PM

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

Carry On

July-Aug 2025
(B. Tech) Program:EXTC Scheme I/II/IIB/III: IIB
~~Regular~~/Supplementary Examination:TY Semester: V
Course Code: EXC 503 and Course Name: Discrete Time Signal Processing
Date of Exam: 25/08/25 Duration: 02.5 Hours Max. Marks: 60

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

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any **two** questions out of three: (05 marks each)	10		
a)	Classify the given impulse response as minimum, maximum or mixed phase system h1(n)={1,0.707,0.25} and h2(n)={1,-5,6}		CO1	R
b)	Compute 4-point FFT of the sequence, x(n)= {0,2,3,-1} using DIT-FFT method		CO2	U
c)	Find the conversion from S to Z domain in bilinear transformation		CO3	U
Q 2	Solve any **two** questions out of three: (05 marks each)	10		
a)	Draw structure of FIR band stop filter with the range of frequencies 2.5kHz to 3.8kHz by taking 5 samples		CO4	A
b)	Compare truncation and rounding method		CO5	R
c)	Explain DTMF in digital signal processing		CO6	U
Q.3	Solve any **two** questions out of three. (10 marks each)	20		
i)	Check the type of filter using magnitude plot response $y(n) = x(n) + 2x(n-1) + x(n-2)$		CO1	U
ii)	Determine the poles of low pass Butterworth filter for N=4 Sketch the location of poles on s-plane and find normalized transfer function		CO4	U
iii)	Study second order IIR filter $H(z)= \frac{1}{(1-0.5z^{-1})(1-0.45z^{-1})}$ the shift in pole with 3-bits in direct form realization.		CO5	U
Q.4	Solve any **two** questions out of three. (10 marks each)	20		

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i)	Determine the response using DIT FFT in LTI system the input x(n)={1,2,3} and impulse response h(n)={-1,-1}.	CO2	U
ii)	Realize the structure of FIR band pass filter to pass the frequencies in the range of 0.4π to 0.65π rad/sample by taking 07 samples using rectangular window	CO3	A
iii)	Explain ECG signal analysis in DSP in detail	CO6	U

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