

K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22

(Autonomous College Affiliated to University of Mumbai)

End Semester Exam

Nov – Dec 2021

B. Tech Program: Electronics and Telecommunication

Examination: TY Semester: V

Course Code: 1UEXC503 and Course Name: Discrete Time Signal Processing

Duration: 03 Hours

Max. Marks: 60

Instructions:

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

		Max. Marks	CO	BT level
Q 1	Solve any six questions out of eight:	12		
i)	Define Band Pass Filter with its characteristics	02	CO1	R
ii)	Define and explain circular time shift property	02	CO2	R
iii)	Calculate DFT of the sequence, $x(n) = \{1, 2, 1, 2\}$	02	CO2	A
iv)	Write disadvantages of FIR filter	02	CO3	R
v)	Summarise aliasing effect	02	CO3	U

vi)	Write short note on design of FIR filter	02	CO4	R
vii)	Write about dead band and limit cycle	02	CO5	R
viii)	Define DTMF in DSP	02	CO6	R
Q.2	Solve any four questions out of six.	16		
i)	Solve the low pass filter described by the difference equation $y(n) = -2y(n-1) + 0.7x(n)$	04	CO1	A
ii)	Compute 4-point FFT of the sequence, $x(n) = \{0, 2, 3, -1\}$ using DIT-FFT method	04	CO2	A
iii)	Find the conversion from S to Z domain in bilinear transformation	04	CO3	U
iv)	Write specifications of digital IIR filter	04	CO4	U
v)	Explain quantization steps for B=03	04	CO5	A
vi)	Write different applications of DSP and explain any one in detail.	04	CO6	U
<b>OR</b>				
Q.3	Solve any two questions out of three.	16		
i)	Explain all pass filter	08	CO1	A
ii)	Realize the structure of FIR high pass filter using hamming window with cut-off frequency $0.8\pi$ rad/sample for $N=07$ .	08	CO3	A

iii)	Study for second order IIR filter $H(z) = \frac{1}{(1-0.5z^{-1})(1-0.45z^{-1})}$ the shift in pole with 3-bits in cascade form realization.	08	CO5	U
Q.4	Solve any two questions out of three.	16		
i)	Determine the response using DIT FFT in LTI system the input $x(n) = \{1, 2, 3\}$ and impulse response $h(n) = \{-1, -1\}$ .	08	CO2	An
ii)	Determine the poles of low pass Butterworth filter for $N=6$ Sketch the location and find normalised transfer function	08	CO4	An
iii)	Explain Channel vocoder with block diagram	08	CO6	A