Dr Nafis Uddin

Roll No:.....

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST - 1 EXAMINATION SEPTEMBER 2018

B.Tech V Semester

COURSE CODE: 10B11EC512 MAX. MARKS: 15

COURSE NAME: Digital Signal Processing COURSE CREDITS: 04

MAX. TIME: 1 Hr

Note: All questions are compulsory. Assume the data wherever necessary.

Q1. A discrete time system is described by the following input-output relationship

$$y[n] = \sum_{k=-\infty}^{n+1} x[k]$$

State whether the above system is linear and time-invariant. CO1 [5]

Q2. Determine the response of the system described by the following difference equation

$$y[n] - 4y[n-1] + 4y[n-2] = x[n] - x[n-1]$$

when the input is $x[n] = (-1)^n u[n]$ and the initial conditions are $y[-1] = y[-2] = 0$. CO2 [5]

Q3. (a) Determine the Z – transform of the signal $x[n] = (1+n)u[n]$.

Also sketch the corresponding ROC in pole – zero diagram. CO2 [2]

(b) Consider a system whose system function is

$$H(z) = \frac{z^{-1} + \frac{1}{2}z^{-2}}{1 - \frac{3}{5}z^{-1} + \frac{2}{25}z^{-2}}$$

Determine the impulse response and step response if $y[-1] = 1$ and $y[-2] = 2$. CO2 [3]