Hall Ticket Number:

Code No. : 18432 (B) N/O

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (E.C.E.) VIII-Semester Main & Backlog Examinations, May-2023

Adaptive Signal Processing (PE-VI)

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

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10× 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO	PSO
1.	Specify the limitations of Wiener filter.	2	2	2	1	3
2.	Determine whether the following matrix is a valid correlation matrix $R = \begin{bmatrix} 1 & 1/2 & 1 \\ 1/2 & 2 & 1/2 \\ 1 & 1 & 1 \end{bmatrix}$	2	3	1	2	3
3.	List the necessary conditions for the convergence of LMS algorithm?	2	1	2	1	3
4.	Compare the advantages of RLS algorithm over LMS algorithm.	2	2	3	1	3
5.	Summarize any two applications of adaptive filters.	2	2	1	1	3
6.	Explain the role of cost function in adaptive filter design.	2	2	3	1	3
7.	Describe the advantages of Kalman filter over Wiener filter.	2	1	5	1	3
8.	Construct a signal flow graph for the Kalman filter.	2	3	5	2	3
9.	Compare the performance of vector Kalman filter with Kalman filter.	2	2	4	1	3
10.	Discuss the applications of vector Kalman filter.	2	2	4	1	3
	Part-B (5×8 = 40 Marks)					
11. a)	How the Gradient operator helps to minimize the mean square error, explain with an example?	4	2	1	2	3
b)	Consider a two-tap Wiener filter with the following statistics $E[d^2(n)] = 2$, $R = \begin{bmatrix} 1 & 0.7 \\ 0.7 & 1 \end{bmatrix}$ and $P = \begin{bmatrix} 1 \\ 0.5 \end{bmatrix}$ Where d(n) is the desired output, R is the correlation matrix and P is the cross-correlation matrix of input and desired output. Find the optimum values of the filter.	4	3	1	2	3

Contd... 2