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/ Inorganic Class Test

Started on	Wednesday, 16 March 2022, 9:03 AM
State	Finished
Completed on	Wednesday, 16 March 2022, 9:57 AM
Time taken	53 mins 18 secs
Grade	**15.00** out of 25.00 (**60**%)

Question **1**

Correct

Mark 2.00 out of 2.00

For O_2, O_2^+, O_2^{2-} and O_2^- species, the CORRECT trend of bond order is

○ a. $O_2 > O_2^{2-} > O_2 > O_2^+$

○ b. $O_2^- > O_2^+ > O_2^{2-} > O_2$

◉ c. $O_2^+ > O_2 > O_2^- > O_2^{2-}$ ✔

○ d. $O_2^{2-} > O_2^+ > O_2 > O_2^-$
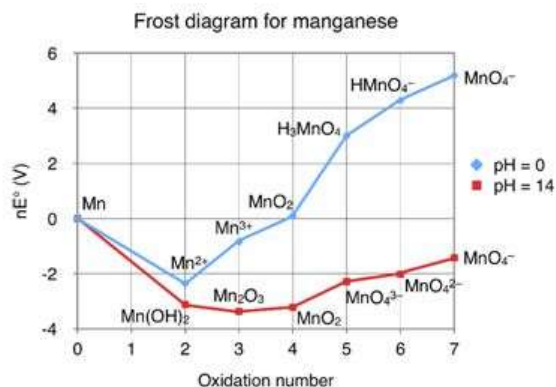
Your answer is correct.

The correct answer is: $O_2^+ > O_2 > O_2^- > O_2^{2-}$

Question **2**

Correct

Mark 2.00 out of 2.00

The CORRECT statement(s) about the Frost diagram of manganese given below is(are)

Frost diagram for manganese

○ a. In both acidic and basic conditions, the Mn(V) species is unstable with respect to comproportionation reaction.

○ b. The oxidising power of MnO_4^- is higher in basic medium as compared to acidic medium

◉ c. Mn^{3+} is unstable with respect to disproportionation in acidic medium   ✔

○ d. Mn in zero oxidation state possesses the most thermodynamic stability among the other oxidation states in both acidic and basic medium

Your answer is correct.

The correct answer is: Mn^{3+} is unstable with respect to disproportionation in acidic medium

Question **3**

Correct

Mark 1.00 out of 1.00

Assume $[Cd(NH_3)_4]^{2+}$ is formed by stepwise reaction and it has $K_1 = 10^{2.65}$, $K_2 = 10^{2.10}$, $K_3 = 10^{1.44}$ and $\beta_4 = 10^{7.12}$. Calculate $\log_{10}K_4$.

Answer: | 0.93 | ✔

The correct answer is: 0.93

Question **4**

Incorrect

Mark 0.00 out of 2.00

For a low spin t_{2g}^4 configuration, which Jahn-Teller distortion is favoured?

○ a. Z-out with $2/3(\delta_2)$ ✖

○ b. Z-out with $1/3(\delta_2)$

○ c. Z-in with $2/3(\delta_2)$

○ d. Z-in with $1/3(\delta_2)$

Your answer is incorrect.

The correct answer is: Z-in with $2/3(\delta_2)$

Question **5**

Incorrect

Mark 0.00 out of 1.00

Given that

$O_2 \rightarrow H_2O_2$ $E^0 = + 0.76$ V

$O_2 \rightarrow H_2O$ $E^0 = + 1.23$ V

The potential (V) for the $H_2O_2 \rightarrow H_2O$ is [0.47] ✖ V.

The correct answer is: 1.7

Question **6**

Incorrect

Mark 0.00 out of 1.00

For the complexes $[Cr(NH_3)_6]^{3+}$, $[Cr(H_2O)_6]^{3+}$, $[CrF_6]^{3-}$ and $[Cr(CN)_6]^{3-}$, the CORRECT order of Δ_o value is

○ a. $[CrF_6]^{3--} < [Cr(NH_3)_6]^{3+} < [Cr(H_2O)_6]^{3+} < [Cr(CN)_6]^{3-}$ ✖

○ b. $[CrF_6]^{3-} < [Cr(H_2O)_6]^{3+} < [Cr(NH_3)_6]^{3+} < [Cr(CN)_6]^{3-}$

○ c. $[Cr(H_2O)_6]^{3+} < [CrF_6]^{3-} < [Cr(NH_3)_6]^{3+} < [Cr(CN)_6]^{3-}$

○ d. $[Cr(H_2O)_6]^{3+} < [Cr(NH_3)_6]^{3+} < [CrF_6]^{3-} < [Cr(CN)_6]^{3-}$

Your answer is incorrect.

The correct answer is: $[CrF_6]^{3-} < [Cr(H_2O)_6]^{3+} < [Cr(NH_3)_6]^{3+} < [Cr(CN)_6]^{3-}$

Question **7**

Correct

Mark 1.00 out of 1.00

Which of the following transition metal ion CANNOT form both high- and low-spin octahedral complexes?

○ a. Cr^{2+}

○ b. Mn^{2+}

◉ c. V^{2+} ✔

○ d. Co^{3+}

Your answer is correct.

The correct answer is: V^{2+}

Question **8**

Correct

Mark 2.00 out of 2.00

The value of 'n' and the oxidation state of the metal in $[Mn(Cl)(CO)_n(pyridine)_2]$ and $[Fe(H)(CH_2CH_3)(CO)_n]$ are (use the 18-electron rule)

○ a. 2 and +1 AND 2 and +1, respectively

○ b. 1 and +1 AND 2 and +2, respectively

◉ c. 3 and +1 AND 4 and +2, respectively   ✔

○ d. 3 and 0 AND 2 and +3, respectively

Your answer is correct.

The correct answer is: 3 and +1 AND 4 and +2, respectively

Question **9**

Correct

Mark 1.00 out of 1.00

In the Monsanto acetic acid catalytic process, the oxidation state of the Rh metal shuttles between

  ⊙ a. +1 and +3   ✔

  ○ b. 0 and +2

  ○ c. +2 and +4

  ○ d. the same oxidation states

Your answer is correct.

The correct answer is: +1 and +3

Question **10**

Incorrect

Mark 0.00 out of 2.00

ΔH (hydration) of Fe^{2+} ion is 50 kJ/mol higher than would be expected if there is no CFSE. Find the magnitude of Δ_o in kJ/mol for high-spin complex $[Fe(OH_2)_6]^{2+}$.

Answer: | 50 | ✘

The correct answer is: 125

Question **11**

Correct

Mark 2.00 out of 2.00

Which of the following is (are) paramagnetic?

- ☐ a. C_2
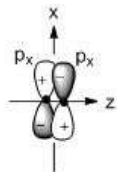
- ☑ b. B_2

  ✔

- ☑ c. N_2^+
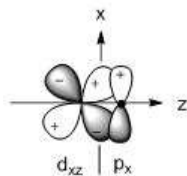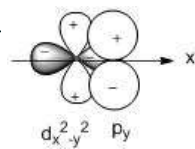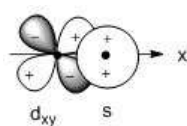
  ✔

- ☐ d. CO

Your answer is correct.
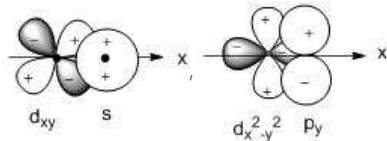
The correct answers are: N_2^+, B_2

Question **12**

Incorrect

Mark 0.00 out of 2.00

The orbital overlap/s that represents $S = 0$ is/are

☐ a.

p_x p_x

☐ b.

d_{xz} | p_x

☐ c.

$d_{x^2-y^2}$ p_y

☑ d.

d_{xy} s

✔

Your answer is incorrect.

The correct answers are:

d_{xy} s $d_{x^2-y^2}$ p_y

Question **13**

Correct

Mark 1.00 out of 1.00

The CORRECT statement about Hemoglobin in its *Relaxed* state

○ a. The proximal histidine does not coordinate with Fe-centre

◉ b. It is diamagnetic   ✔

○ c. Fe ion is high-spin

○ d. Radius of the Fe ion in *Relaxed* state is higher than the *Tensed* state
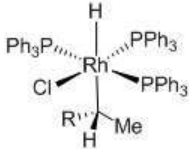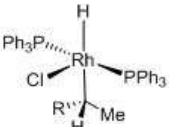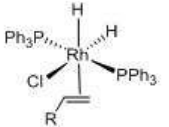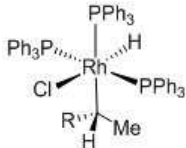
Your answer is correct.

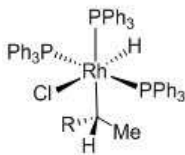The correct answer is: It is diamagnetic

Question **14**

Incorrect

Mark 0.00 out of 1.00

In the hydrogenation of alkene using the Wilkinson's catalyst, the intermediate that yields the final product RCH_2CH_3 is

a. ✖

b.

c.

d.

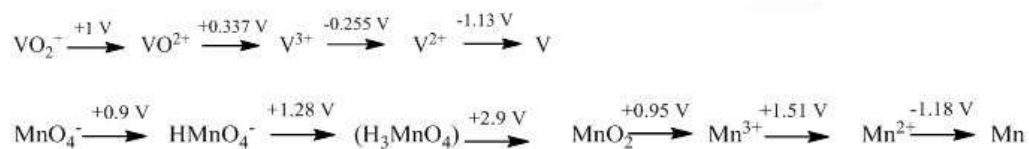Your answer is incorrect.

The correct answer is:

Question **15**

Correct

Mark 3.00 out of 3.00

Refer to the Latimer diagram of vanadium and manganese in acid pH. The products of the reaction of MnO_4^- with five equivalents of VO^{2+} are

_____.

$$VO_2^+ \xrightarrow{+1\ V} VO^{2+} \xrightarrow{+0.337\ V} V^{3+} \xrightarrow{-0.255\ V} V^{2+} \xrightarrow{-1.13\ V} V$$

$$MnO_4^- \xrightarrow{+0.9\ V} HMnO_4^- \xrightarrow{+1.28\ V} (H_3MnO_4) \xrightarrow{+2.9\ V} MnO_2 \xrightarrow{+0.95\ V} Mn^{3+} \xrightarrow{+1.51\ V} Mn^{2+} \xrightarrow{-1.18\ V} Mn$$

- ☐ a. V^{3+}

- ☐ b. MnO_2

- ☑ c. Mn^{2+}

  ✔

- ☑ d. VO_2^+

  ✔

Your answer is correct.

The correct answers are: Mn^{2+}, VO_2^+

Question **16**

Incorrect

Mark 0.00 out of 1.00

A tetrahedral ML_4 complex absorbs light at 568 nm. What is the respective octahedral crystal field splitting (Δ_o) in kJ/mol? [Given h: 6.626 x 10^{-34} J.s; c: 3 x 10^8 m/s]

Answer: | 2.1 | ✗

The correct answer is: 474.5

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