



قائمة الاسئلة

معالجة الاشارة الرقمية - كلية الهندسة - قسم الكهرباء - المستوى الرابع - اتصالات-حاسبات-ساعتان - درجة هذا الاختبار (50)

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- 1) 1- A low pass filter is
- Passes the frequencies lower than the specified cut off frequency
 - Rejects higher frequencies
 - Is used to recover signal from sampled signal
 - All of the mentioned

- a
- b
- c
- + d

- 2) 2- Which are the Fourier coefficients in the following?
- a_0, a_n and b_n
 - a_n
 - b_n
 - a_n and b_n

- + a
- b
- c
- d

- 3) 3- Find the Fourier transform of an exponential signal $f(t) = e^{-2t}u(t)$, $a > 0$.

a) $\frac{1}{(a+j\omega)}$

b) $\frac{1}{(2+j\omega)}$

c) $1 - (a + j\omega)$

d) $1 - (a - j\omega)$

- a
- + b
- c
- d

4)





4- Find the inverse Fourier transform of $\delta(\omega)$.

a) 12π

b) 2π

c) 1π

d) π

- 1) - a
- 2) - b
- 3) - c
- 4) + d

5) 5- Find the inverse Fourier transform of $f(t) = 1$.

a) $u(t)$

b) $\delta(t)$

c) e^{-t}

d) $1/j\omega$

- 1) - a
- 2) + b
- 3) - c
- 4) - d

6) 6- What are periodic signals?

a) The signals which change with time

b) The signals which change with frequency

c) The signal that repeats itself in time

d) The signals that repeat itself over a fixed frequency

- 1) - a
- 2) - b
- 3) + c
- 4) - d

7)





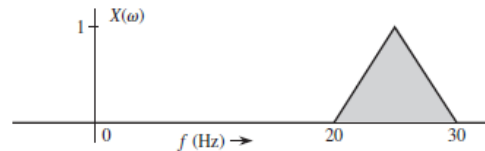
7- The signal $x(t)$ contains the following harmonics

$$x(t) = \cos\left(\frac{2}{3}t\right) + \cos\left(\frac{4}{5}t\right)$$

- a) fifth and sixth harmonics.
- b) first and sixth harmonics.
- c) fifth harmonic only.
- d) sixth harmonic only.

- 1) a
- 2) b
- 3) c
- 4) d

8) 8- Determine the Nyquist sampling rate of the $x(t)$



- a. 10ksample/s
- b. 5 ksample/s
- c. 20 ksample/s
- d. 24ksample/s

- 1) a
- 2) b
- 3) c
- 4) d

9) 9- Determine the minimum sampling frequency for signals $x(t)$ with bandwidth 10 kHz,

- e. 10 ksample/s
- f. 5 ksample/s
- g. 20 ksample/s
- h. 24ksample/s

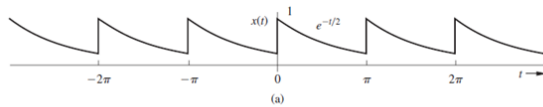
- 1) e
- 2) f
- 3) g
- 4) h

10)





10- Find the f_0 for the periodic signal $x(t)$ shown in Figure below



- a) 2 rad/s
- b) 5 rad/s
- c) 10 rad/s
- d) 2.5 rad/s

- 1) a
- 2) b
- 3) c
- 4) d

11) 11- Determine the time sampling T_s signals $x(t)$ with bandwidth 2 kHz,

- a. 0.25 ms
- b. 0.125 ms
- c. 0.1 ms
- d. 0.4 ms

- 1) a
- 2) b
- 3) c
- 4) d

12) 12- For the signals $x_a(t)$ with bandwidth 6 kHz, what is the number of bits per sample if the line speed is 2^4 kb/s.

- a. 2 bits/sample
- b. 7 bits/sample
- c. 3 bits/sample
- d. 9 bits/sample

- 1) a
- 2) b
- 3) c
- 4) d

13)





13- The signal $x(t)$ contains the Dc harmonics

$$x(t) = 2 + \cos\left(\frac{2}{3}t + 30^\circ\right) + \cos\left(\frac{4}{5}t + 45^\circ\right)$$

- a) 10.
- b) 2.
- c) $1\sqrt{2}$.
- d) 0.

- 1) - a
- 2) b
- 3) - c
- 4) - d

14) 14- For the signals $y(t)$ with bandwidth 5 kHz, what is the number of levels if the line speed is 20 kb/s.

- a. 2 level
- b. 7 level
- c. 4 level
- d. 9 level

- 1) - a
- 2) - b
- 3) c
- 4) - d

15) 15- For the signal $(t) = 7\cos \pi t + 5\sin 2\pi t$, the fundamental frequency w_0 is

- a. π
- b. 0.5
- c. 10
- d. X(t) is not periodic

- 1) a
- 2) - b
- 3) - c
- 4) - d

16)





16- For the signals $y(t)$ with bandwidth 5 MHz , what is the minimum data rate of the line if the quantization level is 2 level.

- a. 10 Mb/s
- b. 20 Mb/s
- c. 30 Mb/s
- d. 5 Mb/s

- 1) a
- 2) b
- 3) c
- 4) d

17) 17- Find the bandwidth for the signals $x(t)$, if the number of bits per sample is 2 and the line speed is 100 kb/s .

- a. 20 KHz
- b. 40 KHz
- c. 100 KHz
- d. 25 KHz

- 1) a
- 2) b
- 3) c
- 4) d

18) 18- For the signal $x(t) = (7\cos\sqrt{2}t + 5\sin 2t)$ the fundamental frequency f_0 is

- a. 2
- b. 5
- c. 10
- d. $X(t)$ is not periodic

- 1) a
- 2) b
- 3) c
- 4) d

19)





19- Find the fundamental frequency ω_0 for the signal $x(t)$

$$x(t) = \cos\left(\frac{2}{3}t + 30^\circ\right) + \cos\left(\frac{4}{5}t + 45^\circ\right)$$

a) $\omega_0 = 3/15$

b) $\omega_0 = 2/15$

c) $\omega_0 = 1/15$

d) $\omega_0 = 7/30$

1) - a

2) + b

3) - c

4) - d

20) 20- Find the fundamental frequency (f_0) of the signal $x(t)$ is

$$x(t) = 1/2 + 2(\cos 2\pi t - 10 \cos 6\pi t + 5 \cos 10\pi t - 17 \cos 20\pi t)$$

a) 5

b) 1

c) 7

d) 1/2

1) - a

2) + b

3) - c

4) - d

21) 21- The signal $x(t)$ contains the Dc harmonics

$$x(t) = \cos\left(\frac{2}{3}t + 30^\circ\right) + \cos\left(\frac{4}{5}t + 45^\circ\right)$$

e) 10.

f) 2.

g) 1\2.

h) 0.

1) - e

2) - f

3) - g

4) + h

22)





22- Determine the Fourier coefficient a_0 component for the signal $x(t)$

$$x(t) = 1/2 + 2(\cos t - 3 \cos 3t + 5 \cos 5t - 17 \cos 7t)$$

- a. 2
- b. 0.5
- c. 1.5
- d. 15

- 1) - a
- 2) + b
- 3) - c
- 4) - d

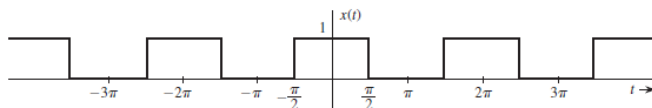
23) 23- The third Fourier coefficient a_3 signal $x(t)$ is

$$x(t) = 1/2 + 2(\cos t - 10 \cos 3t + 5 \cos 5t - 17 \cos 7t)$$

- a) 5
- b) -10
- c) 1
- d) -17

- 1) - a
- 2) + b
- 3) - c
- 4) - d

24) 24- Find the time period for the periodic signal $x(t)$ shown in Figure below



- a. $T_0 = 2\pi$
- b. $T_0 = \pi$
- c. $T_0 = 2$
- d. None of the mentioned

- 1) + a
- 2) - b
- 3) - c
- 4) - d

25)





25-The Nyquist sampling rate is given by:

- a. $F_s = 2 F_m$
- b. $F_s = 3 F_m$
- c. $F_s = 4 F_m$
- d. $F_s = F_m$

- 1) a
- 2) b
- 3) c
- 4) d

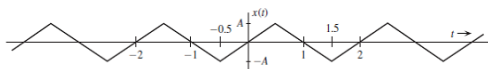
26)

26-Sine wave is a

- a. Periodic signal
- b. nonperiodic signal
- c. noise signal
- d. Both a and c

- 1) a
- 2) b
- 3) c
- 4) d

27) 27-Find the fundamental frequency for the triangular periodic signal $x(t)$ shown in Figure below



- a. $\omega_0 = 1$
- b. $\omega_0 = \pi$
- c. $\omega_0 = 10$
- d. None of the mentioned

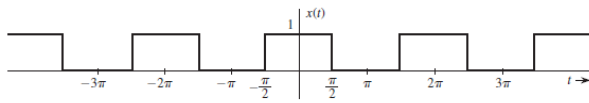
- 1) a
- 2) b
- 3) c
- 4) d

28)





28- Find the fundamental frequency for the periodic signal $x(t)$ shown in Figure below



- a. $w_0 = 1$
b. $w_0 = 5$
c. $w_0 = 10$
d. None of the mentioned

- 1) a
2) b
3) c
4) d

29)

29- An even function $f(x)$ for all values of x and $-x$ holds

- a. $f(x) = f(-x)$
b. $f(x) = -f(x)$
c. $f(x) = f(x)f(-x)$
d. None of the mentioned

- 1) a
2) b
3) c
4) d

30)

30- In Unit impulse function

- a. Pulse width is zero
b. Area of pulse curve is unity
c. Height of pulse goes to infinity
d. All of the mentioned

- 1) a
2) b
3) c
4) d

31)





31- The spectrum of the sampled signal may be obtained without overlapping only if

- a. $f_s \geq 2f_m$
- b. $f_s < 2f_m$
- c. $f_s > f_m$
- d. $f_s < f_m$

- 1) a
- 2) b
- 3) c
- 4) d

32) 32- A distorted signal of frequency f_m is recovered from a sampled signal if the sampling frequency f_s is

- a. $f_s > 2f_m$
- b. $f_s < 2f_m$
- c. $f_s = 2f_m$
- d. $f_s \geq 2f_m$

- 1) a
- 2) b
- 3) c
- 4) d

33) 33- Calculate the minimum sampling rate to avoid aliasing when a continuous time signal is given by $x(t) = 5 \cos 400\pi t$

- a. 100 Hz
- b. 200 Hz
- c. 400 Hz
- d. 250 Hz

- 1) a
- 2) b
- 3) c
- 4) d

34) 34- Calculate the Nyquist rate for sampling when a continuous time signal is given by

$$x(t) = 5 \cos 100\pi t + 10 \cos 200\pi t - 15 \cos 300\pi t$$

- a. 300Hz
- b. 600Hz
- c. 150Hz
- d. 200Hz

- 1) a
- 2) b
- 3) c





4) - d

