

Ionic Half-equations

Q1. (2018) – 6b (ii)

(b) Copper sulfate solution was electrolysed using copper electrodes.

(ii) Before the electrolysis, the masses of the electrodes were determined. After the electrolysis, the electrodes were washed and dried and their masses re-determined.

Figure 6 shows these masses and the resulting changes in masses of the electrodes.

	mass of electrode before electrolysis in g	mass of electrode after electrolysis in g	change in mass of electrode in g
anode	11.27	10.42	–0.85
cathode	11.32	12.17	+0.85

Figure 6

Explain these results.

(4)

Q2. (2018) – 6c

(c) When sodium sulfate solution is electrolysed, using inert electrodes, hydrogen is formed at the cathode.

Write the half equation for the formation of hydrogen gas, H_2 , from hydrogen ions, H^+ .

(2)

Q3. (2019) – 3d

(d) When molten zinc chloride is electrolysed, zinc ions, Zn^{2+} , form zinc atoms.

Write the half equation for this reaction.

(2)

Q4. (2021) – 5c (ii)

(c) In the electrolysis of sodium chloride solution, bubbles of a colourless gas form at the cathode.
This gas, when mixed with air, burns with a squeaky pop.

(ii) Explain how this gas is formed at the cathode.

(2)

Q5. (2021) – 5d (ii)

(d) A solution of copper sulfate in a beaker is electrolysed using copper electrodes.

(ii) During the electrolysis, the anode gets smaller, the cathode gets larger and the solution remains the same shade of blue.

Give the reason for each of these observations.

(3)

the anode gets smaller

.....

.....

the cathode gets larger

.....

.....

the solution remains the same shade of blue

.....

.....

Q6. (2022) – 5b

- 5 When copper sulfate solution is electrolysed using copper electrodes, the mass of each electrode changes.

(b) Before the electrolysis is carried out, the mass of each electrode is determined.

Explain what should be done to the copper electrodes before their masses are determined.

(2)

Q7. (2022) – 5c

- 5 When copper sulfate solution is electrolysed using copper electrodes, the mass of each electrode changes.

(c) Figure 4 shows the results obtained from an electrolysis experiment when copper sulfate solution was electrolysed for 10 minutes.

	electrodes	
	anode	cathode
mass of electrode before electrolysis in g	6.43	6.17
mass of electrode after electrolysis in g	5.62	6.95
change in mass in g	– 0.81	+ 0.78

Figure 4

A)

- (i) Explain, in terms of ions, the changes in mass of the two electrodes shown in the results in Figure 4.

(3)

B)

- (ii) The electrolysis was repeated using another pair of copper electrodes of the same masses.

Explain a change that could be made to the electrolysis experiment to cause the mass of the cathode to increase by 2.34 g in 10 minutes.

(2)

Q8. (2024) – 7a (iii)

- 7 (a) Water, acidified with dilute sulfuric acid, was electrolysed for 10 minutes using inert electrodes.

Figure 5 shows the apparatus used.

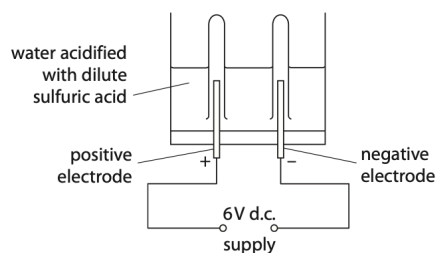


Figure 5

- (iii) Complete and balance the half equation for the formation of oxygen at the positive electrode in this electrolysis.

(2)



Q9. (2024) – 7b (ii, iii)

(b) Copper sulfate solution was electrolysed for 10 minutes using copper electrodes.

Figure 6 shows the mass of the cathode and the appearance of the copper sulfate solution before electrolysis and after electrolysis.

	mass of cathode in g	appearance of copper sulfate solution
before electrolysis	5.32	pale blue solution
after electrolysis	5.87	pale blue solution

Figure 6

A)

(ii) Explain, in terms of ions, the change in mass of the cathode shown in Figure 6.

(2)

B)

(iii) Explain why the appearance of the copper sulfate solution did not change during the electrolysis.

(2)