

# DIGITAL SIGNAL PROCESSING (CP-301)

## Assignment No 1

### CLO-1

**Submission Date:** 15-12-2021

**Instructions:**

- Individual Assignment

**Q No 1:** What is meant by digital signal processor? Explain architecture of any of the digital signal processor.

**Q No 2:** Apply convolution sum on the following sequence

$$x[n] = u[n]$$

$$h[n] = \begin{cases} 0 & n < 0 \\ a^n & 0 \leq n \leq N_1 \\ 0 & N_1 < n < N_2 \\ a^{n-N_2} & N_2 \leq n \leq N_2 + N_1 \\ 0 & n > N_2 + N_1 \end{cases}$$

**Q No 3:** Consider a system with input  $x[n]$  and output  $y[n]$  that satisfy the difference equation

$$y[n] = ny[n-1] + x[n]$$

The system is causal and satisfies initial-rest conditions; i.e., if  $x[n]=0$  for  $n < n_0$ , then  $y[n]=0$  for  $n < n_0$ .

- if  $x[n]=\delta[n]$ , determine  $y[n]$  for all  $n$ .
- Is the system linear? Justify your answer.
- Is the system time invariant? Justify your answer.