Two replicas are sampling distributions $p_1(x)$ and $p_2(x)$ and are currently at states x_1 and x_2. The probability for accepting an exchange is then given by

$$p_{\mathrm{acc}}(x_1, x_2|p_1, p_2) = \min\left\{1, \frac{p_1(x_2)}{p_1(x_1)}\frac{p_2(x_1)}{p_2(x_2)}\right\}. \tag{1}$$

Assume p_1 and p_2 depend on x only through a common function $E(x)$, the "energy", that is, we have $p_i(x) = p_i(E(x))$.
To calculate the average acceptance rate $\overline{p}_{\mathrm{acc}}$, we calculate the expectation value of p_{acc} with respect to the joint distribution $p(x_1, x_2) = p_1(x_1)p_2(x_2)$ and we have

$$\overline{p}_{\mathrm{acc}} = \int\int p_{\mathrm{acc}}(x_1, x_2|p_1, p_2)p_1(x_1)p_2(x_2)\mathrm{d}x_1\mathrm{d}x_2. \tag{2}$$

This is a double integral over two potentially high-dimensional variables. To make progress, we introduce the density of states (DOS) $g(E)$, which counts the multiplicity of energies:

$$g(E) = \int \mathrm{d}x\ \delta(E - E(x)) \tag{3}$$

Using the DOS, we can write the expectation value of any function $f(x)$ which depends on x only via the energy E (meaning, again, $f(x) = f(E(x))$), as an integral over E instead of x:

$$\int \mathrm{d}x\ f(E(x)) = \int \mathrm{d}E g(E)f(E) \tag{4}$$

We further note that often, we only now distributions p up to a normalization constant Z, and we have

$$p(x) = \frac{1}{Z}q(x) \tag{5}$$

Using the DOS, above equation and the assumption that $q(x) = q(E(x))$, we can now rewrite the expected acceptance rate as an integral over energies:

$$\begin{aligned}
\overline{p}_{\mathrm{acc}} &= \tfrac{1}{Z_1Z_2}\int\int \mathrm{d}x_1\mathrm{d}x_2\ \min\left\{1, \tfrac{q_1(E(x_2))}{q_1(E(x_1))}\tfrac{q_2(E(x_1))}{q_2(E(x_2))}\right\} q_1(E(x_1))q_2(E(x_2)) && (6)\\
&= \tfrac{1}{Z_1Z_2}\int\int \mathrm{d}x_1\mathrm{d}x_2\ \min\left\{q_1(E(x_1))q_2(E(x_2)), q_1(E(x_2))q_2(E(x_1))\right\} && (7)\\
&= \tfrac{1}{Z_1Z_2}\int\int \mathrm{d}E_1\mathrm{d}E_2\ g(E_1)g(E_2)\min\left\{q_1(E_1)q_2(E_2), q_1(E_2)q_2(E_1)\right\} && (8)
\end{aligned}$$

Note that the normalization constants Z_1, Z_2 can be written in terms of the energies E, too:

$$Z_i = \int \mathrm{d}x\ q(E(x)) = \int \mathrm{d}E\ g(e)q(E) \tag{9}$$

Long story short: if we have access to $g(E)$, we can estimate the expected acceptance rate by means of simple numeric approximation of one-dimensional and two-dimensional integrals over energies.
We can get a good estimate of $g(E)$ via multiple histogram reweighting; it is

essentially an estimate of $g(E)$ at every sampled value and thus the integrals collapse into weighted sums.
More specifically, for the Boltzmann ensemble, we have

$$p_1(x) \quad = \tfrac{1}{Z(\beta_1)} \exp(-\beta_1 E(x)) \tag{10}$$

$$p_2(x) \quad = \tfrac{1}{Z(\beta_2)} \exp(-\beta_2 E(x)) \tag{11}$$

Assuming we have an estimate of $g(E)$ from multiple histogram reweighting, this means we can calculate the expected acceptance rate for any two pairs of inverse temperatures β_1, β_2. Say now that $\beta_0 = 1$ gives us the distribution we actually are interested in and $\beta_N = \epsilon \approx 0$ is an almost uniform distribution. This suggests an iterative algorithm to get a sequence $\beta_0 > \beta_1 > \ldots > \beta_N$ for which the acceptance rates between simulations at consecutive temperatures β_i, β_{i+1} are attain a constant value $\overline{p}_{\text{acc}}^{\text{target}}$: we start with $\beta = 1$ and lower β in increments of $\Delta\beta$, until the expected acceptance rate drops below $\overline{p}_{\text{acc}}^{\text{target}}$. We then save the β value before the last decrement as β_1. We then calculate acceptance rates between β_1 and steadily decreasing β values, until the acceptance reate drops below $\overline{p}_{\text{acc}}^{\text{target}}$ again and we save the previous β value as β_2 and so on and so forth. At one point, we will hit a predefined β_{min}. We then terminate and have obtained the desired sequence of β values as our optimized schedule.