QP Code : 24814

[3 Hours] [Total Marks : 80]

N.B : 1. Attempt any four questions.
2. Figures to right indicate full marks.
3. Assume suitable data if needed.

1. (a) The transfer function of analog filter is given below **10**

$$H(s) = \frac{s+0\cdot1}{(s+0\cdot1)^2+9}$$

find H(z) using impulse invariance technique.

(b) The transfer function of analog filter is given below **10**

$$H(s) = \frac{5S+1}{S^2+0\cdot4S+1}$$

Design the digital IIR filter using BLT with critical frequency 10Hz and sampling frequency 60 Hz **10**

2. (a) The transfer function of low pass analog filter is given below **10**

$$H(s) = \frac{\Omega s}{S+\Omega c}$$

where Ωc is analog cutoff frequency. Design a digital IIR low pass filter using BLT with a 3-dB bandwidth $0\cdot2\ \pi$. **10**

Assume bandwidth of analog filter = – 3dB.

(b) Explain Butterworth approximation along with response at low pass filter, pole locations & order of a filter. **10**

3. (a) State properties of Fourier transform and prove convolution property. **10**

(b) Distinguish between Fourier transform and wavelets. **10**

Explain Haar multiresolution analysis.

4. (a) (i) Differentiate between FIR filter & IIR filter. **10**

(ii) State properties of autocorrelation & cross correlation.

(b) Explain frequency domain sampling of Fourier transform. **10**

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5. (a) Explain any one application of DSP in biosignal processing. **10**

   (b) Explain impulse invariance and bilinear transformation with suitable formulas invoved in them. **10**

6. (a) For the following sequence : **10**

   {4, 6, 10, 12, 8, 6, 5, 5} obtain a mean & diff. coefficients.

   Show that original sequence can be obtained from the coefficients.

   (b) State properties of DFT. Prove any two of them. **10**