JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -I EXAMINATIONS-2022

B.Tech-V Semester (ECE)

COURSE CODE (CREDITS): 18B11EC511 (4) MAX. MARKS: 15

COURSE NAME: Principles of Digital Signal Processing

COURSE INSTRUCTORS: Dr. Sunil Datt Sharma

MAX. TIME: 1 Hour

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q1. If the impulse response of a system is known, then the response for any input can be determined using an operation. Identify the name of operation, and perform this operation between impulse response of the system $x_1[n] = [1\ 2\ 3\ 4]$ and input sequence $x_2[n] = [1\ 1\ 1\ 1]$ to get the output of the system. **[CO-1, Marks 1+1]**

Q.2 Calculate the energy and power of the signal $x[n] = u[n]$, **[CO-1, Marks 1+1]**

Q.3 Calculate the fundamental period of the signal $x[n]$, where $x[n] = cos\left(\frac{n\pi}{3}\right) + cos(\frac{n3\pi}{4})$ **[CO-1, Marks 1+1+1]**

Q.4 Compute the even and odd component of the signal $x[n] = \alpha^n u[n]$. **[CO-1, Marks 1+1]**

Q.5. Compute the periodic convolution of the $x_1[n] = [1\ 2\ 3\ 4]$ and $x_2[n] = [1\ 1\ 1\ 1]$ **[CO-1, Marks 2]**

Q.6. Calculate the Z-transform $X[z]$ of the discrete time sequence $x[n] = [1, 1, 1, 1, 1]$ and write your comment to justify the existence of $X[z]$ in the zplane. **[CO-1, Marks 1+1]**

Q.7 Classify the following signals based on its dimension. **[CO-1, Marks 1+1]**

Image, speech signal, ECG Signal, Video Signal.