APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER

FIRST SEMESTER M.TECH. DEGREE EXAMINATION MARCH 2021

Branch: Electronics &Communication Engineering

Specialization: Communication Engineering & Signal Processing

08EC6251(B) Adaptive Signal Processing

(Common to CESP and ECE)

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	What is the significance of Performance Surface?	3

Answer b or c

b	Compare various adaptive linear predictors.	6
c	Derive an expression for Minimum MSE using Gradient Method.	6

Q.no.	Module 2	Marks
2.a	What are linear optimum filters? Explain the statistical approaches of linear filters.	3

Answer b or c

b	Derive Wiener-Hopf Equation.	6

c   Consider a Wiener filtering problem characterized as follows: The correlation matrix R of the tap-input vector u(n) is $R = \begin{bmatrix} 1 & 0.5 \\ 0.5 & 1 \end{bmatrix}$. The cross-correlation vector between the tap-input vector u(n) and the desired response d(n) is $P = \begin{bmatrix} 0.5 \\ 0.25 \end{bmatrix}$. Evaluate the tap weights of the Wiener filter.   6

Q.no.	Module 3	Marks
3.a	What is the significance of learning curve?	3

Answer b or c

b	Discuss any gradient search method to get the optimum error.	6
c	Explain Misadjustment in Excess Mean Square Error.	6

Q.no.	Module 4	Marks
4.a	Propose an ideal adaptive algorithm.	3

Answer b or c

b	Explain the properties of LMS/Newton Algorithm.	6
c	Explain LMS algorithm.	6

Q.no.	Module 5	Marks
5.a	Propose an adaptive modelling with and without noise.	4

Answer b or c

b	Design a multipath communication channel with Adaptive modelling?	8
c	Explain the Adaptive modelling for FIR filter synthesis.	8

Q.no.	Module 6	Marks
6.a	What is inverse adaptive modelling?	4

Answer b or c

b	Describe the adaptive equalizers in telephone channel	8
c	Explain IIR filter synthesis by the equation error	8