Sanjay Ghodawat University, Kolhapur

2020-21

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EXM/P/09/00

Year and Program: B.Tech. ECE	**School of Technology**	**Department: Electronics Engg.**
Course Code: ECE 301	**Course Title: Digital Signal Processing**	**Semester : V**
Day : Monday **Date : 14/12/2020**	**End Semester Examination**	**Time : 2 Hrs.** **Max Marks : 50**

Question Paper

Instructions: 1) All Questions are compulsory.
2) Use of non-programmable calculator is allowed.

		Marks	Bloom's Level	CO
Q.1	**Answer the following (any Two)–**			
a)	Compute the DFT of given sequence x(n) = {0.5,0,0.5,0} using direct computation method	8	2	1
b)	Compute the DFT of sequence x(n) = {0, 1, 2, 3, 0, 0, 0, 0}by DIT FFT	8	2	2
c)	Explain in brief Goertzel Transform	8	1	2
Q.2	**Answer the following (any two) –**			
a)	Design a linear phase FIR filter of order 7 with cutoff frequency 1 rad/sec using rectangular window	8	5	3
b)	Determine the filter coefficient $h_d(n)$ for the desired frequency response of a low pass filter given by $H_d(e^{j\omega}) = \begin{cases} e^{-j2\omega} & -\frac{\pi}{4} \le \omega \le \frac{\pi}{4} \\ 0 & \frac{\pi}{4} \le \omega \le \pi \end{cases}$ If we define the filter coefficient by $h(n) = h_d(n)W(n)$ where, $W(n) = \begin{cases} 1 & for \quad 0 \le n \le 4 \\ 0 & otherwise \end{cases}$	8	3	3
c)	For the analog transfer function $H(s) = \frac{2}{(s+1)(s+3)}$ determine H(z) if (a) T = 1s and (b) T = 0.5s using impulse invariant method.	8	2	4

Q.3 Answer the following (any two) –

a)	Find the direct form-I and direct form-II realizations of a discrete-time system represented by the transfer function $H(z) = \frac{3z^3 - 5z^2 + 9z - 3}{[z - (1/2)][z^2 - z + (1/3)]}$	9	2	5
b)	Realize the following system with minimum number of multipliers $H(z) = 1 + 3z^{-1} + 2z^{-2} + 5z^{-3} + 2z^{-4} + 3z^{-5} + z^{-6}$	9	3	5
c)	Explain the application of DSP in the field of Speech synthesis & analysis.	9	2	6

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