APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER

Q. P. Code :CE0818222-P **(Pages: 2)** **Name .....**

Reg. No.....

SECOND SEMESTER M.TECH. DEGREE EXAMINATION APRIL 2018

Branch: Electronics & Communication Engineering **Specialization: CESP**

08EC 6222 ESTIMATION AND DETECTION

Time:3 hours **Max.marks: 60**

Answer all six questions.

Modules 1 to 6: Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

Q.no.	Module 1	Marks
1.a	Discuss Maximum likelihood detection criterion	3
	Answer b or c	
b	Obtain the decision region for the given conditional pdf using ML criterion. $P(z/m_1) = \frac{1}{\sqrt{2\pi}} e^{\frac{-z^2}{2}}$ $P(z/m_2) = \frac{1}{\sqrt{2\pi}} e^{\frac{-(z-1)^2}{2}}$	6
c	Obtain the decision region for the given conditional pdf using ML criterion. $P(z/m1) = \frac{1}{\sqrt{2\pi}} e^{\frac{-z^2}{2}}$ $P(z/m2) = \frac{1}{2\sqrt{2\pi}} e^{\frac{-z^2}{8}}$	6

Q.no.	Module 2	Marks
2.a	Discuss Bayes Risk criterion	3
	Answer b or c	
b	Find the false alarm and detection probability using Bayes Risk criterion P(m1)=0.25, p(m2)=0.75 C11=C22=0, C21=2, C12=1 $P(z/m_1) = \frac{1}{2} e^{-|z|}$ $P(z/m_2) = e^{-2|z|}$	6
c	Solve the decision problem with the following conditional probabilities $P(z/m_1) = \frac{1}{2} e^{-z}$ $P(z/m_2) = e^{-2z}$ and use the following costs $C_{11}=C_{22}=0$, $C_{12}=2$, $C_{21}=1$	6

Q.no.	Module 3	Marks
3.a	Obtain the block diagram for optimum decision devive for additive gaussian noise	3
	Answer b or c	
b	Discuss about the General Gaussian problem.	6
c	Derive the expression for integrating optimum receiver and obtain the block diagram from the equation.	6

Q.no.	Module 4	Marks
4.a	Differentiate between estimation and decision.	3
	Answer b or c	
b	Find the maximum likelihood estimation, by considering the following observation of scalar parameter Θ. $z_i = \Theta + n_i$, where n_i are independent and Gaussian distributed, zero mean random variables with variance σ^2 The density function $P(z/\Theta) = \prod_{i=1}^{I} e^{\frac{-(zi-\Theta)^2}{2\sigma^2}}$	6
c	Explain Mean Square Error method for estimation with an example	6

Q.no.	Module 5	Marks
5.a	Explain Unbiased estimators	4
	Answer b or c	
b	Explain Sensitivity and error analysis with an example	8
c	Explain Asymptotic properties	8

Q.no.	Module 6	Marks
6.a	Define state estimation	4
	Answer b or c	
b	Explain in detail about exponential families of distributions	8
c	Explain Kalman Filter	8