

# 06002 Essay

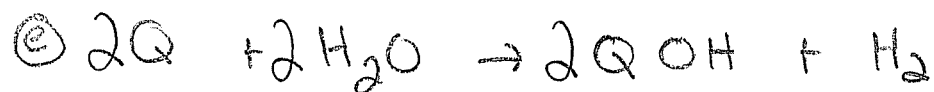
atomic # 119

a) [ ] 8s<sup>1</sup>

b) Metal - 8s<sup>1</sup> put the element in the same group as alkali metals  
- has only 1e<sup>-</sup> that it will easily lose, just like the other alkali metals

c) Largest in group because it has 8 energy levels

d) +1



f) i)  $Q_2CO_3$

ii) yes soluble - alkali carbonates are soluble  
alkali metal salts are soluble in H<sub>2</sub>O

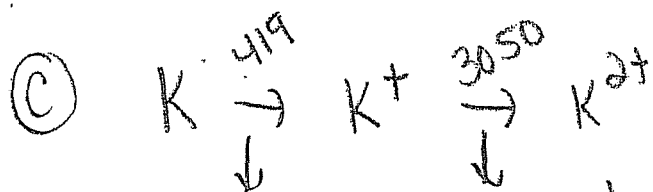
D4991

a)  $\text{Ca} = 0.197 \text{ nm}$   
 $\text{Ca}^{2+} = 0.099 \text{ nm}$

the cation is smaller because it has lost  $2e^-$ , losing an electron shell in the process. This causes an increase in the  $Z_{\text{eff}}$  in cation, decreasing the radius.

b)  $\text{CaO}_{(s)} = -3460 \text{ kJ}$       $2+/2-$   
 $\text{K}_2\text{O}_{(s)} = -2240 \text{ kJ}$       $1+/2-$

The greater the magnitude of charge, the more attracted the ions are to each other, resulting in more energy needed to break the bond



lower than Ca's

1st IE because

it is losing its only valence electron to achieve noble gas configuration (very stable)

Very high IE because  $\text{K}^+$  has a noble gas configuration and is very stable.

Higher than Ca 2nd IE because

Ca is not yet in noble gas configuration after removal of  $2e^-$

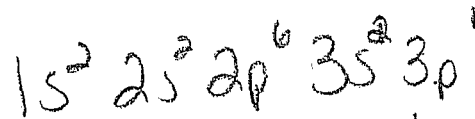
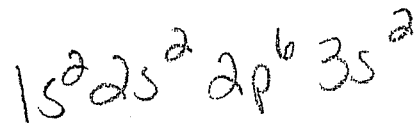
(d)

Mg

1<sup>st</sup> IE 738 KJ

Al

1<sup>st</sup> IE 578 KJ



want to lose

this electron

because it will be  
left w/ a full  $3s^2$

subshell

$3p$  energy level is  
also more shielded  
from nucleus so it  
is easier to  
remove  $e^-$

high IE because  
if you lose  $3s^2$  electron  
you no longer have  
a full subshell