10.5.3.19

EE23BTECH11065 - prem sagar

Question:
200 logs are stacked in the following manner .20 logs in the bottom row ,19 in the next row ,18 in the row next to it and so on(see Fig 5.5).In how many rows are the 200 logs placed and how many logs are in the top row.

Solution:

Symbol	Value	Description
$x(0)$	20	first term of AP
d	-1	common difference
$x(n)$		$(x(0)+nd)\,u(n)$
$y(n)$	200	$\frac{n+1}{2}[x(0)+x(n)]u(n)$

TABLE 1
INPUT PARAMETERS

From Table 1:

$$200 = \frac{n+1}{2}(20+20-n) \tag{1}$$

$$n = 24\,(\text{or})\,15 \tag{2}$$

for n=24

$$x(24) = 20-24 \tag{3}$$

$$= -4 \tag{4}$$

but logs cannot be negative
for n=15

$$x(15) = 20-15 \tag{5}$$

$$= 5 \tag{6}$$

so 5 logs are there on top row
15 rows are needed.

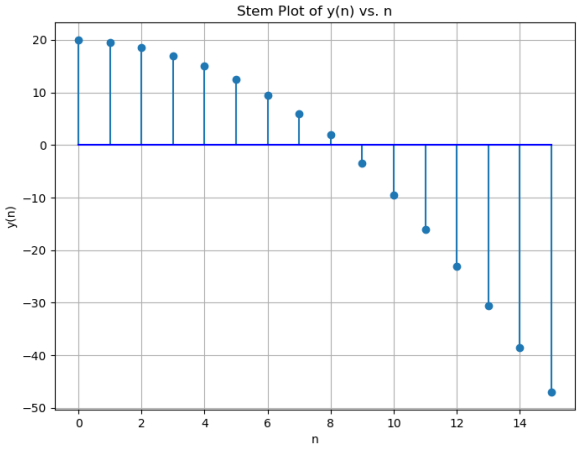

Fig. 1. plot of y(n) v/s n