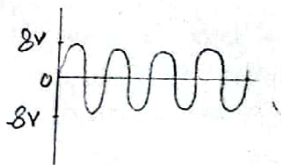
Quantized Code

Normalized Quantized value

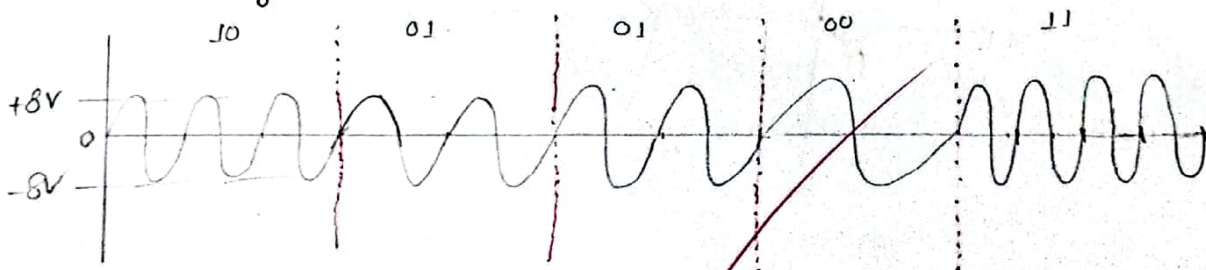0.5   -1.5   +1.5   -1.5

Quantized code

2   0   3   0

2. Carrier signal

modulated signal

3. From Constellation Diagram,

$00 \rightarrow 45°$

$10 \rightarrow 135°$

$11 \rightarrow 225°$

$01 \rightarrow 315°$

$$l = \sqrt{1^2 + 1^2} = 1.4$$