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M.Tech. (ECE) (2018 Batch) (Sem.–2)

ADVANCED DIGITAL SIGNAL PROCESSING

Subject Code : MTEC-104-18

M.Code : 76260

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1.Attempt any FIVE questions out of EIGHT questions.
2.Each question carries TWELVE marks.

Q1. a) Write the advantages and disadvantages of the FIR filter over IIR filter.

b) The desired frequency response of the low pass filter is

$$H_d(e^{j\omega}) = \begin{cases} 0, & -\frac{\pi}{4} \le \omega \le \frac{\pi}{4} \\ e^{-j3\omega}, & \frac{\pi}{4} < |\omega| \le \pi \end{cases}$$

Determine the filter coefficient $h_d(n)$ if the window function is defined as :

$$W(n) = \begin{cases} 1, & 0 \le n \le 3 \\ 0, & \text{otherwise} \end{cases}$$

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Q2. Discuss the 8-point FFT algorithm using decimation in time technique.

Q3. Write short notes on :

a) Bilinear transformation

b) Multirate digital signal processing.

Q4. Discuss the steps involved in the least mean square (LMS) adaptive filtering algorithm. Using this adaptive algorithm, derive the 3-tape finite impulse response (FIR) LMS adaptive filter architecture.

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Q5. What is the basic principle of parametric methods in power spectral estimation ? Discuss various techniques in parametric method.

Q6. Explain the Wiener filtering and derive the equations for the Wiener Hopf relations.

Q7. Why LMS algorithm is preferred over recursive least square (RLS) algorithm? Explain the different steps involved in the RLS algorithm.

Q8. Explain in detail about cancelling echoes in long telephone circuits using adaptive algorithm.

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NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.

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