**Unit 2 TT3 Redox reactions Solns**

**SECTION A: Multiple-choice questions (1 mark each)**

**Question 1**

*Answer:* D

*Explanation:*

Ag+(aq) + e- 🡪 Ag(s). This is reduction and silver ions will be the oxidant

**Question 2**

*Answer:* B

*Explanation:*

Br2(l) + 2e- 🡪 2Br-(aq) This is reduction.

**Question 3**

*Answer:* D

*Explanation:*

The reaction represented is Mg(s) 🡪 Mg2+(aq) + 2e- which is oxidation

**Question 4**

*Answer:* C

*Explanation:*

The oxidation state of both hydrogen and oxygen gases is zero. When they form a compound they form ions and electrons are transferred.

**Question 5**

*Answer:* B

*Explanation:*

Zn(s) 🡪 Zn2+(aq) + 2e is oxidation

**Question 6**

*Answer:* C

*Explanation:*

2H+(aq) + 2e- 🡪 H2(g) is reduction

**Question 7**

*Answer:* A

*Explanation:*

The half cell is for the reaction Fe3+(aq) + e- 🡪 Fe2+(aq). Platinum is inert and will not react. There is no iron electrode for iron metal to be the reactant.

**Question 8**

*Answer:* A

*Explanation:*

Oxidation is a loss of electrons so the electrode at which this occurs will be negative

**Question 9**

*Answer:* D

*Explanation:*

When aluminium corrodes it forms ions; Al(s) 🡪 Al3+(aq) + 3e-

**Question 10**

*Answer:* D

*Explanation:*

The more reactive metal can replace the less reactive metal in solution. Option D is the only combination suitable.

**SECTION B: Short-answer questions**

**Question 1**

**a**. Complete and balance the following half equations;

**i**. Al(s) 🡪 Al3+(aq) + 3e- oxidation

**ii**. Fe3+(aq) + e- 🡪 Fe2+(aq) reduction

**iii**. I2(s) +2e- 🡪 2I-(aq) reduction

1 + 1 + 1 = 3 marks

**b**. see above

3 marks

Total 6 marks

**Question 2**

**a**. Mg(s) + Pb2+(aq) 🡪 Mg2+(aq) + Pb(s) Mg= reductant, Pb2+ oxidant

**b**. 2Li(s) + MgBr2(aq) 🡪 2LiBr(aq) + Mg(s) Li = reductant Mg2+ oxidant

**c**. Cl2(g) + 2KBr(aq) 🡪 2KCl(aq) + Br2(l) Cl2 = oxidant Br- = reductant

2 + 2 + 2 = 6 marks

**Question 3**

**a**. The second one will occur spontaneously

**i**. Cu(s) + LiBr(aq) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**ii**. 2Li(s) + CuBr2(aq) 🡪 2LiBr(aq) + Cu(aq)

**b.** see above

**c**. Li reductant Cu2+ oxidant

2 + 1 + 2 = 5 marks

**Question 4**

**a**. sodium

1 mark

**b. i**. Ca 1s22s22p63s23p64s2

**ii**. Ca2+ 1s22s22p63s23p6

**iii**. Calcium ions are accepting two electrons to form calcium atoms

**iv**. Ca2+(aq) + 2e- 🡪 Ca(s)

**v**. Reduced as electrons are being gained

1 + 1 + 1 + 1 + 1 = 5 marks

**c. i**. Na(s) 🡪 Na+(aq) + e-

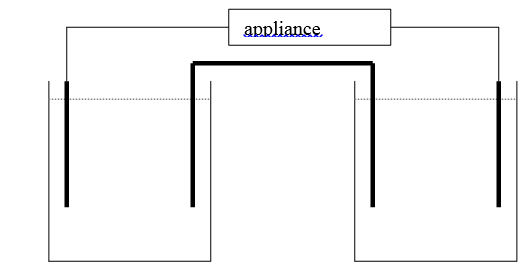
**ii**. Reductant

1 + 1 = 2 marks

Total 8 marks

**Question 5**

electron flow\*



* \*

zinc\* nickel \*

\*Zn(NO3)2(aq) NiSO4(aq)

\*anode: Zn(s) 🡪 Zn2+(aq) + 2e- \*cathode: Ni2+(aq) + 2e- 🡪 Ni(s)

\* overall equation: Zn(s) + Ni2+(aq) 🡪 Zn2+(aq) + Ni(s)

**a**.

8 marks

**b**.  **i**. the level of nickel on it will build up

**ii**. it will gradually decay away

1 + 1 = 2 marks

Total 10 marks

**Question 6**

**a. i.** Fe to Fe3+

**ii**. oxygen gas

1 + 1 = 2 marks

**b**. water is a reactant in this process – it facilities the flow of electrons

1 mark

**c**. **i**. paint is a physical barrier that prevents oxygen and water contacting the iron

**ii.** cover in other materials such as bitumen or a more reactive metal. Use a sacrificial anode

1 + 1 = 2 marks

Total 5 marks