

II) 1) a) B, C b) C

2) e) Ne

3) a) Si. Na  $11p^+$   $1s^2 2s^2 2p^6 3s^1$   $\xrightarrow{1^{st}}$

Mg  $12p^+$   $1s^2 2s^2 2p^6 3s^2$   $\xrightarrow{1^{st}}$

Si  $14p^+$   $1s^2 2s^2 2p^6 3s^2 3p^1$   $\xrightarrow{1^{st}}$

For each atom, the first electron ionized comes from the third energy level. Si has the most protons in its nucleus so it has the largest ionization energy.

b) Na. Na  $1s^2 2s^2 2p^6 3s^1$   $\xrightarrow{1^{st}}$   $1s^2 2s^2 2p^6$   $\xrightarrow{2^{nd}}$

Mg  $1s^2 2s^2 2p^6 3s^2$   $\xrightarrow{1^{st}}$   $1s^2 2s^2 2p^6 3s^1$   $\xrightarrow{2^{nd}}$

Si  $1s^2 2s^2 2p^6 3s^2 3p^1$   $\xrightarrow{1^{st}}$   $1s^2 2s^2 2p^6 3s^2 3p^0$   $\xrightarrow{2^{nd}}$

With Na the second electron ionized is removed from the second energy level. With Mg + Si the second electron ionized is removed from the third energy level.

$\therefore$  Na has the largest second ionization energy.

c) The 3rd ionization energy for Be is the largest.

Mg  $1s^2 2s^2 2p^6 3s^2$   $\xrightarrow{1^{st}}$

C  $1s^2 2s^2 2p^1 2p^1$   $\xrightarrow{1^{st}}$

Be  $1s^2 2s^2$   $\xrightarrow{1^{st}}$   $1s^2 2s^1$   $\xrightarrow{2^{nd}}$   $1s^2$   $\xrightarrow{3^{rd}}$

4) a) 1 b) 1 c) 2 d) 2 (Note) - The valence electrons are easiest to remove since they are furthest from the nucleus.

5) Element A - 4 valence  $e^-$ , Element B - 1 valence  $e^-$ , Element C - 3 valence  $e^-$

6) M has 2 valence electrons and would therefore tend to become  $M^{2+}$  when it forms an ion.

$\therefore$  Oxide  $\Rightarrow M^{2+} O^{2-} \Rightarrow MO$

Phosphide  $\Rightarrow M^{2+} P^{3-} \Rightarrow M_3P_2$

Sulphide  $\Rightarrow M^{2+} S^{2-} \Rightarrow MS$

Fluoride  $\Rightarrow M^{2+} F^- \Rightarrow MF_2$

Nitride  $\Rightarrow M^{2+} N^{3-} \Rightarrow M_3N_2$