2016, 1

Points 4, 1, 1, 1, 1, 2

(a) (i) $q = (110\ g)(4.18\ J\ g^{-1}\ °C^{-1})(20.6\ °C) = 9470\ J = 9.47\ kJ$

(ii) $\Delta H_{soln} = \frac{9470\ J}{(10.0\ g/(6.94+35.45))} = -40.1\ kJ\ mol_{rxn}^{-1}$

(b) $1s^2\ 2s^2\ 2p^6$

(c) The electronic configuration of Li^+ is $1s^2$. A whole extra, quantum shell in the Na^+ ion means that the ionic radius is significantly greater for Na.

(d) LiCl. Given lattice energy is governed by Coulomb's law, the smaller the value of r (the distance between the ions), and the larger the force of attraction between them. Since Li^+ is smaller than Na^+, Li^+ and Cl^- can get closer together than Na^+ and Cl^-. *(I also like a comparison based upon the greater charge density of Li^+ over Na^+, here).*

(e) Cl^- on the left (the larger), Li^+ on the right (the smaller).

(f) H_2O (δ^- oxygen) to Li^+, and H_2O ($\delta+$ hydrogen) to Cl^-. Each can be described as dipole (H_2O) to ion (Li^+, Cl^-) interactions.