Question **1**

Not yet answered

Marked out of 1.00

Flag question

The probability of symbol error for 16-QAM with $\frac{E_s}{N_0} = 20$ is given as

Select one:

- ○ $\frac{3}{2}Q\left(\frac{1}{\sqrt{2}}\right)$
- ○ $3Q(1)$
- ○ $\frac{7}{2}Q\left(\sqrt{\frac{1}{3}}\right)$
- ◉ $3Q(2)$

Question **2**

Not yet answered

Marked out of 1.00

Flag question

Let the decision regions for $\mathcal{H}_1, \mathcal{H}_0$ be R_1, R_0, respectively, and corresponding prior probabilities of the hypotheses be π_1, π_0. The probability of error is given as

Select one:

- ○ $\pi_1 \int_{R_1} p(\bar{\mathbf{y}}|\mathcal{H}_1)d\bar{\mathbf{y}} + \pi_0 \int_{R_0} p(\bar{\mathbf{y}}|\mathcal{H}_0)d\bar{\mathbf{y}}$
- ○ $\pi_1 \int_{R_0} p(\bar{\mathbf{y}}|\mathcal{H}_0)d\bar{\mathbf{y}} + \pi_0 \int_{R_1} p(\bar{\mathbf{y}}|\mathcal{H}_1)d\bar{\mathbf{y}}$
- ◉ $\pi_1 \int_{R_0} p(\bar{\mathbf{y}}|\mathcal{H}_1)d\bar{\mathbf{y}} + \pi_0 \int_{R_1} p(\bar{\mathbf{y}}|\mathcal{H}_0)d\bar{\mathbf{y}}$
- ○ $\pi_0 \int_{R_0} p(\bar{\mathbf{y}}|\mathcal{H}_1)d\bar{\mathbf{y}} + \pi_1 \int_{R_1} p(\bar{\mathbf{y}}|\mathcal{H}_0)d\bar{\mathbf{y}}$

Question **3**

Not yet answered

Marked out of 1.00

Flag question

The min P_e detector chooses $\mathcal{H}_0$ when

Select one:

- ◉ $\frac{p(\bar{\mathbf{y}}|\mathcal{H}_0)}{p(\bar{\mathbf{y}}|\mathcal{H}_1)} \geq \frac{\pi_1}{\pi_0}$
- ○ $\frac{p(\bar{\mathbf{y}}|\mathcal{H}_0)}{p(\bar{\mathbf{y}}|\mathcal{H}_1)} \geq \frac{\pi_0}{\pi_1}$
- ○ $\frac{p(\bar{\mathbf{y}}|\mathcal{H}_0)}{p(\bar{\mathbf{y}}|\mathcal{H}_1)} \leq \frac{\pi_1}{\pi_0}$
- ○ $\frac{p(\bar{\mathbf{y}}|\mathcal{H}_0)}{p(\bar{\mathbf{y}}|\mathcal{H}_1)} \geq \frac{\pi_0}{\pi_1}$

Question **4**

Not yet answered

Marked out of 1.00

Flag question

The min P_e detector chooses $\mathcal{H}_0$ when

Select one:

- ◉ $\Pr(\mathcal{H}_0|\bar{\mathbf{y}}) \geq \Pr(\mathcal{H}_1|\bar{\mathbf{y}})$
- ○ $\Pr(\mathcal{H}_1|\bar{\mathbf{y}}) \geq \Pr(\mathcal{H}_0|\bar{\mathbf{y}})$
- ○ $\Pr(\bar{\mathbf{y}}|\mathcal{H}_0) \geq \Pr(\bar{\mathbf{y}}|\mathcal{H}_1)$
- ○ $\Pr(\bar{\mathbf{y}}|\mathcal{H}_1) \geq \Pr(\bar{\mathbf{y}}|\mathcal{H}_0)$

Question **5**

Not yet answered

Marked out of 1.00

Flag question

The min P_e decision rule is the

Select one:

- ○ ML rule
- ○ LRT
- ○ Least Squares
- ◉ MAP rule

Question **6**

Not yet answered

Marked out of 1.00

Flag question

For equiprobable hypotheses, the min P_e decision rule reduces to the

Select one:

- ○ LRT
- ◉ ML rule
- ○ Least Squares
- ○ Maximum Apriori Probability rule

Question **7**

Not yet answered

Marked out of 1.00

Flag question

Consider $\bar{s} = \begin{bmatrix} 2 \\ -2 \\ 2 \\ -2 \end{bmatrix}$, $\sigma^2 = 2$ and $\pi_0 = \frac{e}{1+e}$. For the binary signal detection problem described in class, the threshold for the MAP decision rule is given as

Select one:

- ◉ 10
- ○ 8
- ○ 6
- ○ 12

Question **8**

Not yet answered

Marked out of 1.00

Flag question

For the binary signal detection problem described in class, the minimum P_e achieved using the MAP rule is given as

Select one:

- ○ $\pi_0 Q\left(\frac{\|\bar{s}\|^2+2\sigma^2 \ln\frac{\pi_1}{\pi_0}}{2\sigma\|\bar{s}\|}\right) + \pi_1 Q\left(\frac{\|\bar{s}\|^2-2\sigma^2 \ln\frac{\pi_1}{\pi_0}}{2\sigma\|\bar{s}\|}\right)$
- ○ $\pi_0 Q\left(\frac{\|\bar{s}\|-2\sigma \ln\frac{\pi_1}{\pi_0}}{2\sigma^2\|\bar{s}\|^2}\right) + \pi_1 Q\left(\frac{\|\bar{s}\|+2\sigma \ln\frac{\pi_1}{\pi_0}}{2\sigma^2\|\bar{s}\|^2}\right)$
- ◉ $\pi_0 Q\left(\frac{\|\bar{s}\|^2-2\sigma^2 \ln\frac{\pi_1}{\pi_0}}{2\sigma\|\bar{s}\|}\right) + \pi_1 Q\left(\frac{\|\bar{s}\|^2+2\sigma^2 \ln\frac{\pi_1}{\pi_0}}{2\sigma\|\bar{s}\|}\right)$
- ○ $\pi_0 Q\left(\frac{\|\bar{s}\|+2\sigma \ln\frac{\pi_1}{\pi_0}}{2\sigma^2\|\bar{s}\|^2}\right) + \pi_1 Q\left(\frac{\|\bar{s}\|-2\sigma \ln\frac{\pi_1}{\pi_0}}{2\sigma^2\|\bar{s}\|^2}\right)$

Question **9**

Not yet answered

Marked out of 1.00

Flag question

Consider the binary signal detection problem with $SNR = 10\ dB$ and $\pi_1 = 0.60$. The min P_e achieved using the optimal decision rule is

Select one:

- ○ 0.00787
- ○ 0.0569
- ◉ 0.0555
- ○ 0.1046

Question **10**

Not yet answered

Marked out of 1.00

Flag question

Consider the binary signal detection problem with $SNR = 10\ dB$ and $\pi_1 = 0.60$. The P_e achieved using the ML decision rule is

Select one:

- ○ 0.00787
- ◉ 0.0569
- ○ 0.0555

○ 0.1046

Finish attempt ...