Premier University
Department of Computer Science and Engineering
4th Semester Special Retake Examination, 2020
Course Title: Signals and Systems
Course Code: EEE 201
Full Marks: 35; Time: 2 hours

Q-1 a. Given 3.5

$x[n] = 2, n=1,2$
$= -2, n=-1,-2,-3$
$= 0, n=0, n>2 \text{ or } n<-3$

Find $y[n] = x[3n+2]$

b. Categorize the signal 3.5

$x[n] = n, \quad 0<=n<5$
$= 20-n, \quad 5<=n<=10$
$= 0, \text{otherwise}$

as power or energy signal and find the energy/time average power

Q-2 a. Write short notes on: i)Impulse Function ii)Ramp Function 02

b. Define causal system. Consider a system for which input-output relation is $y(t) = x(t)\,x(t-1)$. Find out whether the system is linear or non-linear. 05

Q-3 a. Evaluate the convolutional integral for a system with input x(t) and impulse response h(t), respectively given by $x(t) = u(t-1)-u(t-3)$ and $H(t) = u(t) - u(t-1)$ 06

b. Describe briefly the initial value theorem. 01

Q-4 a. Determine the Laplace transform, ROC and locations of poles and zeros of X(s) for $x(t) = \sin(4t)u(t)$ 04

b. Find the unilateral Laplace Transform of $x(t) = e^{-t}u(t) * \sin(t-3)u(t-3)$ 03

Q-5 a. The impulse response of a system is given by $h(t) = RC^{-1} * e^{-t/RC} * u(t)$ Find the expression for magnitude and phase response. 05

b. Explain whether the function $x(t) = t$ stable or not. 02