13. Charge movement in electric and magnetic field - answers

13.1. $\omega = \frac{qB}{m}$

13.2. $q = \frac{F}{vB\sin\alpha}$

13.3. $x = \frac{2\pi mv\cos\alpha}{qB}$

13.4. electron moves straight with constant velocity (do you know why?)

13.5. a) $v_0 = l\sqrt{\frac{eU}{2mdy_0}}$; b) $v_k = \sqrt{\frac{eU}{2mdy_0}(l^2 + 4y_0^2)}$

13.6. $t = \frac{v_0 m sin\alpha}{eE} + \sqrt{\frac{v_0^2\sin^2\alpha}{e^2E^2} + \frac{2my_0}{eE}}$; $x = v_0\cos\alpha\left(\frac{v_0 m sin\alpha}{eE} + \sqrt{\frac{v_0^2\sin^2\alpha}{e^2E^2} + \frac{2my_0}{eE}}\right)$

13.7. $v = \sqrt{\frac{2kq_1q_2(l_0-l)}{mll_0}}$

13.8. a) $\frac{E}{B} = v$; b) $B = \frac{F_c}{qv}$

13.9. $\frac{a_N}{a_S} = \frac{qBt}{m}$

13.10. $\alpha = arctg\left(\frac{vB}{E}\right)$