Assignment 11

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. Due on 2019-04-17, 23:59 IST.

1) Consider a discrete memoryless channel (DMC). The input to the DMC is a source generating two outputs 0 and 1 with equal probability. The capacity of the channel is maximum when probability of error (p) is

   a. p=0
   b. p=1
   c. p=0 or p=1
   d. p=0.5

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

2) Consider a discrete memoryless channel (DMC). The input to the DMC is a source generating two outputs 0 and 1 with equal probability. The capacity of the channel is minimum when probability of error (p) is

   a. 0
   b. 1
   c. 0.5
   d. Capacity is independent of p

No, the answer is incorrect. Score: 0. Accepted Answers: c
For power limited communication channels, the most ideal modulation scheme would be:

a. M-ary PAM
b. M-ary PSK
c. OOK
d. MFSK

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

4) Linear phase filters result in:

a. Zero channel impulse response (CIR)
b. Symmetric channel impulse response
c. Random channel impulse response
d. Infinite channel impulse response

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

5) Consider an additive white Gaussian noise (AWGN) channel with 3 kHz bandwidth with a power spectral density $\frac{N_0}{2} = 10^{-12}$ W/Hz. The signal power required at the receiver is 0.2. The channel capacity is:

a. 15.75 kbps
b. 45.07 kbps
c. 81.26 kbps
d. 0

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

6) A certain telephone line has a bandwidth of 3.5 kHz. Calculate the data rate (in bits/s) that can be transmitted if we use BPSK with raised cosine filters with roll-off factor of $\alpha = 0.25$.

a. 5600
b. 8400
c. 11200
d. 14000
7) The tails of raised cosine filter (with bandwidth (W)) falls off with the rate

   a. $W$
   b. $W^2$
   c. $W^3$
   d. $W^4$

8) Consider the binary data transmission at a rate of 56 kbps using baseband binary pulse amplitude modulation (PAM) that is designed to have a raised cosine spectrum. The transmit bandwidth (in kHz) required of a roll-off factor of 0.25 is

   a. 10 kHz
   b. 20 kHz
   c. 35 kHz
   d. 50 kHz

9) Raised cosine filter becomes the Nyquist filter for a roll-off factor of

   a. 0
   b. 0.5
   c. 1
   d. infinite
10) If roll-off factor is increased the bandwidth of the pulse

a. Increases  
b. Decreases  
c. Neither increase nor decrease  
d. Additional information is required

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

11) A duobinary pulse \( x(nT) \) has a value of 1 for \( n = \)

a. -1 and 0  
b. -1 and 1  
c. 0 and 1  
d. -1, 0 and 1

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

12) For maximum likelihood receiver of a duobinary pulse using modulo 2 subtraction precoding, the detection threshold(s) is(are) at

a. 0  
b. 1  
c. +1 and -1  
d. -0.5 and +0.5

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

13)
The convolution of the channel impulse response and zero-forcing equalizer filter response would produce a(n) _________ filter response in time domain.

a. Constant function  
b. Sinusoidal function  
c. Unit step function  
d. Impulse

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

14) An ideal band-pass channel 500 Hz-2000 Hz is deployed for communication. A modes designed to transmit bits at the rate of 4800 bits/sec using 16-QAM. The roll-off factor w raised cosine spectrum that utilizes the entire frequency band is

a. 0.1  
b. 0.25  
c. 0.5  
d. 0.6

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

15) The capacity of the band-limited additive white Gaussian noise (AWGN) channel is given by

\[ C = BW \log_2 \left( 1 + \frac{P}{\sigma^2 W} \right) \] bits per second (bps), where W is the channel bandwidth, P is the average power received and \( \sigma^2 \) is the one-sided power spectral density of the AWGN. For a fixed \( \frac{P}{\sigma^2} = 1000 \), the channel capacity (in kbps) with infinite bandwidth (W → ∞) is approximately

a. 1.44  
b. 1.08  
c. 0.72  
d. 0.36

No, the answer is incorrect. 
Score: 0