49. For simplicity, we assume the record is turning freely, without any work being done by its motor (and without any friction at the bearings or at the stylus trying to slow it down). Before the collision, the angular momentum of the system (presumed positive) is $I_i\omega_i$ where $I_i = 5.0 \times 10^{-4}$ kg·m^2 and $\omega_i = 4.7$ rad/s. The rotational inertia afterwards is $I_f = I_i + mR^2$ where $m = 0.020$ kg and $R = 0.10$ m. The mass of the record (0.10 kg), although given in the problem, is not used in the solution. Angular momentum conservation leads to

$$I_i\omega_i = I_f\omega_f \implies \omega_f = \frac{I_i\omega_i}{I_i + mR^2} = 3.4 \text{ rad/s} .$$