

### Exercise 3.43 – Transition metals oxidation state

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**Q343-01** The electron configuration for  $\text{Mn}^{2+}$  is which of the following?

- A.  $[\text{Ar}] 4s^2 3d^3$
  - B.  $[\text{Ar}] 3d^5$
  - C.  $[\text{Ar}] 4s^1 3d^5$
  - D.  $[\text{Ar}] 4s^1 3d^4$
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**Q343-02** Vanadium, electronic configuration  $[\text{Ar}] 3d^3 4s^2$ , exists in which of the following oxidation states?

- I. 0
- II. +2
- III. +4

- A. I, II and III are correct.
  - B. I and II are correct.
  - C. II and III are correct.
  - D. I is the only correct response.
  - E. III is the only correct response.
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**Q343-03** " $\text{Zn}^{2+}$  complexes are generally atypical of d-block complexes in general." Which answer below is correct and supports this statement?

- A.  $\text{Zn}^{2+}$  complexes are paramagnetic.
  - B.  $\text{Zn}^{2+}$  complexes tend to be colourless.
  - C.  $\text{Zn}^{2+}$  complexes are always octahedral.
  - D.  $\text{Zn}^{2+}$  is one of several oxidation states of Zn.
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**Q343-04** Which properties are typical of d block elements?

- I Complex ion formation
- II Catalytic behaviour
- III Colourless compounds

- A. I, II and III
  - B. II and III only
  - C. I and III only
  - D. I and II only
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**Q343-05** The cyanide ion,  $\text{CN}^-$ , can form two complexes with iron ions. The formulas of these ions are  $[\text{Fe}(\text{CN})_6]^{4-}$  and  $[\text{Fe}(\text{CN})_6]^{3-}$ . What is the oxidation state of the iron in each of the complexes?

- |    | $[\text{Fe}(\text{CN})_6]^{4-}$ | $[\text{Fe}(\text{CN})_6]^{3-}$ |
|----|---------------------------------|---------------------------------|
| A. | -4                              | -3                              |
| B. | +2                              | +3                              |
| C. | +3                              | +2                              |
| D. | -3                              | -4                              |
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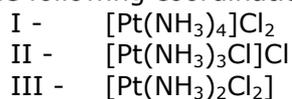
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**Q343-06** A transition metal ion  $X^{3+}$  has the electronic configuration  $[\text{Ar}] 3d^4$ . What is the atomic number of element X.

- A. 22
  - B. 24
  - C. 25
  - D. 27
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**Q343-07** Consider the following coordination compounds



What are the charges on the complex ions?

	<b>I</b>	<b>II</b>	<b>III</b>
A.	+2	+1	0
B.	-2	-1	0
C.	0	+1	+2
D.	0	-1	-2

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**Q343-08** A certain element has the electronic configuration  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^3$ . Which oxidation states would this element most likely show?

- A. +2 only
  - B. +3 only
  - C. +2 and +5 only
  - D. +2, +3, +4, +5
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**Q343-09** What is the oxidation state of the platinum ion in the compound  $[\text{Pt}(\text{NH}_3)_4]\text{Cl}_2$ ?

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**Q343-10** What is the oxidation state of the manganese ion in the compound  $[\text{Mn}(\text{NH}_3)_4\text{Cl}_2]\text{SO}_4$ ?

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