CRM08	Rev 1.10	<EC>	<10/01/2021>

CONTINUOUS INTERNAL EVALUATION- 3

Dept:EC	Sem :V A	Sub:DSP	S Code:18EC52
Date:11/01/2021	Time: 2:30-4:00 pm	Max Marks: 50	Elective:N

Note: Answer any 2 full questions, choosing one full question from each part.

QN	Questions	Marks	RBT	COs
	PART A			
1 a	Given a lowpass prototype $H_p(s) = \dfrac{1}{(s+1)}$ (i) Determine the high pass filter with a cut off frequency of 40 radians per second. (ii) Determine the band pass filter with a center frequency of 100 rad / sec and bandwidth of 20 rad / sec.	6	L2	CO4
b	Using BLT design a second order digital lowpass Butterworth filter with a cut off frequency of 3.4 kHz at a sampling frequency of 8000 Hz. Use python script to plot the magnitude response	9	L3	CO4
c	Discuss briefly the following special Digital Signal Processor hardware units. (i) Multiplier and Accumulator (MAC) Unit (ii) Shifters (iii) Address Generators	10	L2	CO5
	OR			
2 a	Design a digital band stop Butterworth filter with the following specifications: • Center frequency of 2.5 kHz • Passband width of 200 Hz and ripple of 3 dB • Stop band width of 50 Hz and attenuation of 10 dB • Sampling frequency of 8000 Hz. Use python script to plot the magnitude response	12	L3	CO4
b	With the diagram explain the basic architecture of TMS320C54x family processor.	9	L2	CO5
c	Convert the following decimal numbers into Q – 15 representation. (i) −0.1958 (ii) 0.560123	4	L3	CO5
	PART B			
3 a	Design a digital lowpass Butterworth filter with the following specifications • 3 dB attenuation at the passband frequency of 1.5 kHz • 10 dB attenuation at the stopband frequency of 3 kHz • Sampling frequency of 8000 Hz. Use python script to plot the magnitude response.	10	L3	CO4
b	Differentiate between FIR and IIR filters	4	L2	CO4
c	With the block diagram explain Digital signal processors based on the	6	L2	CO5

Prepared by: Shivaprasad

HOD

CONTINUOUS INTERNAL EVALUATION- 3

	Harvard architecture.			

d	Convert Q-15 numbers into Decimal numbers
	
	  1. 0.110111000010001
	
	  2. 1.010100000001101
		5	L3	CO5

	OR			
4 a	Design a second-order digital bandpass Butterworth filter with the following specifications an upper cutoff frequency of 2.6kHz an lower cutoff frequency of 2.4kHz a sampling frequency of 8000 Hz Use python script to plot the magnitude response.	10	L3	CO4
b	The following IIR filter $y(n)= 2x(n) + 0.5y(n-1)$ uses the direct form 1, for a particular application, the maximum input is Imax=0.25. Develop the DSP implementation equations in the Q-15 fixed-point system	5	L3	CO5
c	Discuss the following IEEE Floating – Point Formats. (i) Single Precision Format (ii) Double Precision Format	6	L2	CO5
d	Convert the following number in the IEEE single precision format to the decimal format (i)111100000.0111....0000 (ii)010001000.011....0000	4	L3	CO5

Prepared by: Shivaprasad

HOD