Assignment-5

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. Due on 2019-03-06, 23:59 IST.

1) Consider the signal $x(t)$ with Hilbert transform $\hat{x}(t)$. The complex pre-envelope of this signal is

- $x(t) - \hat{x}(t)$
- $x(t) + \hat{x}(t)$
- $x(t) - j\hat{x}(t)$
- $x(t) + j\hat{x}(t)$

No, the answer is incorrect.

Score: 0

Accepted Answers:
- $x(t) + j\hat{x}(t)$

2) Consider the signal $2 \sin(2\pi f_m t) \cos(2\pi f_c t)$. The complex pre-envelope of this signal is

- $2 \sin(2\pi f_m t) e^{j2\pi f_c t}$
- $2 \cos(2\pi f_m t) e^{j2\pi f_c t}$
- $e^{j2\pi(f_m+f_c) t}$
3) Consider a quadrature carrier multiplexing (QCM) signal with in-phase and quadrature components given by \(x_I(t), x_Q(t)\). The complex baseband equivalent of the QCM signal is

\[
x_I(t) - jx_Q(t) \\
x_Q(t) + jx_I(t) \\
x_Q(t) - jx_I(t) \\
x_I(t) + jx_Q(t)
\]

No, the answer is incorrect.
Score: 0

Accepted Answers:
\(x_I(t) + jx_Q(t)\)

4) Consider the phase modulated signal \(s(t) = A_c \cos (2\pi f_c t + k_p A_m \sin (2\pi f_m t))\). The maximum frequency deviation of the signal is

\[
k_p A_m \quad \quad k_p A_m f_m \quad \quad k_p A_m f_c \quad \quad k_p f_m \quad \quad k_p f_m / A_m
\]

No, the answer is incorrect.
Score: 0

Accepted Answers:
\(k_p A_m f_m\)

5) In a narrowband FM signal,

\[
\Delta f \ll f_m \\
f_c \ll \Delta f \\
f_m \ll \Delta f \\
\Delta f \ll f_c
\]

No, the answer is incorrect.
Score: 0

Accepted Answers:
\(\Delta f \ll f_m\)

6) Consider a narrowband FM signal with frequency deviation \(\Delta f\), that is passed through a frequency multiplier with multiplication factor \(n\). The maximum frequency deviation of the output signal is

\[
\Delta f \ll f_m
\]
7) Consider a FM signal with the message signal $A_m \cos (2\pi f_m t)$ and modulation index $\beta$. The maximum frequency deviation of the signal is

$$\Delta_f$$

$$\frac{\Delta_f}{n}$$

$$n\Delta_f$$

$$n^2\Delta_f$$

No, the answer is incorrect.
Score: 0
Accepted Answers:

$$n\Delta_f$$

8) An angle-modulated signal is described as $x_c(t) = 20 \cos (2\pi \times 10^3 t + 0.3 \sin (2 \times 10^3 \pi t))$. Consider $x_c(t)$ as an FM signal with $k_f = 10$. Find the message signal $m(t)$.

$$0.3 \sin (2 \times 10^3 \pi t)$$

$$30\pi \sin (2 \times 10^3 \pi t)$$

$$300 \cos (2 \times 10^3 \pi t)$$

$$30 \cos (2 \times 10^3 \pi t)$$

No, the answer is incorrect.
Score: 0
Accepted Answers:

$$30 \cos (2 \times 10^3 \pi t)$$

9) An angle-modulated signal is described as $x_c(t) = 20 \cos (2\pi \times 10^3 t + 0.3 \sin (2 \times 10^3 \pi t))$. Consider $x_c(t)$ as an FM signal with $k_f = 10$. The bandwidth of $x_c(t)$ evaluated using Carsons rule is

$$2 \text{ KHz}$$
10) An angle-modulated signal with carrier frequency $f_c = 5 \times 10^7$ Hz is described by the equation $\varphi(t) = 5 \cos(2\pi f_c t + 2 \times \sin(5000\pi t))$. Find its frequency deviation $\Delta f$. 

- 2.6 kHz
- 0.3 MHz
- 20 MHz

No, the answer is incorrect.

Score: 0

Accepted Answers:
- 2.6 kHz

- 2.5 kHz
- 2 kHz
- 5 kHz
- 15 kHz

No, the answer is incorrect.

Score: 0

Accepted Answers:
- 5 kHz