Unit 14 - Week 11 Lectures

Assignment-11

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

Due on 2019-10-16, 23:59 IST.

1) Which one of the following statements is true? *1 point*

- In a pre-amplifier based direct detection receiver, we can ignore the signal to noise beating but shot noise and thermal noise in the circuit cannot be ignored.
- In a direct detection receiver circuit, shot noise is independent of the bit (0 or 1) transmitted.
- In a direct detection receiver circuit, thermal noise is independent of the bit (0 or 1) transmitted but shot noise is dependent on the bit transmitted.
- In a direct detection receiver circuit, shot noise as well as thermal noise is independent of the bit (0 or 1) transmitted.

No, the answer is incorrect.
Score: 0
Accepted Answers:
In a direct detection receiver circuit, thermal noise is independent of the bit (0 or 1) transmitted but shot noise is dependent on the bit transmitted.

2) Given the minimum optical power corresponding to bit 0 is 1 dBm and extinction ratio is 22 dB. The maximum optical power corresponding to bit 1 is *1 point*

- 199.52 mW
- 139 mW
- 21 dBm
- 22 dBm

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

3) For an OOK system optical signal is received using a photodiode of responsivity of 0.8 A/W with bandwidth of 500 MHz and load resistor is 100Ω. Given the optical power corresponding to bit 0 is -20 dBm and extinction ratio is 22 dBm. The shot noise current generated when bit 0 is received is *1 point*

- 8.009 nA
- 35.8 nA
- 16 nA
- 3.2 nA

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

4) In Question 3, the shot noise current generated when bit 1 is received is *1 point*

- $2.5\ \mu A$
- $0.5\ \mu A$
- $4.0\ \mu A$
- $0.45\ \mu A$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$0.45\ \mu A$

5) The thermal noise generated in the system given in Question 3 at $25^{\circ}C$ is *1 point*

- $0.286\ \mu A$
- $0.45\ \mu A$
- $4.5\ \mu A$
- $4.0\ \mu A$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$0.286\ \mu A$

6) For extinction ratio (ER) = ∞, if optical current received for bit 1 is 2 mA, the BER for the system is given by (assume $\sigma_0^2 = 4 \times 10^{-6}\ A^2$ and $\sigma_1^2 = 9 \times 10^{-6}\ A^2$) *1 point*

- Q(0.3)
- Q(0.4)
- Q(0.5)
- Q(2.5)

No, the answer is incorrect.
Score: 0
Accepted Answers:
Q(0.4)

7) For ER < ∞, if optical current received for bit 1 is 2 mA and for bit 0 is 0.3 mA, the BER for the system is given by (assume $\sigma_0^2 = 4 \times 10^{-6}\ A^2$ and $\sigma_1^2 = 9 \times 10^{-6}\ A^2$) *1 point*

- Q(0.34)
- Q(0.06)
- Q(0.5)
- Q(0.46)

No, the answer is incorrect.
Score: 0
Accepted Answers:
Q(0.34)

8) The optimum threshold current value in Question 7 for minimum BER is (assume that probability of transmission of bit 1 and bit 0 is same) *1 point*

- 1.32 mA
- 1.15 mA
- 0.98 mA
- 2.3 mA

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

9) If probability of transmission of bit 1 is not equal to probability of transmission of bit 0, the optimum threshold current value calculated in Question 8 will not change. *1 point*

- True
- False

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

10) The quadrature point of optical MZIM occurs at voltage value of *1 point*

- $\frac{V_\pi}{4}$
- $\frac{V_\pi}{2}$
- 0
- V_π

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{V_\pi}{2}$