Unit 10 - Week 7- Signal Reconstruction from Sampled Signal ,Introduction to Pulse Amplitude Modulation, Spectrum of PAM Signal and Reconstruction, Quantization, Uniform Quantizers – Midrise and Midtread, Quantization noise, Lloyd Max Quantization Algorithm, Non-uniform Quantizers

Assignment-7

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-18, 23:59 IST.

1) Consider a message signal with maximum frequency f_m. The minimum sampling frequency f_s required to avoid distortion in the spectrum of the sampled signal is *1 point*

- f_m
- $2f_m$
- $\frac{1}{2}f_m$
- $(f_m)^2$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$2f_m$

2) Consider a signal $m(t)$ with spectrum $M(f)$, which is sampled with an ideal impulse train of sampling frequency f_s. The spectrum of the resulting sampled signal is *1 point*

- $\frac{f_s}{2}(M(f-f_s)+M(f+f_s))$
- $\frac{1}{2}M(f-f_s)(1+\text{sgn}(f-f_s))+\frac{1}{2}M(f+f_s)(1-\text{sgn}(f+f_s))$
- $f_s\sum_{n=-\infty}^{\infty}M(f-nf_s)$
- $M(f)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$f_s\sum_{n=-\infty}^{\infty}M(f-nf_s)$

3) Consider the signal $m(t)=\cos(100\pi t)$. What is the minimum sampling frequency required for no distortion? *1 point*

- 25 Hz
- 100 Hz
- 100π Hz
- 200 Hz

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

4) Consider the signal $m(t)=10\times\text{sinc}(5t)=10\times\frac{\sin(5\pi t)}{5\pi t}$. What is the minimum sampling rate required for this signal to avoid aliasing? *1 point*

- 2.5 Hz
- 5 Hz
- 10 Hz
- 5π Hz

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

5) Consider the signal $m(t)=\cos(160\pi t)$ to be sampled using an impulse train with sampling frequency $f_s=180$ Hz. What is the range of possible cutoff frequencies of the low pass filter required for perfect reconstruction of the signal $m(t)$ from the sampled signal? Consider the frequency response of an ideal low pass filter with cutoff frequency f_l to be 1 for $-f_l\le f\le f_l$ and 0 otherwise. *1 point*

- $40Hz<f_l<120Hz$
- $80Hz<f_l<100Hz$
- $80Hz<f_l<180Hz$
- $80Hz<f_l<160Hz$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$80Hz<f_l<100Hz$

6) Consider the sinusoidal signal $m(t)=\cos(2000\pi t)$. It is sampled using an impulse train with sampling frequency $f_s=1.8kHz$, followed by low pass filtering with an ideal low pass filter of cutoff frequency $2kHz$. What are the frequencies of the sinusoids present in the resulting signal? *1 point*

- $1kHz$ only
- $1kHz$ and $0.2kHz$ only
- $1kHz$ and $0.8kHz$ only
- $1kHz$ and $1.8kHz$ only

No, the answer is incorrect.
Score: 0
Accepted Answers:
$1kHz$ and $0.8kHz$ only

7) Consider a message signal $m(t)$ with maximum frequency f_m. The minimum sampling rate required to sample this signal to avoid distortion of the spectrum is termed the *1 point*

- Carsons rate
- Nyquist rate
- Costas rate
- Viterbi rate

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

8) Consider the signal $m(t)=\cos(400\pi t)$. What is the minimum sampling frequency required for no distortion? *1 point*

- 400 Hz
- 800 Hz
- 100 Hz
- 200 Hz

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

9) Consider the signal $m(t)=\sin(300\pi t)$ to be sampled using an impulse train with sampling frequency $f_s=400$ Hz. What is the range of possible cutoff frequencies of the low pass filter required for perfect reconstruction of the signal $m(t)$ from the sampled signal? Consider the frequency response of an ideal low pass filter with cutoff frequency f_l to be 1 for $-f_l\le f\le f_l$ and 0 otherwise. *1 point*

- $150Hz<f_l<250Hz$
- $300Hz<f_l<400Hz$
- $150Hz<f_l<400Hz$
- $200Hz<f_l<400Hz$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$150Hz<f_l<250Hz$

10) Consider the sinusoidal signal $m(t)=\cos(10\times10^3\pi t)$. It is sampled using an impulse train with sampling frequency $f_s=8kHz$, followed by low pass filtering with an ideal low pass filter of cutoff frequency $6kHz$. What are the frequencies of the sinusoids present in the resulting signal? *1 point*

- $5kHz$ only
- $5kHz$ and $3kHz$ only
- $5kHz$ and $8kHz$ only
- $5kHz$ and $6kHz$ only

No, the answer is incorrect.
Score: 0
Accepted Answers:
$5kHz$ and $3kHz$ only