Started on	Friday, 17 November 2023, 7:25 AM
State	Finished
Completed on	Sunday, 19 November 2023, 9:19 PM
Time taken	2 days 13 hours
Grade	**9.00** out of 10.00 (**90**%)

Question **1**

Correct

Mark 1.00 out of 1.00

Flag question

PDF of amplitude a of Rayleigh fading channel is

Select one:

- $2ae^{-a^2}, -\infty < a < \infty$
- $2ae^{-a^2}, a \geq 0$ ✔
- $ae^{-a^2}, a \geq 0$
- $ae^{-a^2}, -\infty < a < \infty$

Your answer is correct.

The correct answer is: $2ae^{-a^2}, a \geq 0$

Question **2**

Correct

Mark 1.00 out of 1.00

Flag question

The integral $\int_{-\infty}^{\infty} a^2 e^{-\frac{a^2}{2\sigma^2}} da$ evaluates to

Select one:

- 0
- $\sqrt{2\pi}\sigma^3$ ✔
- $2\sigma^2$
- σ^3

Your answer is correct.

The correct answer is: $\sqrt{2\pi}\sigma^3$

Question **3**

Correct

Mark 1.00 out of 1.00

Flag question

Which of the following statements is true?

Select one:

- BER of the wireless channel $\propto e^{-\frac{1}{2}SNR}$ while that of the wireline channel $\propto \frac{1}{SNR}$
- BER of the wireline and wirelesss channel $\propto e^{-\frac{1}{2}SNR}$
- BER of the wireline and wirelesss channel $\propto \frac{1}{SNR}$
- BER of the wireline channel $\propto e^{-\frac{1}{2}SNR}$ while that of the wireless channel $\propto \frac{1}{SNR}$ ✔

Your answer is correct.

The correct answer is: BER of the wireline channel $\propto e^{-\frac{1}{2}SNR}$ while that of the wireless channel $\propto \frac{1}{SNR}$

Question **4**

Correct

Mark 1.00 out of 1.00

Flag question

SER of M −ary QAM for $SNR = \rho$ is

Select one:

- $4\left(1-\frac{1}{\sqrt{M}}\right)Q\left(\sqrt{\frac{\rho}{(M-1)}}\right)$
- $\left(1-\frac{1}{\sqrt{M}}\right)Q\left(\sqrt{\frac{3\rho}{(M-1)}}\right)$
- $4\left(1-\frac{1}{\sqrt{M}}\right)Q\left(\sqrt{\frac{3\rho}{(M-1)}}\right)$ ✔
- $4\left(1-\frac{1}{M}\right)Q\left(\sqrt{\frac{3\rho}{(\sqrt{M}-1)}}\right)$

Your answer is correct.

The correct answer is: $4\left(1-\frac{1}{\sqrt{M}}\right)Q\left(\sqrt{\frac{3\rho}{(M-1)}}\right)$

Question **5**

Correct

Mark 1.00 out of 1.00

Flag question

Consider the random signal detection problem described in class. The optimal detector for this problem is given as choose $\mathcal{H}_1$ if

Select one:

- $\bar{\mathbf{s}}^T\bar{\mathbf{y}} \leq \gamma$
- $\|\bar{\mathbf{y}}\|^2 > \gamma$ ✔
- $\|\bar{\mathbf{y}}\|^2 \leq \gamma$
- $\bar{\mathbf{s}}^T\bar{\mathbf{y}} > \gamma$

Your answer is correct.

The correct answer is: $\|\bar{\mathbf{y}}\|^2 > \gamma$

Question **6**

Correct

Mark 1.00 out of 1.00

Flag question

The optimal detector for the random signal detection problem is

Select one:

- Matched filter
- Generalized matched filter
- Phase detector
- Energy detector ✔

Your answer is correct.

The correct answer is: Energy detector

Question **7**

Correct

Mark 1.00 out of 1.00

Flag question

The χ^2_N-**Central chi-squared RV** with N **degrees of freedom** is

Select one:

- Sum of squares of N i.i.d. standard Normal random variables ✔
- Sum of N i.i.d. standard Normal random variables
- Sum of squares of N i.i.d. unit mean unit variance Normal random variables
- Sum of N i.i.d. unit mean unit variance Normal random variables

Your answer is correct.

The correct answer is: Sum of squares of N i.i.d. standard Normal random variables

Question **8**

Correct

Mark 1.00 out of 1.00

Flag question

The PDF of χ^2_N-**Central chi-squared RV** with N **degrees of freedom** is

Select one:

- $\frac{1}{2^{\frac{N}{2}-1}\Gamma\left(\frac{N}{2}\right)} x^{\frac{N}{2}} e^{-\frac{1}{2}x},\ x \geq 0$
- $\frac{1}{2^{\frac{N}{2}}\Gamma(N)} x^{\frac{N}{2}-1} e^{-x},\ x \geq 0$
- $\frac{1}{2^{\frac{N}{2}}\Gamma\left(\frac{N}{2}\right)} x^{\frac{N}{2}-1} e^{-\frac{1}{2}x},\ x \geq 0$ ✔
- $\frac{1}{2^{\frac{1}{2}}\Gamma\left(\frac{1}{2}\right)} x^{\frac{N}{2}-1} e^{-\frac{1}{2}x},\ x \geq 0$

Your answer is correct.

The correct answer is: $\frac{1}{2^{\frac{N}{2}}\Gamma\left(\frac{N}{2}\right)} x^{\frac{N}{2}-1} e^{-\frac{1}{2}x},\ x \geq 0$

Question **9**

Incorrect

Mark 0.00 out of 1.00

Flag question

The P_{FA} for the random signal detection problem is

Select one:

- $Q\left(\frac{\gamma}{\sigma^2}\right)$
- $\frac{\Gamma\left(\frac{N}{2}, \frac{\gamma}{\sigma^2}\right)}{\Gamma\left(\frac{N}{2}\right)}$ ✖
- $Q_{\chi^2_N}\left(\frac{2\gamma}{\sigma^2}\right)$
- $\frac{\Gamma\left(\frac{N}{2}, \frac{\gamma}{2\sigma^2}\right)}{\Gamma\left(\frac{N}{2}\right)}$

Your answer is incorrect.

The correct answer is: $\frac{\Gamma\left(\frac{N}{2}, \frac{\gamma}{2\sigma^2}\right)}{\Gamma\left(\frac{N}{2}\right)}$

Question **10**

Correct

Mark 1.00 out of 1.00

Flag question

The P_D for the random signal detection problem is

Select one:

- $\frac{\Gamma\left(\frac{N}{2}, \frac{\gamma}{\sigma^2+\sigma_s^2}\right)}{\Gamma\left(\frac{N}{2}\right)}$
- $Q_{\chi^2_N}\left(\frac{\gamma}{\sigma^2+\sigma_s^2}\right)$ ✔
- $Q\left(\frac{\gamma}{\sigma^2+\sigma_s^2}\right)$
- $\frac{\Gamma\left(\frac{N}{2}, \frac{\gamma}{\sigma^2}\right)}{\Gamma\left(\frac{N}{2}\right)}$

Your answer is correct.

The correct answer is: $Q_{\chi^2_N}\left(\frac{\gamma}{\sigma^2+\sigma_s^2}\right)$

Finish review