

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 annually. Find the amount in 15th 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 $(n + 1)^{\text{th}}$ year
d	500	common difference
$y(n)$		sum upto n^{th} term

TABLE 1
INPUT DATA

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

$$d = 500 \quad (2)$$

From (2) and Table 1:

$$x(n) = (10000 + 500n)u(n) \quad (3)$$

Amount in 15th year is

$$x(14) = x(0) + 14 \times d \quad (4)$$

$$\Rightarrow x(14) = 17000 \quad (5)$$

Total amount after 20 years is

$$x(20) = x(0) + 20 \times 500 \quad (6)$$

$$\Rightarrow x(20) = 20000 \quad (7)$$

From (2)

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

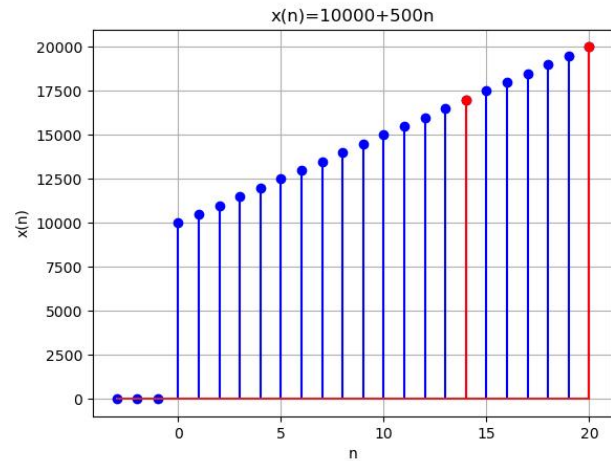


Fig. 1. graph for $x(n) = 10000 + 500n$