Time Complexity Questions

Q1)

Acc. to Masters theorem

for if condition the $T(n) = O(1)$

further

recurrence Rel^n found to be

$$T(n) = 2T\left(\frac{n}{2}\right) + O(n) \quad \text{---} \quad (1)$$

comparing (1) with

$$T(n) = aT\left(\frac{n}{b}\right) + f(n)$$

$\therefore a = 2$

$b = 2$

$f(n) = O(n)$

$\therefore$ Acc. to Masters theorem

$\log_b a = \log_2 2 = 1$

$k = 1$ $\quad \therefore T(n) = O(n \log n)$

Q.2

→

Here for loop is running 2 times which is also a nested

∴ TC = $O(n^2)$

Q.3

Here for loop is running only 1 time

∴ Worst TC = $O(n)$

Q.4

Here for loop is running for 2 times which is nested

∴ $O(n^2)$.

& for if condition The TC = $O(1)$

∴ Total Worst Time complexity = ~~$O(n)$~~

$= O(n^2 + 1)$

$= O(n^2)$

Q.5)

→ Here for loop is running for 2 times which is also nested loops

∴ TC = $O(n^2)$