AQ – 2882

First Semester M. E. Electrical (Electronics and Power) Engg. (CGS) Examination

(New)

ADVANCED DIGITAL SIGNAL PROCESSING

1 EEPME 3

P. Pages : 3

Time : Three Hours] [Max. Marks : 80

Note : (1) Assume suitable data wherever necessary.
(2) Illustrate your answer wherever necessary with the help of neat sketches.
(3) Use pen of Blue/Black ink/refill only for writing the answer book.

1. (a) Explain in detail the procedure to obtain impulse response, frequency response of a continuous time signal. 7

   (b) Obtain the unit step response of constinuous time domain system having unit sample response $h(n) = (\frac{1}{2})^n u(n)$. 7

OR

2. (a) Explain in detail the properties of the systems. 7

   (b) Explain in detail with neat diagram the procedure of convolution of continuous time system with example. 7

3. (A) Explain Quantization errors in detail. 7

   (B) Determine the direct forms I and II realization for a third order IIR transfer function.

$$H(z) = \frac{0.28z^2 + 0.319z + 0.04}{0.5z^3 + 0.3z^2 + 0.17z - 0.2}$$

6

OR

4. Determine the parallel realization of the IIR digital filter transfer function.

   (a) $H(z) = \frac{3(2z^2 + 5z + 4)}{(2z+1)(z+2)}$

(b) $H(z) = \dfrac{3z\ (5z-2)}{(z+1/2)(3z-1)}$ 13

5. A Low-pass filter is tobe designed with the following desired frequency response.

$$Hd\ (e^{jw}) = \begin{cases} e^{-j2w} & -\frac{\pi}{4} \le W \le \frac{\pi}{4} \\ 0 & \frac{\pi}{4} < |W| \le \pi \end{cases}$$

Determine the filter coefficient hd[n] if the window function is defined as

$$W[n] = \begin{cases} 1 & 0 \le n \le 4 \\ 0 & \text{otherwise} \end{cases}$$

Also determine frequency response of the desired filter. 13

OR

6. A filter is to be designed with the following desired frequency response.

$$Hd(e^{jw}) = \begin{cases} 0 & -\frac{\pi}{4} \le W \le \frac{\pi}{4} \\ e^{-j2w} & \frac{\pi}{4} < |W| \le \pi \end{cases}$$

Determine the filter coefficients hd[n] if the window function is defined as

$$W[n] = \begin{cases} 1 & 0 \le n \le 4 \\ 0 & \text{otherwise} \end{cases}$$

Also determine the frequency response $H(e^{jw})$ of the desired filter. 13

7. Explain in detail non-parametric method of power spectrum estimation used for Averaging the periodogrms. 13

OR

8. Explain in detail AR, MA and ARMA models. 13

9. (A) Explain basic Winner filter theory. 7

(B) Explain basic LMS adaptive algorithm. 7

OR

10. (A) Explain need of multirate digital signal processing. 7

(B) Explain polphyase decompostion structure. 7

11. (A) Explain selection factors of DSP processor. 7

(B) Explain architecture of General purpose digital signal processor. 6

OR

12. (A) Why we need special purpose DSP-processor ? 7

(B) Explain basic requirement of special purpose DSP processors. 6