13|11|24

TE|EIX|sem-V|CBCGS|R-19|c-Scheme|DSP|SH-24

Duration: 3 Hours **[Max. Marks: 80]**

QP-10065659

N.B.: (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1 **Attempt any FOUR** **[20]**

a How s-plane is mapped to z-plane using impulse invariant transformation?

b State the properties of DFT.

c Explain the term linear phase and state its importance in digital filters.

d Explain Quantization and effects of truncation and rounding.

e Compute the DFT of the four point sequence x(n)={0,1,2,3}

2 a Explain the overlap-add and overlap-save method for filtering of long data sequences. **[10]**

b Design a FIR filter with hamming window for the following specifications: **[10]**

$H_d(w) = e^{-j3w}$ $-\pi/4 \leq w \leq \pi/4$

$= 0$ $\pi/4 \leq w \leq \pi$

3 a Draw architectural block diagram of DSP processor and explain functions of each block. **[10]**

b Design Chebyshev analog filter with maximum pass band attenuation of 2.5dB at $\Omega_P = 20$ rad/sec and stop band attenuation of 30 dB at $\Omega_S = 50$ rad/sec. **[10]**

4 a Obtain the DFT of the sequence x(n)= {1,1,1,1,1,1,1,0}using DIT FFT algorithm. **[10]**

b Describe any one application of DSP. **[10]**

5 a State and explain types of windowing techniques. **[10]**

b Design a Butterworth lowpass filter to meet the following specifications. **[10]**
Passband gain=0.89
Passband frequency edge= 30Hz
Attenuation=0.20
stop edge= 75Hz

6 a Explain in detail **[10]**
(i) Fixed point DSP processors
(ii) Floating-point DSP processors

b Write a note on polyphase filters. **[10]**

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