Oxford Cambridge and RSA

A level Chemistry A

H432/01 Periodic table, elements and physical chemistry

Question Set 7

1. (a) (i) This question is about redox, electrode potentials and feasibility.

Table 1.1 shows standard electrode potentials for four redox systems.You need to use this information to answer the questions below.

Redox system	Equation	$E^{\ominus}$/V
1	$Zn^{2+}(aq) + 2e^- \rightleftharpoons Zn(s)$	–0.76
2	$SO_4^{2-}(aq) + 2H^+(aq) + 2e^- \rightleftharpoons SO_3^{2-}(aq) + H_2O(l)$	+0.17
3	$Fe^{3+}(aq) + e^- \rightleftharpoons Fe^{2+}(aq)$	+0.77
4	$MnO_4^-(aq) + 8H^+(aq) + 5e^- \rightleftharpoons Mn^{2+}(aq) + 4H_2O(l)$	+1.51

Table 1.1

A standard cell is set up in the laboratory based on redox systems **1** and **3** and the standardcell potential is measured.

Draw a labelled diagram to show how this cell could be set up to measure its standardcell potential.

Include details of the apparatus, solutions and the standard conditions required tomeasure this standard cell potential.

Standard conditions

.....

[4]

(ii) Predict the standard cell potential of this cell.

standard cell potential = ……. V

[1]

(b) In **Table 1.1**, what is the strongest reducing agent and the strongest oxidising agent?

Strongest reducing agent

.....

Strongest oxidising agent

.....

[2]

(c) Electrode potentials can be used to predict the feasibility of reactions.

Construct an overall equation for the predicted reaction between the species in redox systems **2** and **4**.

[2]

Total Marks for Question Set 7: 9