# NCERT 11.9.5.30

EE23BTECH11043 - BHUVANESH SUNIL NEHETE*

## Question

A man deposited Rs 10000 in a bank at the rate of 5% simple interest anually. Find the amount in $15^{th}$ year since he deposited the amount and also calculate the total amount after 20 years.

## Answer

| Parameter | Value/Formula | description |
|---|---|---|
| $x(0)$ | Rs.10000 | Total amount deposited |
| r | 5 | Rate of interest |
| $x(n)$ | $(x(0)+nd)\,u(n)$ | amount at the start of $(n+1)^{th}$ year |
| $d$ | 500 | common difference |

TABLE 1
Input data

$$\text{Interest in one year} = \frac{10000 \times 5 \times 1}{100} \tag{1}$$

$$d = 500 \tag{2}$$

From (2) and Table 1:

$$x(n) = (10000 + 500n)u(n) \tag{3}$$

Amount in $15^{th}$ year is

$$x(14) = x(0) + 14 \times d \tag{4}$$

$$\implies x(14) = 17000 \tag{5}$$

Total amount after 20 years is

$$x(20) = x(0) + 20 \times 500 \tag{6}$$

$$\implies x(20) = 20000 \tag{7}$$

From (2)

$$X(z) = \frac{10000}{1 - z^{-1}} + \frac{500z^{-1}}{(1 - z^{-1})^2} \quad |z| > 1 \tag{8}$$

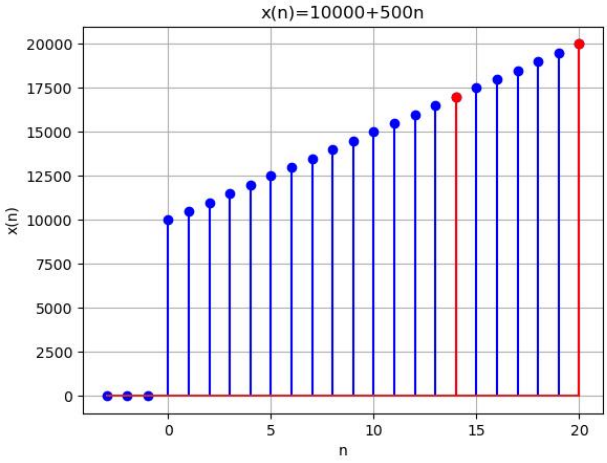


Fig. 1. graph for $x(n) = 10000 + 500n$