Nepal college of information technology

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|  | **Unite Test**  Fall 2012 | Time : 2 hrs |
| Program : BE CE  Semester : Fall(VII) | | FM : 70 |
| Subject : Digital Signal Processing | | PM : 35 |

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| *Candidates are required to give their answers in their own words as far as practicable.* |
| *The figures in the margin indicate full marks.* |
| Attempt all the questions. |

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|  | 1. What are the basic elements of digital signal processing? Explain its advantages over analog signal processing. 2. Given the analog input signal xa(t)= 2sin(1000πt) + 10sin(6000πt) + 5cos(12000πt).   i)What is the Nyquist Rate of sampling?  ii)If the signal is sampled at a rate of 5000 samples per second, what is the discrete time signal obtained after sampling?  iii)What is the analog signal that can be reconstructed from the above sampled signal if we use ideal interpolation  iv)Can you obtain original signal? Why? | 7      8 |
|  | 1. Find the response of an LTI system whose impulse response h[n] = {1,1,2} to the input sequence x[n] = {0,1}. 2. Determine whether or not the given signal y[n]=n2x[n] is   i)Linear  ii)Causal  iii)Stable  iv)Shift invariant  Also define the term LTI system with suitable example. | 7    8 |
|  | 1. Determine the total solution y[n], n≥0, to the difference equation y[n] + a1y[n-1] = x[n]. When the input sequence is unit step and y[-1] is an intial condition i.e. zero. 2. Define the term z-transform and ROC. Also find z-transform of the discrete-time signal x[n]= 2n u[n] + 3(0.5)n u[n] | 8    8 |
|  | 1. Find the transfer function and impulse response of a discrete time LTI system described by linear constant-coefficient difference equation given as under:   y[n]= 0.5y[n-1] + x[n] + 0.333y[ n-1]   1. Given a signal X[k] = {0,1,2,3} repeating every 4 points. Assume this as the Discrete Fourier Transform of discrete time signal x[n], determine x[n] and show its plot for n= -3 to 7 | 7  7 |
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|  | ***Write short notes on (Any Two)***   1. DFT vs Z-Transform 2. Transient and Steady State Response 3. Signal & System | 2\*5 |