d) $E_i = E_f - E_{ini}$ $\quad Na \rightarrow Na^+ + 1e^-$

$E_i = E_{Na^+} - E_{Na}$ 0,25

$Na: 1s^2 2s^2 2p^6 3s^1$

$Na^+: 1s^2 2s^2 2p^6$

$E_i = 2E(1s) + 8E(2s2p) - 2E(1s) - 2E(2s2p) - E(3s)$ 0,25

$E_i = -E(3s)$ 0,25

$E(3s) = -\frac{13,6\, Z_{eff}^2}{n^2}$ 0,25

$Z_{eff} = Z - \sigma$ 0,25

$= Z - (8 \cdot 0,85 + 2 \cdot 1) = 2,2$ 0,25

$E(3s) = -\frac{13,6\,(2,2)^2}{(3)^2} = -7,31\ eV$ 0,25

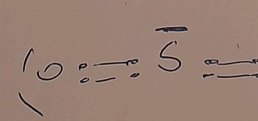
$\boxed{E_i = 7,3\ eV}$ 0,25

2) a) SO_2

$_{16}S: 1s^2 2s^2 2p^6 3s^2 3p^4$ $\quad$ vs $\quad$ $V = 2$

S^* $\quad$ $V = 4$ 0,5

$O: 1s^2 2s^2 2p^4$ $\quad$ $V = 2$ 0,5



0,5

b) Geometry "VSEPR" $\quad AX_nE_m$ $\quad n = 2$, $m = 1$

$AX_2E_1 \rightarrow P = n + m = 3$

$P = 3 \rightarrow$ electro geometry triangl plane $\alpha = 120°$ 0,5

$\rightarrow$ Molecular shape (V, bent) 0,5

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