SRI KRISHNA COLLEGE OF TECHNOLOGY
An Autonomous Institution
Approved by AICTE | Affiliated to Anna University
Accredited by NAAC with ‘A’ grade
Kovaipudur, Coimbatore – 641042, Tamilnadu, India.
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

QUESTION BANK

Class	Course Code	Course Title
III Year EEE	*22EE603*	*PRINCIPLES OF DIGITAL SIGNAL PROCESSING*

Course Outcomes:

CO 1:	Illustrate the basics of discrete time signals and systems.	[U]
CO 2:	Interpret the concepts of Discrete and Fast Fourier transform	[U]
CO 3:	Comprehend the architecture of advanced processors	[U]
CO 4:	Apply the concept of transformation techniques in Discrete Time systems	[AP]
CO 5:	Design di erent types of filters using various filter design techniques.	[AP]

CO3: Comprehend the architecture of advanced processors

CO5: Design di erent types of filters using various filter design techniques.

Module –III: FIR Filters, IIR Filters and Digital Signal Processors

	Part – A	**RBT**	**CO**	**Marks**
1.	Infer the digital signal processing applications with the TMS320 family.	U	CO3	2
2.	Contrast Von Neumann and Harvard architectures.	U	CO3	2
3.	Summarize the factors that influence selection of DSPs.	U	CO3	2
4.	Obtain the equation of the order of N and cut off frequency Ω_c of Butterworth filter.	U	CO5	2
5.	Compare FIR and IIR Filters.	U	CO5	2
6.	Identify the properties of Butterworth lowpass filters.	U	CO5	2
7.	Draw the block diagram of von neumann architecture.	U	CO3	2
8.	Infer the advantage of Harvard architecture of TMS32 series.	U	CO3	2
9.	Calculate the order of the butterworth filter if it has a -2db passband attenuation at a frequency of 20 rad/sec and atleast -10 db stopband attenuation at 30 rad/sec.	AP	CO5	2
10.	Infer the reason why impulse invariant method is not preferred in the design of IIR filters other than low pass filter.	U	CO5	2
11.	Outline the applications of FFT algorithms.	U	CO5	2
12.	Infer the need for anti-aliasing and anti-imaging filters in downsampling and upsampling of a signal respectively.	U	CO5	2
13.	Extend Prewarping with the help of equations.	U	CO5	2
14.	Relate the bilinear transform equation between s plane and z plane.	U	CO5	2
15.	Infer the reason why impulse invariant method is not preferred in the design of IIR filters other than low pass filter.	U	CO5	2
	Part – B	**RBT**	**CO**	**Marks**
1.	Explain in detail the architecture of TMS320C54 signal processing chip with suitable block diagram.	U	CO3	8
2.	Design an analog butterworth filter that has a -2db passband attenuation at a frequency of 20 rad/sec and atleast -10 db stopband attenuation at 30 rad/sec.	AP	CO5	8

	Explain in detail about Von Neumann architecture with a neat sketch.	U	CO3	8
4.	With a neat function block diagram, elaborate in detail about any one of the latest DSP architectures.	U	CO3	8
5.	Describe the architecture of TMS320C5X with neat sketch.	U	CO3	16
6.	Design a low pass filter using rectangular window by taking 9 samples of ω(n) with the cut-off frequency of 1.2 radians per second.	AP	CO5	8
7.	Design a lowpass filter for the following specification. $H_d(\omega) = \{e^{-j2\omega}\ ;\ -\pi/4 \le \omega \le -\pi/4\}$ $= \{0\ ;\ \pi/4 \le \omega \le \pi\}$ With window function $\omega_n = 1;\ 0 \le n \le 4$ $= 0$; otherwise	AP	CO5	16
8.	Design a Butterworth digital IIR filter using impulse invariance method for the following specifications. $0.8 \le \lvert H(ej\omega) \rvert \le 1.0$; for $0 \le \omega \le 0.2\pi$ $\lvert H(ej\omega) \rvert \le 0.2$; for $0.6\pi \le \omega \le \pi$	AP	CO5	16
9.	Determine H(z) that results when the bilinear transformation is applied to $H_a(s) = (s^2+4.525)/(s^2+0.692s+0.504)$	AP	CO5	16
10.	Develop a Butterworth digital IIR filter using bilinear transformation by taking T = 1 second, to satisfy the following specifications $0.707 \le \lvert H(e^{j\omega}) \rvert \le 1.0$; for $0 \le \omega \le 0.2\pi$ $\lvert H(e^{j\omega}) \rvert \le 0.08$; for $0.4\pi \le \omega \le \pi$.	AP	CO5	16
11.	An analog filter has a transfer function $H(s) = 10/(s^2+7s+10)$. Design a digital filter equivalent to this using impulse invariant method for T=0.2 sec.	AP	CO5	8
12.	Design an ideal high pass filter with a frequency response $H_d(e^{j\omega}) = 1\ for\ \frac{\pi}{4} \le \lvert\omega\rvert \le \pi$ $= 0\ for\ \lvert\omega\rvert \le \frac{\pi}{4}$ Find the values of h(n) for N=11. Find H(z) and plot the magnitude response using Hamming window.	AP	CO5	16