Pokhara University

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| Level: Bachelor | Semester – Fall | Year : 2011 |
| Programme: BE | | Full Marks: 100 |
| Course: Signal System and Processing | | Pass Marks: 45 |
| Time : 3hrs. |

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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 is an energy signal? Sketch the given signal, and determine whether the given signal is a power signal or an energy signal. 2. Define impulse response of a system. Determine if the system described by the following equation y(n) = x(n) – x(n-1) for 3. Linearity 4. Shift invariance 5. Causality | 2+5  8 |
| 1. 2. | 1. Explain the magnitude response of Butterworth, Chebyshev and Inverse Chebyshev filter. 2. Design a digital Chebyshev filter to satisfy the conditions:       use Bilinear Transformation for T = 1 sec. | 7  8 |
|  | 1. What is the ROC for the Z-Transform? Find the Z-transform and ROC of the given sequence 2. For the given system, 3. Find the transfer function and plot the pole zero diagram 4. Find the impulse response of the system | 2+5  8 |
|  | 1. An FIR filter has co-efficient, Determine the FIR filter co-efficients for the direct form structure. 2. Explain about group delay and Gibbs phenomenon with illustration. | 8  7 |
|  | 1. Discuss about FIR filter design by Kaiser Window. 2. Design a digital low pass Butterworth filter using impulse- invariance method to meet the following specifications.   Pass Band edge frequency = 1.25 KHz  Stop Band edge frequency = 2.75 KHz  Pass Band ripple ≤ 0.5 dB  Stop Band ripple ≥ 15 dB  Sampling Frequency = 10 KHz | 7  8 |
|  | 1. Perform circular convolution of the given sequence using DFT and IDFT: x1(n) = {2, 1, 2, 1} and x2(n) = {1, 2, 3, 4}. 2. What is a window function? Discuss about the rectangular window. | 8  7 |
|  | Write short notes on **any two:**   1. Noise in digital filter 2. Radix-2 FFT algorithm 3. Signal and system | 2×5 |