BE Semester-_5th___ (Biomedical Engineering) Question Bank

(BM- 605 DIGITAL SIGNAL PROCESSING)

All questions carry equal marks (10 marks)

Q.1	Write classification of signals and systems.
Q.2	Explain digital signal processing and writes its applications.
Q.3	Write advantages and limitations of digital signal processing
Q.4	Determine whether the following systems are static or Dynamic, Linear or Nonlinear, Shift variant or Invarient, Causal or Non-causal, Stable or unstable. • y[n]=x[n]+(1/x[n-1]) • $y[n]=x^2[n]+x[n]$
Q.5	Determine convolution sum of two sequences: • x(n)={3,2,1,2} & h(n)={1,2,1,2} • x(n)={1,2,1,2,1,2} & h(n)={1,,1,0,1}
Q.6	Find the convolution of the two signals x(n)=1, n=-2, 0, 1 =2, n=-1 =0, elsewhere h(n)=δ(n)-δ(n-1)+δ(n-2)-δ(n-3)
Q.7	Determine the response of the relaxed system characterized by the impulse response $h(n)=(1/2)^n u(n)$ to the input signal $x(n)=2^n u(n)$.
Q.8	Explain in detail Frequency response of LTI system.
Q.9	Explain System functions for systems with linear constant-coefficient Difference equations.
Q.10	Explain Freq. response of rational system functions relationship between magnitude & phase.
Q.11	Write short note on All pass systems and Minimum/Maximum phase systems.
Q.12	Define total response of discrete-time system. how to find the total response of discrete-time system.
Q.13	Find the natural response of the system described by difference equation, y(n)+2y(n-1)+y(n-2)=x(n)+x(n+1) with initial condition y(-1)=y(-2)=1.
Q.14	Find the forced response of the system described by difference equation, y(n)+2y(n-1)+y(n-2)=x(n)+x(n-1) for input $x(n)=(1/2)^n u(n)$.
Q.15	Find the forced response of the system described by difference equation, y(n)-4y(n-1)+4y(n-2)=x(n)-x(n-1) for input $x(n)=(-1)^n u(n)$.
Q.16	Find the total response of the system described by difference equation, y(n)-4y(n-1)+4y(n-2)=x(n)-x(n-1) when the input is $x(n)=(-1)^n u(n)$ with the initial conditions y(-1)=y(-2)=1.
Q.17	Determine the impulse response of h(n) for the system described by the second-order difference equation, y(n)=0.6y(n-1)-0.08y(n-2)+x(n)

Q.18	Determine the impulse response of h(n) for the system described by the second-order difference equation, y(n)+y(n-1)-2y(n-2)=x(n-1)+2x(n-2)
Q.19	Describe Basic Structures of IIR Systems.
Q.20	Describe Basic Structures of FIR Systems.
Q.21	Explain in detail Effect of round off noise in digital filters.
Q.22	Describe design of Discrete-Time IIR filters from Continuous-Time filters.
Q.23	Explain Design of FIR filters by windowing Optimum approximations of FIR filters.
Q.24	Write short note on optimum equiripple approximations of FIR filters.
Q.25	Write the properties of Discrete-Fourier Transform and explain Linear Convolution using DFT.
Q.26	Write short note on Goertzel Algorithm
Q.27	Explain Decimation-in-Time FFT Algorithms, Decimation-in-Frequency FFT Algorithm.
Q.28	Explain DSP processor architecture.
Q.29	Write short note on ECG & EMG signal analysis.
Q.30	Write short note on EEG signal analysis.
Q.31	Obtain direct form I and II and cascade realization of a system described by, $y(n) - \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2) = x(n) + \frac{1}{2}x(n-1).$
Q.32	The transfer function of discrete time causal system is given by, $H(z) = \frac{1 - z^{-1}}{1 - 0.35z^{-1} - 0.15z^{-2}}$ Draw cascade and parallel realization.
Q.33	Compute the circular convolution of following sequences and compare the results with linear convolution. X(n) = {1,1,1,1,-1,-1,-1,-1,-1} and h(n) = {0,1,2,3,4,3,2,1}
Q.34	Obtain the linear convolution of two sequences defined as, X(n) = u(n) –u(n-3) H(n)= u(n-1)+ u(n-2)-u(n-4)-u(n-5) using circular convolution.
Q.35	Determine the response of FIR filter using DFT if: x(n) = {1,2,1} and h(n) ={1, 1 2} ↑ ↑
Q.36	Obtain DTFT of single sided exponential pulse $x(n) = \left(\frac{1}{3}\right)^n u(n)$. & derive magnitude and phase response of the signal.
Q.37	Design an FIR lowpass filter satisfying the following specifications, $\alpha_p \leq 0.1$dB, $\alpha_s \geq 44.0$dB, ω_p=20rad/sec; ω_s=30rad/sec; ω_{sf}=100 rad/sec;
Q.38	Design an FIR bandpass filter satisfying the following specifications, f_{p1}=20Hz, f_{p2}=30Hz α_p=0.5dB, α_s =30dB, f_{s1}=10Hz, f_{s2}=40Hz , F=100Hz.
Q.39	Compute the circular convolution of following sequences and compare the results with linear convolution.

	X(n) = { 0.5,1, 0.5, 1, 0.5,1,0.5,1} and h(n) = {0,1,2,3,4,3,2}
Q.40	Given the two sequence are: X(n) = {0, 1, 2, 5,6} H(n)= {2,1,1,2,1} find the circular convolution.