

~~$x(t) = 10 \cos(2\pi 2000t)$~~

~~$(\cos 800\pi t)$~~

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D.C S1-E1-a

channel
and analog
converter

Q1) Draw block diagram for the Transmitter part of the Digital communication system and explain the function of one of its components.

Q2) Explain the sampling process in Time domain by equations and signal diagram

Q3) An analog signal, $x(t) = 10 \cos(2\pi 2000t)$ is to be sampled at Nyquist rate.

1. Sketch the spectrum of original signal
2. What is its Nyquist rate and Nyquist interval
3. Sketch the spectrum for the sampled signal from 0 to 10KHZ

$x(t) = 10 \cos(2\pi 2000t)$
 $\frac{2\pi 2000}{2} = 2000$

~~What is the Nyquist rate and Nyquist interval?~~
~~encoder and decoder~~
~~1. Encoder~~
~~2. Decoder~~
~~3. Encoder~~
~~4. Decoder~~
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~~98. Decoder~~
~~99. Encoder~~
~~100. Decoder~~

D.C S1-E1-b

Q1) Draw block diagram for the receiver part of the Digital communication system and explain the function of one of its components.

Q2) Explain the sampling process in Frequency domain by equations and signal diagram

Q3) An analog signal, $x(t) = 10 \cos(2\pi 4000t)$ is to be sampled at Nyquist rate.

4. Sketch the spectrum of original signal
5. What is its Nyquist rate and Nyquist interval
6. Sketch the spectrum for the sampled signal from 0 to 16KHZ

~~What is the Nyquist rate and Nyquist interval?~~
~~Its value is 8000 Hz~~
~~With: $2\cos A \cos B = \cos(A+B) + \cos(A-B)$~~
 ~~$\cos(A+B) = \frac{1}{2} \cos(A+B) + \frac{1}{2} \cos(A-B)$~~

أسئلة الشهر الأول

نموذج B

Q3

$$X(t) = 10 \cos(2\pi 4000t)$$

Sol

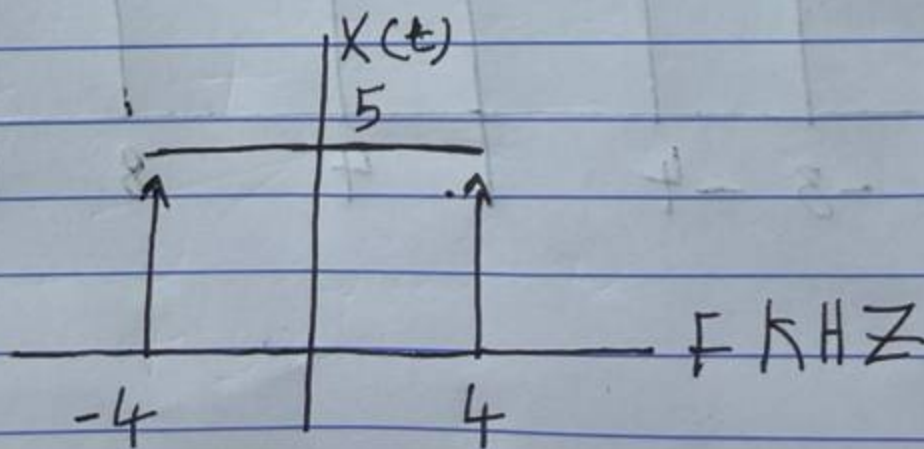
$$A = 10$$

$$F = 4000 \text{ Hz}$$

$$\cos Q = \frac{e^{jQ} + e^{-jQ}}{2}$$

$$10 \cos(2\pi 4000t) = \cancel{10} \frac{e^{j(2\pi 4000t)} + e^{-j(2\pi 4000t)}}{\cancel{2}}$$

$$= 5e^{j(2\pi 4000t)} + 5e^{-j(2\pi 4000t)}$$



2) Nyquist Rate

$$F_s = 2 F_m$$

$$F_s = 2 * 4000$$

$$F_s = 8000 \text{ Hz}$$

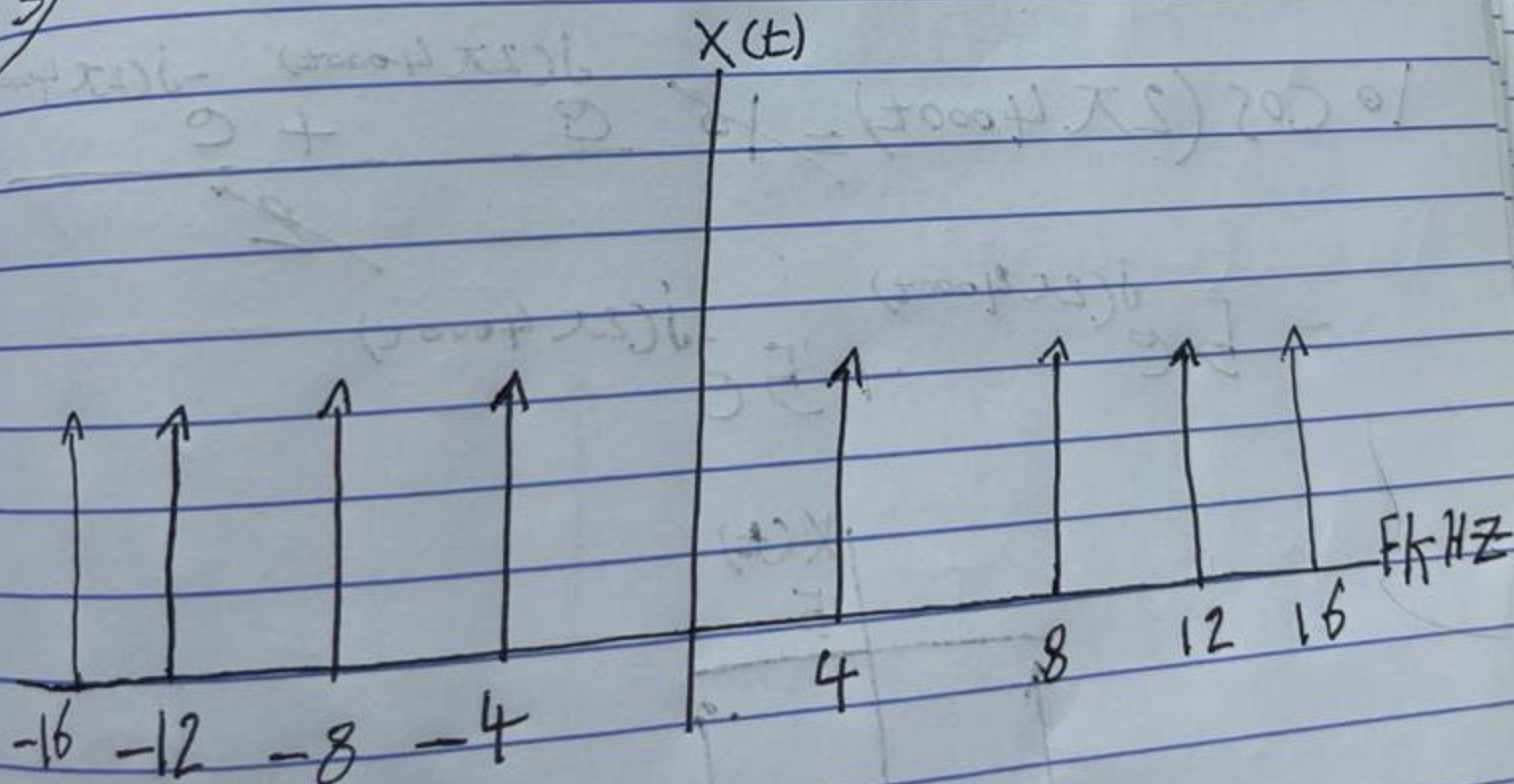
Nyquist interval

$$T_s = \frac{1}{F_s}$$

$$T_s = \frac{1}{8000}$$

$$T_s = 0.000125 \text{ sec}$$

3)



(a) Find the value of

$$Q3/ a. \quad X(t) = 10 \cos(2\pi 2000t)$$

$$2\pi f = 2\pi 2000$$

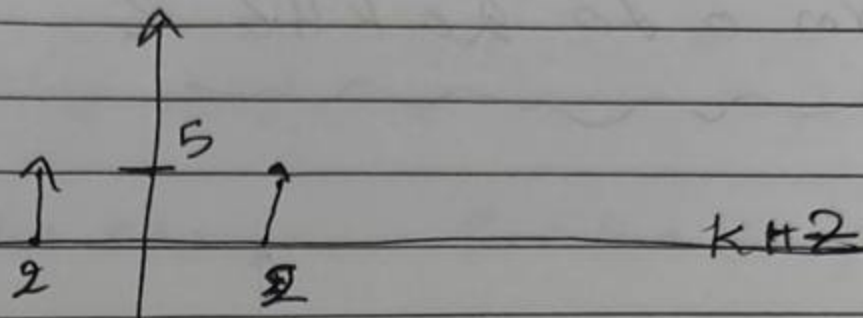
$$f = 2000 \rightarrow 2 \text{ kHz}$$

$$\cos Q = \frac{e^{jQ} + e^{-jQ}}{2}$$

$$= \frac{1}{2} (e^{j2\pi 2000t} + e^{-j2\pi 2000t})$$

$$= 5 (e^{j2\pi 2000t} + e^{-j2\pi 2000t})$$

$$= 5 e^{j2\pi 2000t} + 5 e^{-j2\pi 2000t}$$



b)

$$F_s = 2 F_m$$

$$= 2 \times 2000$$

$$= 4000 \text{ Hz}$$

$$F_s = 4 \text{ kHz}$$

$$T_s = \frac{1}{F_s} = \frac{1}{4000} = 25 \text{ msec}$$

س. ١ / التاريخ

الصفحة

c)

$\omega \rightarrow 10 \text{ kHz}$

$\therefore \text{Nyquist rate} = 4 \text{ kHz}$

