

Name: _____
Student ID: _____
Signature: _____

CITY UNIVERSITY OF HONG KONG

Semester A 2015/2016

EE3210: Signals and Systems

Quiz 4

1. Time allowed: 15 minutes
2. Total number of problems: 2
3. Total marks available: 11
4. This paper may not be retained by candidates

Special Instructions

5. This is a closed book exam
6. Attempt all questions from each problem
7. A list of possibly relevant equations is attached at the end of this paper

Problem 1: (8 marks)

Consider a discrete-time LTI system with unit impulse response $h[n] = \beta^n u[n]$. Use the convolution sum to find the response $y[n]$ of the system to the input $x[n] = \beta^n u[n]$.

Problem 2: (3 marks)

Determine the representation of the continuous-time unit step signal $u(t)$ in terms of the continuous-time unit impulse signal $\delta(t)$.

Appendix – A list of possibly relevant equations

- Convolution sum: $x[n] * h[n] = \sum_{k=-\infty}^{+\infty} x[k]h[n-k]$
 - Commutative property: $x[n] * h[n] = h[n] * x[n]$
 - Distributive property: $x[n] * (h_1[n] + h_2[n]) = x[n] * h_1[n] + x[n] * h_2[n]$
 - Associative property: $x[n] * (h_1[n] * h_2[n]) = (x[n] * h_1[n]) * h_2[n]$
- Convolution integral: $x(t) * h(t) = \int_{-\infty}^{+\infty} x(\tau)h(t-\tau)d\tau$
 - Commutative property: $x(t) * h(t) = h(t) * x(t)$
 - Distributive property: $x(t) * [h_1(t) + h_2(t)] = x(t) * h_1(t) + x(t) * h_2(t)$
 - Associative property: $x(t) * [h_1(t) * h_2(t)] = [x(t) * h_1(t)] * h_2(t)$

— End of Paper —