Started on	·			
State	Finished			
	Friday, 13 October 2023, 7:47 PM			
	5 mins 19 secs			
Grade	<b>10.00</b> out of 10.00 ( <b>100</b> %)			
Question <b>1</b>				
Correct				
Mark 1.00 out of 1.00				
False alarm occurs v	when			
Select one:				
<ul><li>The test correct</li></ul>	tly detects the absence of signal under ${\cal H}_{ m o}$			
The test falsely	detects the presence of signal under $\mathcal{H}_{\mathrm{o}}$			
$\bigcirc$ The test falsely detects the absence of signal under $\mathcal{H}_{\scriptscriptstyle 1}$				
	tly detects the presence of signal under $\mathcal{H}_1$			
o The test correc	The presence of signal and $n_1$			
Your answer is corre	act			
	is: The test falsely detects the presence of signal under $\mathcal{H}_{_0}$			
The correct answer	is. The test faisely detects the presence of signal under $n_0$			
Question <b>2</b> Correct				
Correct Mark 1.00 out of 1.00				
Correct				
Correct  Mark 1.00 out of 1.00   ▼ Flag question	[0.2) $[0.2)$			
Correct  Mark 1.00 out of 1.00  Flag question  Consider $\bar{s} = [1]$				
Correct  Mark 1.00 out of 1.00  Flag question  Consider $\bar{\mathbf{s}} = [1]$ Select one:				
Correct  Mark 1.00 out of 1.00  Flag question  Consider $\bar{\mathbf{s}} = [1]$ Select one:	$(\underline{0},\underline{2})$			
Correct  Mark 1.00 out of 1.00  ▼ Flag question  Consider $\bar{s} = [1]$ Select one:	(0,2). $(0,16)$			
Correct  Mark 1.00 out of 1.00  ▼ Flag question  Consider $\bar{s} = [1]$ Select one:     Mark 1.00 out of 1.00    Mark 1.00 out of 1.00   Mark 1.00 ou	( <u>0,16)</u> ( <u>0,4)</u>			
Correct  Mark 1.00 out of 1.00  ▼ Flag question  Consider $\bar{s} = [1]$ Select one:	( <u>0,16)</u> ( <u>0,4)</u>			
Correct  Mark 1.00 out of 1.00  ▼ Flag question  Consider $\bar{s} = [1]$ Select one:	(Q.2). (Q.16). (Q.4). (Q.8).			
Correct  Mark 1.00 out of 1.00  Flag question  Consider $\bar{s} = [1]$ Select one:    Mark 1.00 out of 1.00  Consider $\bar{s} = [1]$ Mathcal (N)    Mathcal (N)    Mathcal (N)    Mathcal (N)   Mathcal	(Q.2). (Q.16). (Q.4). (Q.8).			
Correct  Mark 1.00 out of 1.00  ▼ Flag question  Consider \$\overline{s}\$ = [1]  Select one:	(Q.2). (Q.16). (Q.4). (Q.8).			
Correct  Mark 1.00 out of 1.00  Flag question  Consider \$\bar{s}\$ = [1]  Select one:    Mathcal{N}	(Q.2). (Q.16). (Q.4). (Q.8).			
Correct  Mark 1.00 out of 1.00  Flag question  Consider $\bar{s} = [1]$ Select one:  Mathcal{N}  Mathcal{N}  Mathcal{N}  Your answer is correct answer  The correct answer	(Q.2). (Q.16). (Q.4). (Q.8).			
Correct  Mark 1.00 out of 1.00  Flag question  Consider \$\bar{s}\$ = [1]  Select one:    Mathcal{N}	(Q.2). (Q.16). (Q.4). (Q.8).			
Correct  Mark 1.00 out of 1.00  Flag question  Consider $\bar{s} = [1]$ Select one:    Mark 1.00 out of 1.00  Consider $\bar{s} = [1]$ Mathcal (N)    Mathcal (N)    Mathcal (N)    Mathcal (N)   Mathcal	(Q.2). (Q.16). (Q.4). (Q.8).			

Consider $\bar{\mathbf{s}} = [1 \ 1 \ -1 \ -1]^T$ , $\gamma = 1$ and $\sigma^2 = \frac{1}{2}$ . The probability of false alarm for the signal detection problem described in lectures is
Select one:
$\bigcirc$ $Q\left(\frac{1}{\sqrt{2}}\right)$ $\checkmark$
$Q\left(\frac{1}{\sqrt{2}}\right) \qquad \qquad Q\left(\frac{1}{4}\right)$
$Q\left(\frac{1}{2}\right)$
$_{\bigcirc}$ $Q(1)$
Your answer is correct.
The correct answer is: $Q\left(\frac{1}{\sqrt{2}}\right)$
Question <b>4</b> Correct
Mark 1.00 out of 1.00  ▼ Flag question
riag question
Detection occurs when
Select one:
○ The test correctly detects the absence of signal under <u>Mathcal{H 0}</u>
○ The test falsely detects the absence of signal under <u>mathcal{H 1}</u>
○ The test falsely detects the presence of signal under <u>  \times_\mathcal{H 0}</u> }
The test correctly detects the presence of signal under
Your answer is correct.
The correct answer is: The test correctly detects the presence of signal under <u>mathcal{H 1}</u>
Question <b>5</b>
Correct  Mark 1.00 out of 1.00
Flag question
Consider $\bar{\mathbf{s}} = \begin{bmatrix} 1 & -1 & -1 & 1 \end{bmatrix}^T$ and $\sigma^2 = 2$ . The distribution of the test statistic $\bar{\mathbf{s}}^T \bar{\mathbf{y}}$ under $\mathcal{H}_1$ is
Select one:

 $\mathcal{N}(2,16)$ 

 $\mathcal{N}(4,16)$ 

$\mathcal{N}(4.8)$	
37 (4,0)	

$$\mathcal{N}(2,4)$$

Your answer is correct.

The correct answer is:  $\mathcal{N}(4.8)$ 

Question **6** 

Correct

Mark 1.00 out of 1.00

Consider  $\bar{\mathbf{s}} = [1 \quad -1 \quad 1]^T$ ,  $\gamma = 1$  and  $\sigma^2 = 2$ . The probability of detection for the signal detection problem described in lectures is

Select one:

$$Q\left(-\frac{1}{2}\right)$$

$$Q\left(-\frac{1}{2\sqrt{2}}\right)$$

$$\bigcirc \qquad Q\left(\frac{1}{\sqrt{2}}\right)$$

$$Q\left(-\frac{3}{2\sqrt{2}}\right) \quad \checkmark$$

Your answer is correct.

The correct answer is:  $Q\left(-\frac{3}{2\sqrt{2}}\right)$ 

Question 7

Correct

Mark 1.00 out of 1.00

As 
$$\gamma \to -\infty$$

Select one:

$$\bigcirc \quad P_D \rightarrow 0, P_{FA} \rightarrow 1$$

$$\bigcirc P_D \to 1, P_{FA} \to 0$$

Your answer is correct.

The correct answer is:  $P_D 
ightarrow 1$  ,  $P_{FA} 
ightarrow 1$ 

Question  ${\bf 8}$ 

Correct

Mark 1.00 out of 1.00

The quantity Q(x), where  $Q(\cdot)$  denotes the Gaussian Q —function, equals

Select one:

$$\int_{-x}^{\infty} \frac{1}{\sqrt{2\pi}} e^{-\frac{t^2}{2}} dt$$

$$\bigcirc \int_{-\infty}^{x} \frac{1}{\sqrt{2\pi}} e^{-\frac{t^2}{2}} dt$$

Your answer is correct.

The correct answer is:  $\int_{-\infty}^{-x} \frac{1}{\sqrt{2\pi}} e^{-\frac{t^2}{2}} dt$ 

Question **9** 

Correct

Mark 1.00 out of 1.00

For a Gaussian random variable  $X \sim \mathcal{N}(1.4)$ , the corresponding standard normal can be derived as

Select one:

$$\frac{X-1}{4}$$

$$\frac{X-1}{2} \quad \checkmark$$

$$\frac{X}{2}-2$$

$$\frac{X-2}{\sqrt{2}}$$

Your answer is correct.

The correct answer is:  $\frac{X-1}{2}$ 

Question 10

Correct

Mark 1.00 out of 1.00

The ROC of the signal detection problem is given as

Select one:

$$Q(Q^{-1}(P_{FA}) - \sqrt{SNR})$$

$$Q\left(Q^{-1}(P_{FA}) - \sqrt{SNR}\right) \checkmark$$

$$Q\left(Q^{-1}(P_{FA}) - \sqrt{\frac{1}{SNR}}\right)$$

$$\bigcirc \quad Q(Q^{-1}(P_{FA}) - SNR)$$

$$\bigcirc Q\left(Q^{-1}(P_{FA}) - \frac{1}{SNR}\right)$$

Your answer is correct.

 $Q(Q^{-1}(P_{FA}) - \sqrt{SNR})$ The correct answer is:

Finish review