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| **Continuous Assessment Test I – May 2023** | | | | | | | | | |
| Programme | | : | **B.Tech (ECE)** | | Semester | | : | **FS inter2023-24** | |
| Course | | : | **Digital Signal Processing** | | Code | | : | **BECE301L** | |
| Class Nbr | | : | **CH2022232500062** | |
| Faculty | | : | **Dr. Ramesh. R** | | Slot | | : | **F1+ TF1** | |
| Time | | : | **90 Minutes** | | Max. Marks | | : | **50** | |
| **Answer Key** | | | | | | | | | |
| **Q.No.** | **Questions** | | | | | | | | **Marks** | |
| **1.** | Determine the period of a DT signal  if periodic.  Simplified form: x[n]=0.5(sin(10pi n)-sin(4pi n))  N1=(2pi/10pi)\*5 =1  N2=(2pi/4pi)\*2=1  N=LCM(N1,N2)=1 | | | | | | | | **[3]** | |
| **2.** | Impulse response of a DT system is given by. Comment on causality and stability of the DT system.  h[n] is nonzero for  n >= -6  So h[n] is not absolutely summable. Unstable system, non-causal. | | | | | | | | **[5]** | |
| **3.** | A linear time-invariant system is given as Determine. Specify the ROC of and obtain for the following conditions.   1. System is stable. 2. System is causal.   Taking z-transform,  Using partial fraction,  On solving,  The system has poles at and   1. The system is stable, its ROC must include the unit circle and hence it is . 2. The system is causal, its ROC is | | | | | | | | **[10]** | |
| **4.** | For a DT-LTI system,  represent the input, impulse response and output, respectively. Use Convolution Property of z-Transform to determine the response of the system.    In z-domain, the response  Let us assume, and  Then, and  Using convolution, | | | | | | | | **[7]** | |
| **5.** | If 4-Point DFT of a DT signal  is, then determine the DFT of  using properties of DFT. | | | | | | | | **[5]** | |
| **6.** | Compute 4-point DFT of a DT signal. Use the DFT coefficients, determine energy contained in the signal. | | | | | | | | **[5]** | |
| **7.** | Compute 8 point DFT of the sequence  Using **DIT-FFT** radix-2 algorithm.  X(n)={ 1.0000 0.7070 0 -0.7070 -1.0000 -0.7070 0 0.7070  }  X(k)={ 0 3.9997 0 0.0003 0 0.0003 0 3.9997  } | | | | | | | | **[15]** | |

Course Faculty

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