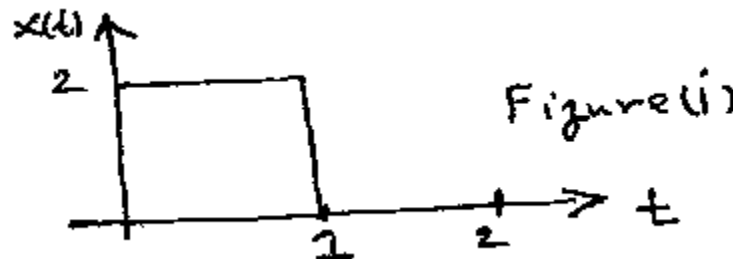


FACULTY OF INFORMATICS**B.E. 2/4 (IT) II – Semester (Supplementary) Examination, January 2015****Subject : Signals and Systems****Time : 3 hours****Max. Marks : 75****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (25 Marks)**

- 1 Define 'system'. 2
- 2 Define and show an example waveform for continuous time and discrete time signal. 2
- 3 For the signal $x(t)$ shown in figure (i) plot $x(t-2)$ and $x(t+1)$. 3



- 4 Distinguish between energy and power signals. 3
- 5 If $F\{x(t)\}$ is $X(W)$, find the FT of $x(t) e^{-j\omega_0 t}$. 3
- 6 Draw a discrete-time and quantized signal. What is the difference between the two signals. 3
- 7 Given $X(s) = \frac{4}{(s+1)(s-3)}$. Find $x(t)$. 3
- 8 Find the Z-transform of a^n . 2
- 9 State the properties of a system. 2
- 10 Define transfer function. 2

PART – B (50 Marks)

- 11 a) Write the trigonometric and compact cosine series representation of a periodic signal and derive the relationship between their coefficients. 8
 b) The signal $x(t) = 3 \cos 2\pi(100k)t + 4 \cos 2\pi(200k)t$
 Draw the frequency domain representation of the above signal. 2
- 12 a) Prove that the convolution in the time domain is equivalent to multiplication in the frequency domain. Wrt FT. (ie) $F\{x_1(t) x_2(t)\} = X_1(W)X_2(W)$. 5
 b) Find the FT of $e^{-\alpha t} u_s(t)$. Plot its amplitude and phase spectra. 5
- 13 a) Define sampling. 2
 b) Explain how using ADC one can obtain a quantized signal. Describe the blocks sampler, quantizer and coder. Draw the sample wave forms. 6
 c) What is zero-order hold (ZOH)? 2

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|----|---|---|-------|
| 14 | a) | Distinguish between convolution and correlation. | 2 |
| | b) | Find the z-transform of (i) \sqrt{n} (ii) $u_s(n)$ (iii) $(0.1)^n u_s(n) - 2^n u_s(-n-1)$ | 6 |
| | c) | Discuss the properties of ROC in ZT. | 2 |
| 15 | Define the following system properties. Also give few examples for each property. | | |
| | i) | Causal | |
| | ii) | linearity | |
| | iii) | time-invariance | |
| | iv) | BIBO stability | 4x2.5 |
| 16 | a) | State and prove the sampling theorem for a band limited signal. | 6 |
| | b) | What is 'aliasing' | 2 |
| | c) | Compare LT and FT | 2 |
| 17 | Write notes on : | | |
| | a) | MATLAB applications | 5 |
| | b) | Transfer function and block diagram reduction | 5 |
