5. Here,

$$\left.\begin{aligned} T(n) &= T(n/2) + n \;; \\ T(1) &= 1 \end{aligned}\right\}$$

Comparing the above recurrence relation with the following relation

$$T(n) = \begin{cases} d & , n = 1 \\ aT(\lceil n/b \rceil) + cn^k & , \text{otherwise} \end{cases}$$

we get,

$$a = 1 \;,\; b = 2 \text{ and } k = 1$$

$$\Rightarrow \quad 1 < 2^1 \;, \text{ i.e., } a < b^k$$

∴ The asymptotic running time for the given relation using the Master formula will be –

$$T(n) \text{ is } \Theta(n^k) \text{ i.e. } \Theta(n).$$