NCERT Discrete - 10.5.3.20

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Parameter	Value	Description
$x(0)$	5	First term
r	2	Common ratio
$y(n)$	315	Sum of $n+1$ terms
$x(n)$	?	Last term

TABLE 0
INPUT PARAMETERS

Question : 10.5.3.20 The sum of some terms of G.P. is 315 whose first term and the common ratio are 5 and 2 , respectively. Find the last term and the number of terms.

Solution:

$$x(n) = x(0)r^n u(n) \tag{1}$$

From (**??**)

$$X(z) = \frac{5}{1-2z^{-1}} \quad |z| > |2| \tag{2}$$

By contour integration:

$$y(n) = x(0)\left(\frac{r^{n+1}-1}{r-1}\right)u(n) \tag{3}$$

$$315 = 5\left(2^{n+1}-1\right) \tag{4}$$

$$\implies n = 5 \tag{5}$$

The number of terms is $n+1 = 6$
From (1):

$$x(5) = 5\left(2^5\right) \tag{6}$$

$$= 160 \tag{7}$$

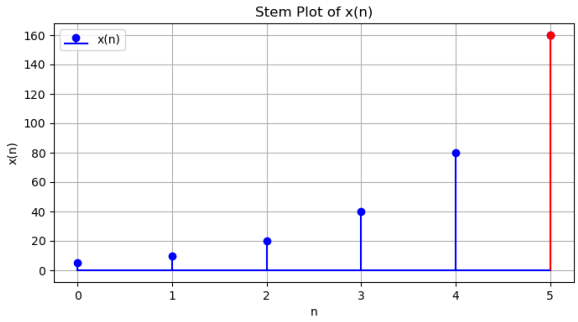

Fig. 0. Stem plot of x(n)

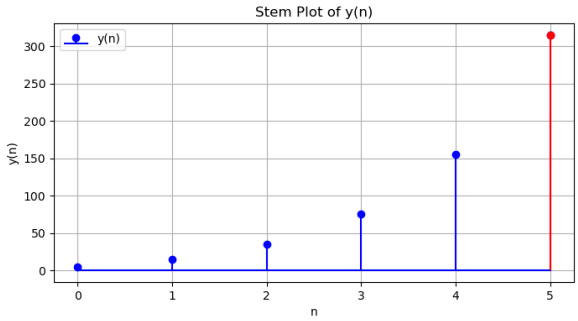

Fig. 0. Stem plot of y(n)