**AS Redox Reactions – Test (Ans)**

**1.** (a) Gain of electrons **(1)** 1

(b) (i) (+)5 or V or N5+ **(1)**

(+)4 or IV or N4+

(+)2 or II or N2+ **(1)**

(ii) Reduction **(1)**

4H+ + NO3– + 3e(–)  NO + 2H2O **(1)**

(iii) 2H+ + NO3– + e(–) NO2 + H2O **(1)**

(iv) Cu + 4H+ + 2 NO3– Cu2+ + 2H2O + 2NO2

species **(1)** balanced **(1)**

If electrons included, mark CE if these are not balanced

 8

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**2.** (a) (i) Loss (of electrons) **(1)**

(ii) *Oxidation state of nitrogen in NO:* (+) 2 **(1)**

 *Oxidation state of nitrogen in NH+:* –3 **(1)**

(iii) I2 **(1)** 4

(b) (i) Cl2 + 2e–  2Cl– **(1)**

(ii) SO2 + 2H2O  SO42– + 4H+ + 2e– **(1)**

(iii) SO2 + 2H2O + Cl2  SO42– + 2Cl– + 4H+ **(1)** or H2SO4 + 2HCl etc

Ignore state symbols in equation
Allow multiples of all equations

 3

[7]

**3.** (a) Accepts electrons 1

(b) Charge on the ion (or element or atom) 1

(c) +4 1
+5 1
-3 1

(d) (i) Cu–  Cu2+ + 2e– 1

(ii)  1

(iii)  1

[8]

**4.** (a) A reducing agent gives electrons **(1)**

Not electron pairs

 1

(b) Zero **(1)** 1

(c) (i) (+)3**(1)**

(ii) –3**(1)**

(iii) –1**(1)**

Allow answers in roman 3

(d) (i) PbO2 + 4H+ +2e–  Pb2+ + 2H2O **(1)**

(ii) 2Cl–  Cl2 +2e– **(1)**

(iii) Pb2 + 4H+ +2Cl–  Pb2+ + Cl2 + 2H2O **(1)**

Or molecular

 3

[8]

A 25

B 22

C 19

D 16

E 13