Unit 12 - Week 9 - Basics of Probability, Conditional Probability, Independent Events - Mary-PAM Example, Independent Events-Block Transmission, Independent Events-Multiantenna Fading

Assignment-9

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

Due on 2020-04-01, 23:59 IST.

1) A television signal (video and audio) has a bandwidth of 8 MHz. This signal is sampled at 50% above the Nyquist rate, quantized and binary coded to obtain a PCM signal. If the samples are quantized into 512 levels, determine the bit-rate of the resulting signal. *1 point*

- 216 Mbps
- 72 Mbps
- 144 Mbps
- 288 Mbps

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

2) Consider a uniform quantizer with 64 quantization levels and maximum message amplitude 100. What is the quantization noise power? *1 point*

- -0.77 dB
- -3.55 dB
- -5.39 dB
- 2.57 dB

No, the answer is incorrect.
Score: 0
Accepted Answers:
-0.77 dB

3) Consider the probability density function of the message sample m given as *1 point*

$$f_M(m) = 2(1-m), 0 \leq m \leq 1.$$

What is the optimal quantization level corresponding to the interval $[0, 1]$?

- 1/2
- 2/3
- 1/3
- 3/2

No, the answer is incorrect.
Score: 0
Accepted Answers:
1/3

4) In the delta modulation, the distortion that arises when the step size Δ is large in comparison to a signal that is relatively flat, is termed as *1 point*

- Small amplitude distortion
- Granular noise
- Slope overload distortion
- Additive White Gaussian Noise

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

5) Consider a superhet receiver with broadcast frequency f_c and intermediate frequency f_{IF}. The corresponding local oscillator (LO) frequency that is larger than f_c is given as *1 point*

- $f_c + f_{IF}$
- $f_c + 2f_{IF}$
- $2f_c + f_{IF}$
- $2f_c + 2f_{IF}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$f_c + f_{IF}$

6) Consider the probability density function of the samples of a signal given as $f_M(m) = \sin(m), 0 \leq m \leq \pi/2$. What is the optimal quantization level corresponding to the interval $[0, \pi/2]$? *1 point*

- $\pi/4$
- 1/4
- 1/2
- 1

No, the answer is incorrect.
Score: 0
Accepted Answers:
1

7) A television signal (video and audio) is sampled, quantized and binary coded to obtain a PCM signal. If the samples are quantized to 1024 levels, determine the number of binary pulses required to encode each sample *1 point*

- 9
- 10
- 1024
- 2

No, the answer is incorrect.
Score: 0
Accepted Answers:
10

8) Consider signals $m_i(t), 1 \leq i \leq 5$ band-limited to $2i$ kHz each, time division multiplexed after sampling respectively at the Nyquist rate for each signal. The samples are then quantized using a μ-law quantizer with $L = 512$ levels and binary coded using PCM. What is the bit rate of the resulting digital information signal? *1 point*

- 540 Kbps
- 120 Kbps
- 280 Kbps
- 660 Kbps

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

9) Which of the following quantizers is based on the principle of companding *1 point*

- Lloyd-max Quantizer
- Delta Modulation
- μ-Law Quantizer
- Differential Pulse Coded Modulation (DPCM)

No, the answer is incorrect.
Score: 0
Accepted Answers:
μ-Law Quantizer

10) In a radio receiver for the AM system, the mixer translates the carrier frequency f_c to a fixed IF using the local oscillator (LO) frequency that is larger than the corresponding broadcast frequency. It is known that for the broadcast frequency of 950 kHz, the local oscillator frequency is 1.6 MHz. What is the local oscillator frequency corresponding to a broadcast frequency of 1.2 MHz? *1 point*

- 1.6 MHz
- 1.85 MHz
- 250 kHz
- 2.8 MHz

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