Hall Ticket Number:

Code No. : 17356 O

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (E.E.E.) VII-Semester Backlog Examinations, Dec.-23/Jan.-24

Digital Signal Processing

Time: **3 hours** Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10× 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	List the advantages of digital signal processing over analog signal processing.	2	1	1	1,2,3,12
2.	Differentiate zero input response and zero state response.	2	2	2	1,2,3,12
3.	Differentiate Discrete Fourier Transform with Fourier Transform.	2	2	2	1,2,3,12
4.	List the properties of Discrete Fourier Transform.	2	1	2	1,2,3,12
5.	Draw the frequency response of an ideal low pass filter.	2	2	4	1,2,3,12
6.	List the specifications of a filter.	2	1	4	1,2,3,12
7.	Define group delay.	2	1	4	1,2,3,12
8.	Write the equation for rectangular window function.	2	2	4	1,2,3,12
9.	Name the software used to write coding for TMS320LF2407 DSP controller.	2	1	5	1,2,3,12
10.	Compute the voltage gain of a DC–DC buck boost converter when duty ratio is equal to one.	2	2	5	1,2,3,12
	Part-B (5×8 = 40 Marks)				
11. a)	Test the properties casuality, linearity, shift invariance and memory for the system $y[n]=x[n^2]+x^2[n]$.	4	3	2	1,2,3,12
b)	Determine the step response of the causal system $y[n]-y[n-1]=x[n]+x[n-1]$	4	3	2	1,2,3,12
12. a)	Compute Fast Fourier Transform of the signal $x[n]=\{1,1,1,2,2,2,3,3\}$	4	3	2	1,2,3,12
b)	Explain how to determine linear convolution of two signals using Discrete Fourier Transform.	4	1	3	1,2,3,12

Contd... 2

Code No. : 17356 O

13. a)	The system function of an IIR filter is $H(s) = \frac{4(s+2)}{(s+3)(s^2+2s+5)}$. Obtain the system function H[z] using bilinear transformation.	4	3	4	1,2,3,12
b)	Realize the direct form–I for the system described by the difference equation $y[n] = -0.7y[n-1] - 0.9y[n-2] + 2x[n] + 0.3x[n-1] + 0.5x[n-2]$	4	4	4	1,2,3,12
14. a)	Design an FIR filter with frequency response $H(e^{j\omega}) = \begin{cases} 1 & \text{for } -\pi \le \omega \le 0 \\ -1 & \text{for } 0 \le \omega \le \pi \end{cases}$ using rectangular window. Assume N=11.	4	4	4	1,2,3,12
b)	Obtain the frequency response of an FIR filter with symmetrical impulse response and odd length.	4	2	4	1,2,3,12
15. a)	Explain about multiplexing in TMS320LF2407 DSP controller.	4	1	5	1,2,3,12
b)	Explain about the peripherals Event manager, Joint Test Action Group Port, Control Area Network and Watchdog timer in TMS320LF2407 DSP controller.	4	1	5	1,2,3,12
16. a)	With a block diagram, explain how a continuous time signal is processed using a digital signal processor.	4	2	1	1,2,3,12
b)	Compute circular convolution of the sequences x[n]={1,3} and h[n]={2,1}	4	3	3	1,2,3,12
17.	Answer any ***two*** of the following:				
a)	Compare Finite Impulse Response filter with Infinite Impulse Response filter.	4	2	4	1,2,3,12
b)	Realize a linear phase FIR filter whose impulse response is given as h[n]={1, 2, 3, 2, 1}	4	3	4	1,2,3,12
c)	Explain how a DC–DC buck – boost converter is controlled using TMS320LF2407 DSP controller.	4	2	5	1,2,3,12

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	27.5%
ii)	Blooms Taxonomy Level – 2	32.5%
iii)	Blooms Taxonomy Level – 3 & 4	40%

*****