Q1

$i = 0$; $i < n$; i++ $\rightarrow O(n)$

$j = 0$ $j*j < n$ j++ $\rightarrow$

$0 \rightarrow$ $j^2 < n$

n $j = \sqrt{n}$

$\underbrace{j = 0\ 1 . 2\ \ 3\ \ 4 \ldots\ldots \sqrt{n}}_{x \text{ terms}}$ (chota)

$T.C \Rightarrow O(n\sqrt{n})$

Q2

for $i = 0$; $i < n$; i++ — n

for $j = 1$; $j < n$; $j *= 2 \Rightarrow j = 2j$

$i = 0$ $j = 1, 2, 4 \ldots$

$i = 1$ $j =$

$\therefore$ $j = 1, 2, 4 \ldots\ldots n$

$1, 2^1, 2^2 \ldots\ldots 2^x$

$\therefore 2^x = n$

$\log_2 n = x$

$\boxed{\log n = x}$

$\therefore \boxed{TC = n \log n}$

3 $i=0 \quad i<n \quad i++ \rightarrow$ n times

$j=1 \quad j^2<n \quad j=2j \qquad j=\sqrt{n}$

$j=1 \quad 2 \quad 4, 8 \cdots \sqrt{n}$

$j=1 \quad \underbrace{2 \quad 4 \quad 8 \cdots\cdots y}_{x \text{ terms}}$

$\boxed{y=\sqrt{n}}$

$y = 1 \cdot 2^{x-1}$ $\qquad \therefore \boxed{\log\sqrt{n}}$

$y = 2^x$

$\boxed{\log y = x}$ $\qquad \therefore \boxed{T \cdot C = n \log\sqrt{n}}$

$\boxed{or}$

$\log_2 n^{1/2} \Rightarrow \frac{1}{2}\log_2 n \approx \log n$

$\therefore \boxed{n \log n}$

4 $i=n \;;\; i>0 \;;\; i=i/2$

$j=0 \;;\; j<i \;;\; j++$

$i = n, \frac{n}{2}, \frac{n}{4} \cdots\cdots 1$

$\therefore \phi = (\log n)$

$\frac{a(1-r^n)}{1-r}$

$n + \frac{n}{2} + \frac{n}{4} \cdots\cdots 1$

$\Rightarrow n\left(\frac{1-\left(\frac{1}{2}\right)^{\log_2 n}}{1-\frac{1}{2}}\right) =$

$$2n\left(1-\left(\frac{1}{2}\right)^{\log_2 n}\right) \qquad x^{\log_x y} = y$$

$$\therefore\ 2^{\log_2 n} = n$$

$$2n\left(1-\frac{1}{2^{\log n}}\right)$$

$$= 2n\left(1-\frac{1}{n}\right)$$

$$2n - \frac{2n}{n}$$

$$2n-2$$

$$\therefore\ O(n)$$

$\longrightarrow (\log_2 n)$ - term

(5) $i=1$, $i<n$; $i**2$

$j=n$ $j>i$; $j--$

$i=1 \rightarrow n-1, n-2, n-3 \ldots\ldots 2$

$i=2 \rightarrow n-2, n-3 \ldots\ldots 3$

$i=4 \rightarrow n-3 \quad n-4 \ldots\ldots 4$

$\vdots$

$i=n-1 \quad j=n$ - 1 term.

$T.n.o$ - $n-1+n-2+n+4$

$\Downarrow$

$$\boxed{T.C = O(n\log n)}$$