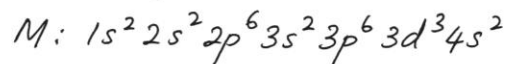


Sem 1 (2003/2004) : Electronic Configuration

Q3 (a) Element M ($Z=23$)



(i) transition metal - blok d

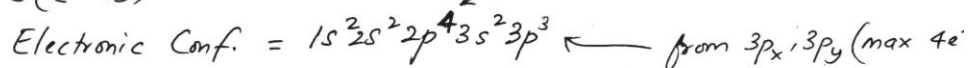
(ii) +2, +3, +4, +5 ← Vanadium

(iii) V_2O_5 : Vanadium (v) oxide or Vanadium pentoxide

Q3 (b) 2 sub-orbital p (ie. p_x, p_y) ← assumption p^4 (max)

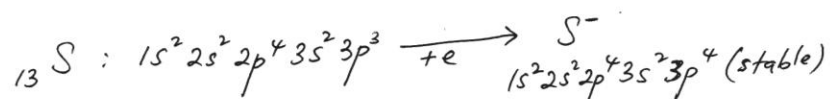
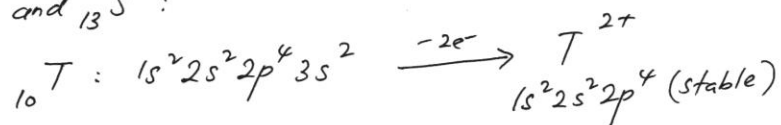
4 sub-orbital d (ie. $d_{xy}, d_{xz}, d_{yz}, d_{z^2}$) ← assume d^8 (max)

(i) S ($Z=13$)



(ii) ${}_{13}S$ is from the main group (block-p)

(iii) ${}_{10}T$ and ${}_{13}S$:



Formula : TS_2

(iv) Ionic compound.

T ($Z=10$) - tendency to form T^{2+} (metal ion)

S ($Z=13$) - tendency to form S^- (non-metal)

(v) U ($Z=19$): $1s^2 2s^2 2p^4 3s^2 3p^4 3d^3 4s^2$

V ($Z=23$): $1s^2 2s^2 2p^4 3s^2 3p^4 3d^8 4s^1$

$\left(\frac{1}{2}\right)$

Sem 1 (2003/2004): Electronic Configuration

Q₃ (vi)

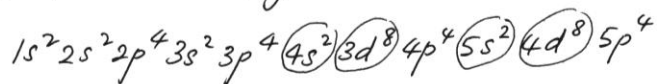
	← s-block →		← d-block (n-1)d block →								← p-block (np-block) →				← Group →	
1	1s ¹ 1	②											11s ² 2	⑬	⑭	
2	2s ¹ 3	2s ² 4									2p ¹ 5	2p ² 6	2p ³ 7	2p ⁴ 8		
3	3s ¹ 9	3s ² 10	③	④	⑤	⑥	⑦	⑧	⑨	⑩	3p ¹ 11	3p ² 12	3p ³ 13	3p ⁴ 14		
4	4s ¹ 15	4s ² 16	3d ¹ 17	3d ² 18	3d ³ 19	3d ⁴ 20	3d ⁵ 21	3d ⁶ 22	3d ⁷ 23	3d ⁸ 24	4p ¹ 25	4p ² 26	4p ³ 27	4p ⁴ 28		
5	5s ¹ 29	5s ² 30	4d ¹ 31	4d ² 32	4d ³ 33	4d ⁴ 34	4d ⁵ 35	4d ⁶ 36	4d ⁷ 37	4d ⁸ 38	5p ¹ 39	5p ² 40	5p ³ 41	5p ⁴ 42		

• Noble gas at period-3 : Atomic No, Z = 14

• Electronic configuration : $1s^2 2s^2 2p^4 3s^2 3p^4$

• Noble gas at period-5 : Atomic No, Z = 42

• Electronic configuration :



Electronic Conf. : $1s^2 2s^2 2p^4 3s^2 3p^4 3d^8 4s^2 4p^4 3d^8 5s^2 5p^4$

Q₃ (vii)

$$\begin{aligned} \text{Relative atomic mass of boronia} &= \left(\frac{95.32}{100} \times 29.89978 \right) + \left(\frac{3.52}{100} \times 31.02146 \right) + \left(\frac{1.16}{100} \times 33.21658 \right) \\ &= 29.97773 \\ &= 30.0 \text{ (Ans)} \end{aligned}$$

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