50. (a) We use Eq. 21-14. For configuration A

$$W_A = \frac{N!}{(N/2)!(N/2)!} = \frac{50!}{(25!)(25!)} = 1.26 \times 10^{14} \ .$$

(b) For configuration B

$$W_B = \frac{N!}{(0.6N)!(0.4N)!} = \frac{50!}{[0.6(50)]![0.4(50)]!} = 4.71 \times 10^{13} \ .$$

(c) Since all microstates are equally probable,

$$f = \frac{W_B}{W_A} = \frac{1265}{3393} \approx 0.37 \ .$$

(d) We use these formulas for $N = 100$: $W_A = 1.01 \times 10^{29}$, $W_B = 1.37 \times 10^{28}$, and $f \approx 0.14$.

(e) For $N = 200$ we have $W_A = 9.05 \times 10^{58}$, $W_B = 1.64 \times 10^{57}$, and $f = 0.018$.

(f) We see from the calculation above that f decreases as N increases, as expected.