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

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Name of the Student:_____
Max. Marks : 14 Marks **Time : 14 Minutes**

Mark Schemes

Q1.

(a) (i) $Fe + 2HCl \rightarrow FeCl_2 + H_2$
(allow ionic formulae)

or $Fe + 2H^+ \rightarrow Fe^{2+} + H_2$

1

(ii) $PV = nRT$ $n = PV/RT$
(allow either formula but penalise contradiction)

1

$n = \frac{110000 \times 102 \times 10^{-6}}{8.31 \times 298}$

1

$= 4.53 \times 10^{-3}$ (mol)
(answer must have at least 3 sig. figs. Ignore units)

1

(iii) Moles of iron = $4.5(3) \times 10^{-3}$ mol
(allow conseq on (a)(ii))

(or = $4.2(5) \times 10^{-3}$ if candidate uses given moles of hydrogen)

1

Mass of iron = $4.53 \times 10^{-3} \times 55.8 = 0.253$ g
(mark is for method mass = moles × A_r)
(Mass of iron can be 56)

1

(iv) $0.253 \times 100/0.263 = 96.1$ % (mark is for answer to 2 sig. figs.)
(allow conseq on mass of iron. E.g. = 90% from $4.2(5) \times 10^{-3}$ moles of H_2 and Fe)
(Do not allow answers greater than or equal to 100%)

1

(b) (i) $Fe^{2+} \rightarrow Fe^{3+} + e^-$
(ignore state symbols)

1

$Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$

1

$Cr_2O_7^{2-} + 14H^+ + 6Fe^{2+} \rightarrow 2Cr^{3+} + 7H_2O + 6Fe^{3+}$

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1

(ii) Moles of dichromate = moles $Fe^{2+}/6$
$= 4.53 \times 10^{-3}/6 = 7.55 \times 10^{-4}$

(Allow conseq, mark is for method (a)(iii)/6)

1

Volume of dichromate = moles/concentration
$(= (7.55 \times 10^{-4} \times 1000)/0.0200)$

(mark is for this method)

1

$V = 37.75\ (cm^3)$

(allow 37.7 to 37.8, allow no units but penalise wrong units)

(allow conseq on moles of dichromate)

(if value of 3.63×10^{-3} used answer is 30.2 to 30.3, otherwise ans = moles $Fe^{2+}/0.00012$)

(if mole ratio wrong and candidate does not divide by 6, max score is ONE for volume method)

1

(iii) ($KMnO_4$) will also oxidise (or react with) Cl^- (or chloride or HCl)

1

[14]

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