

$$1. T(n) = 2T(n-1) + 1 \quad T(0) = 1$$

$$1 + 2T(n-1)$$

$$1 + 2T(1 + 2T(n-1) + 1)$$

$$1 + 2 + 4T(n-2)$$

$$1 + 2 + 4(1 + 2T(n-2) + 1)$$

$$1 + 2 + 4 + 8T(n-3)$$

$$2^{k-1} \cdot T(n-k) \quad n = k$$

$$2^{n-1} \cdot [B.y.O.H. 2^n]$$

recursion

$$1 + 2T(n-1)$$

$$1 + 2T(n-2)$$

$$3. T(n) = T(n-1) + \frac{1}{n}, \quad T(0) = 1$$

$$= [T(n-2) + \frac{1}{n-1}] + \frac{1}{n}$$

$$= T(n-2) + \frac{1}{n-1} + \frac{1}{n}$$

$$= T(n-3) + \frac{1}{n-2} + \frac{1}{n-1} + \frac{1}{n}$$

$$f(n) = \gamma + 1$$

$$B.y.O.H. \log(n)$$

$$2. T(n) = T(n-2) + n^2 \quad T(0) = 1$$

$$T_0 = [T(n-4) + (n-2)^2] + n^2 = T(n-4) + (n-2)^2 + n^2$$

$$T_n = [T(n-6) + (n-4)^2] + (n-2)^2 + n^2$$

$$= T(n-6) + (n-4)^2 + (n-2)^2 + n^2$$

$$\sum_{i=0}^n (2i+1)^2 = \frac{1}{3}n^3 + \frac{1}{2}n^2 + \frac{1}{6}n$$

$$B.y.O.H. n^3$$