Pokhara University

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| Level: Bachelor | Semester – Fall | Year : 2011 |
| Programme: BE | | Full Marks: 100 |
| Course: Signal and System | | 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. Define signal. What are the different operations performed on the independent variable of signal. 2. Define dirac delta, signum, gate, triangular and sinc functions. Draw each function. | 7  8 |
| 1. 8 | 1. The following figure shows the sawtooth waveform. Find the Fourier series for this waveform. Also plot the magnitude and phase spectrum of the signal.      1. State and prove *Time Scaling* property of CTFT. | 8  7 |
|  | 1. Find the Fourier transform of the following signal x(t).   x(t)  t  1  2  -2  3  -3  0  Draw magnitude and phase spectrum.   1. Define DFT. How it is different from DTFT. Find DFT of signal x[n] = {1, 4, 2, 1}. | 7  8 |
|  | 1. Find circular convolution of following signals: x1[n] = {1, 1, -3, 2} and x2[n] = {1, 3, -9, 2, 4}. 2. Define Autocorrelation. State and prove the properties of ACF of energy signal. | 8  7 |
|  | 1. Define linearity and time invariance for a LTI system. Also check the system y(t) = c x (t2-1) 2. Memory 3. Stability   where C is an arbitrary finite constant.   1. What do you understand by unit step response. Also determine the response of the system with impulse response   to an input signal  ↑ | 8  7 |
|  | 1. Explain system response in frequency domain and derive the condition for distortionless transmission. 2. Construct the Direct form I and form II structures of an LTI system described by difference equation given below:   . Which structure of the two is advantageous and why? | 7  8 |
|  | Write short notes on **any two:**   1. IRR and FIR system 2. Causality for LTI system 3. Ideal low pass filter | 2×5 |