Practice Question Set For A-Level
Subject : Chemistry
Paper-1 Topic: Inorganic 2

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Name of the Student:_____
Max. Marks : 8 Marks **Time : 8 Minutes**

Q1.

This question is about electrode potentials and electrochemical cells.

(a) State the meaning of the term electrochemical series.

_____

_____

(1)

The table below shows some electrode potentials.

	E^o **/ V**
$[Fe(H_2O)_6]^{2+}(aq) + 2\ e^- \rightarrow Fe(s) + 6\ H_2O(l)$	–0.44
$H^+(aq) + e^- \rightarrow \frac{1}{2}\ H_2(g)$	0.00
$[Co(NH_3)_6]^{3+}(aq) + e^- \rightarrow [Co(NH_3)_6]^{2+}(aq)$	+0.11
$[Fe(H_2O)_6]^{3+}(aq) + e^- \rightarrow [Fe(H_2O)_6]^{2+}(aq)$	+0.77
$VO_2^+(aq) + 2\ H^+(aq) + e^- \rightarrow VO^{2+}(aq) + H_2O(l)$	+1.00
$[Co(H_2O)_6]^{3+}(aq) + e^- \rightarrow [Co(H_2O)_6]^{2+}(aq)$	+1.81

(b) State **two** conditions needed for the following half-cell to have E^o = 0.00 V

$$H^+(aq) + e^- \rightarrow \frac{1}{2}H_2(g)$$

_____

_____

(1)

(c) Identify the weakest reducing agent in the table above.

_____

(1)

(d) Use half-equations from the table above to deduce an equation for the reduction of VO_2^+ to form VO^{2+} in aqueous solution by iron.

_____

(2)

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(e) Use data from the table above to explain why $[Co(H_2O)_6]^{3+}(aq)$ will undergo a redox reaction with $[Fe(H_2O)_6]^{2+}(aq)$

Give an equation for this reaction.

Explanation _____

_____

_____

Equation

_____

(2)

(f) Suggest why the **two** cobalt(III) complex ions in the table above have different electrode potentials.

_____

_____

_____

(1)

(Total 8 marks)

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