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NPTEL

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Courses » Information Theory, Coding and Cryptography

Announcements **Course** Ask a Question Progress Mentor FAQ

Unit 4 - Week 3

Assignment 3

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

Due on 2018-09-05, 23:59 IST.

1) In an ideal channel, the crossover probability, *p*, is ***1 point***

- 1
- 0
- 0.25
- 0.5

No, the answer is incorrect.
Score: 0

Accepted Answers:
0

2) Relay channels can use ***1 point***

- Amplify-and-Forward (AF) scheme
- Decode-and-Forward (DF) scheme
- Hybrid of AF and DF
- All of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of these

3) For a BSC with 0.5 <p< 1, the capacity ***1 point***

- increases with increasing p
- decreases with increasing p

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4) Channel capacity is a measure of **_1 point_**

- Entropy
- Differential Entropy
- Lower-bound on the maximum rate of information transfer
- The maximum rate at which information can be reliably transmitted over achannel

No, the answer is incorrect.
Score: 0

Accepted Answers:
The maximum rate at which information can be reliably transmitted over achannel

5) The capacity of a binary symmetric channel, given H(p) is the binary entropy function, is **_1 point_**

- 1–H(p)
- H(p) – 1
- 1 – H(p)^2
- H(p)

No, the answer is incorrect.
Score: 0

Accepted Answers:
1–H(p)

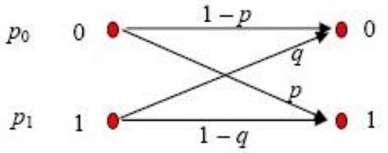
6) Suppose I have two parallel independent BSCs with crossover probabilities p and q. If I choose to send two bits at a time over these parallel channels, my net capacity will be **_1 point_**

- 1 – H(p) – H(q)
- 2 – H(p) – H(q)
- H(p) – H(q)
- H(p) + H(q)

No, the answer is incorrect.
Score: 0

Accepted Answers:
2 – H(p) – H(q)

7) Consider the binary channel shown below. Let the a priori probabilities of sending the binary symbols be p0 and p1, where p0 + p1 = 1. Then thea posteriori probability P(X = 1|Y = 1) is **_1 point_**



- ((1 – p)(1 – p0)) / (pp0 + (1 – q) (1 – p0))
- ((1 – q)(1 – p)) / (pp0 + (1 – q) (1 – p))
- ((1 – q)(1 – p0)) / (pp0 + (1 – q) (1 – p0))
- ((1 – p)(1 – q)) / (pp0 + (1 – q) (1 – p0))

No, the answer is incorrect.
Score: 0

Accepted Answers:
((1 – q)(1 – p0)) / (pp0 + (1 – q) (1 – p0))

8) The capacity of the channel given by is **_0 points_**

$$P = \begin{bmatrix} \frac{1-p}{2} & \frac{1-p}{2} & \frac{p}{2} & \frac{p}{2} \\ \frac{p}{2} & \frac{p}{2} & \frac{1-p}{2} & \frac{1-p}{2} \end{bmatrix}$$

- log 4 + plog(p) + (1 – p)log(1 – p)
- plog(p) + (1 – p)log(1 – p)
- 4(plog(p) + (1 – p)log(1 – p))
- log 4 + (1 – p)log(p) + plog(1 – p)

No, the answer is incorrect.
Score: 0

Accepted Answers:
log 4 + plog(p) + (1 – p)log(1 – p)

9) A telephone channel has a bandwidth of 3000 Hz and the SNR = 20 dB. The channel capacity is (roughly) ***1 point***

- 10 kb/s
- 20 kb/s
- 30 kb/s
- 40 kb/s

No, the answer is incorrect.
Score: 0

Accepted Answers:
20 kb/s

10) Suppose a TV displays 30 frames/second. There are approximately 2 X 10^5 pixels per frame, each pixel requiring 16 bits for colour display. Assuming an SNR of 25 dB the bandwidth required to support the transmission of the TV video signal would be ***1 point***

- 10.50 MHz
- 11.05 MHz
- 11.40 MHz
- 11.55 MHz

No, the answer is incorrect.
Score: 0

Accepted Answers:
11.55 MHz

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