Answer **all** questions
Jawab **semua** soalan

1. A group of students carried out an experiment to investigate the effect of type of electrodes when aqueous copper(II) chloride solution is electrolysed.

   The electrolysis was first carried out by using carbon electrodes.
   Both the electrodes were weighed.
   Copper(II) chloride solution was electrolysed for 45 minutes.
   Then both the carbon electrodes were weighed again.
   The experiment was repeated by replacing carbon electrodes with copper electrodes.

   Sekumpulan pelajar menjalankan eksperimen untuk mengkaji kesan jenis elektrod apabila larutan akueus kuprum(II) klorida dielektrolisis.

   Elektrolisis dimulakan dengan menggunakan elektrod karbon.
   Kedua-dua elektrod karbon itu ditimbang.
   Larutan kuprum(II) klorida dielektrolisis selama 45 minit.
   Kemudian kedua-dua elektrod karbon ditimbang semula.
   Eksperimen itu diulang dengan menggantikan elektrod-elektrod karbon dengan elektrod-elektrod kuprum.

   Diagram 1.1 shows the set-up of apparatus used for the electrolysis of copper(II) chloride solution using carbon electrodes.

   Rajah 1.1 menunjukkan susunan radas bagi elektrolisis larutan kuprum(II) klorida menggunakan elektrod-elektrod karbon.

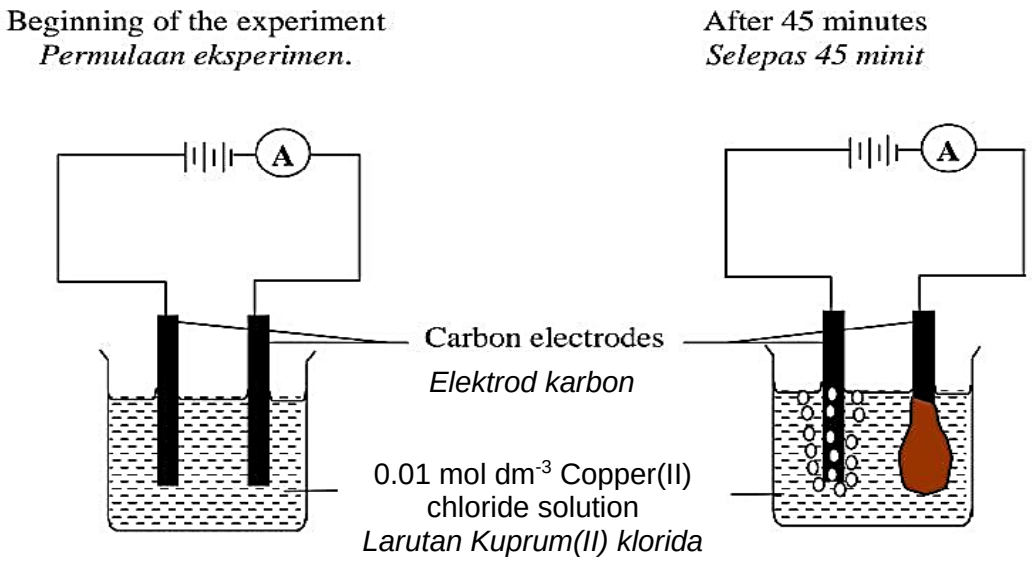


Diagram 1.1
Rajah 1.1

Diagram 1.2 shows the set-up of apparatus for the electrolysis of copper(II) chloride solution using copper electrodes.
Rajah 1.2 menunjukkan susunan radas bagi elektrolisis larutan kuprum(II) klorida menggunakan elektrod-elektrod kuprum.

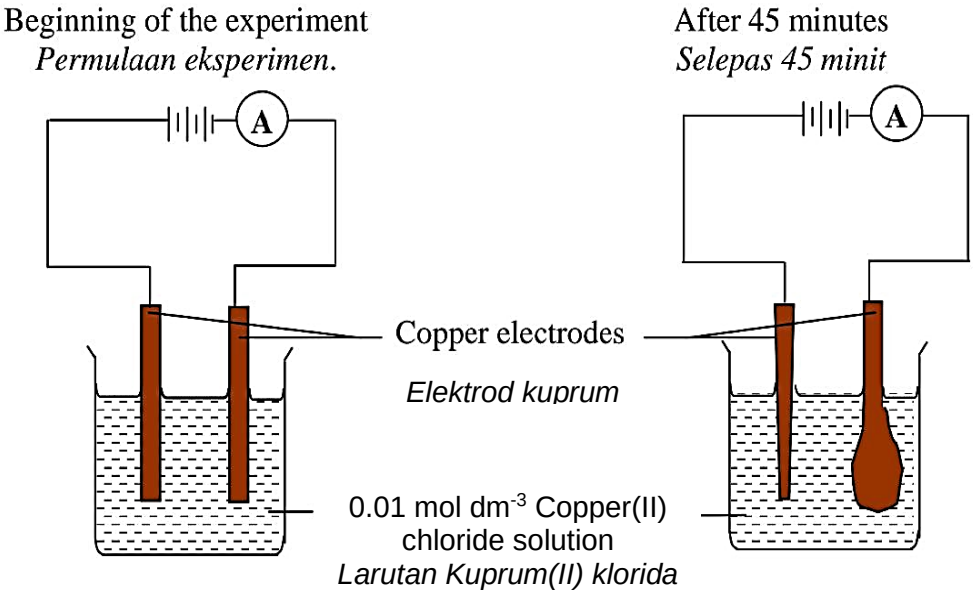


Diagram 1.2
Rajah 1.2

(a) Write the observation and inference obtained at the carbon anode and both the copper electrodes during the electrolysis.
Tuliskan pemerhatian dan inferens yang diperolehi pada anod karbon dan kedua- dua elektrod kuprum semasa elektrolisis itu.

Type of electrodes *Jenis elektrod*	Observations *Pemerhatian*	Inference *Inferens*
Carbon anode *Anod karbon*		
Copper anode *Anod kuprum*		
Copper cathode *Katod kuprum*		

[6 marks]
[6 markah]

(b) Based on the experiment, state
Berdasarkan eksperimen, nyatakan

(i) the manipulated variable.
pemboleh ubah yang dimanipulasikan.

……

(ii) the responding variable.
pemboleh ubah yang bergerak balas.

……

(iii) the constant variable.
pemboleh ubah yang dimalarkan.

……

[3 marks]
[3 markah]

(c) State the hypothesis for the experiment.
Nyatakan hipotesis bagi eksperimen ini.

……

……

[3 marks]
[3 markah]

(d) Based on the experiment in Diagram 1.1,state the colour change of the copper(II) chloride solution after 45 minutes.
Berdasarkan eksperimen dalam Rajah 1.1,nyatakan perubahan warna larutan kuprum(II) klorida selepas 45 minit.

……

……

[3 marks]
[3 markah]

(e) Classify all the ions present in copper(II) chloride solution into cations and anions.
Kelaskan semua ion yang hadir dalam larutan kuprum(II) klorida kepada kation dan anion.

Cations Kation	Anions anion

[3 marks]
[3 markah]

(f) In the diagram 1.1, the colour of the solution change from dark blue to light blue. In the diagram 1.2 there is no change of colour in the solution. Explain the difference.
Dalam rajah 1.1 warna larutan berubah dari biru gelap kepada biru muda. Dalam rajah 1.2 warna larutan tidak berubah. Terangkan perbezaan ini.

(i) Rajah 1.1 :

……...…….

……...……..

……....….

[3 marks]
[3 markah]

(ii) Rajah 1.2 :

……...……...

……..……

..……...……

[3 marks]
[3 markah]

(g) (i) Draw a labelled diagram to show the electroplating of iron key with silver using silver nirate solution as the electrolte.
Lukis satu rajah berlabel untuk menunjukan penyaduran kunci besi dengan argentum dengan menggunakan larutan argentum nirat.

[3 marks]
[3 markah]

(ii) What will happen to the iron key after electrolysed for 20 minutes?
Apakah yang akan berlaku kepada kunci besi itu selepas 20 minit dielektrolisiskan?

……

[3 marks]

[3 markah]

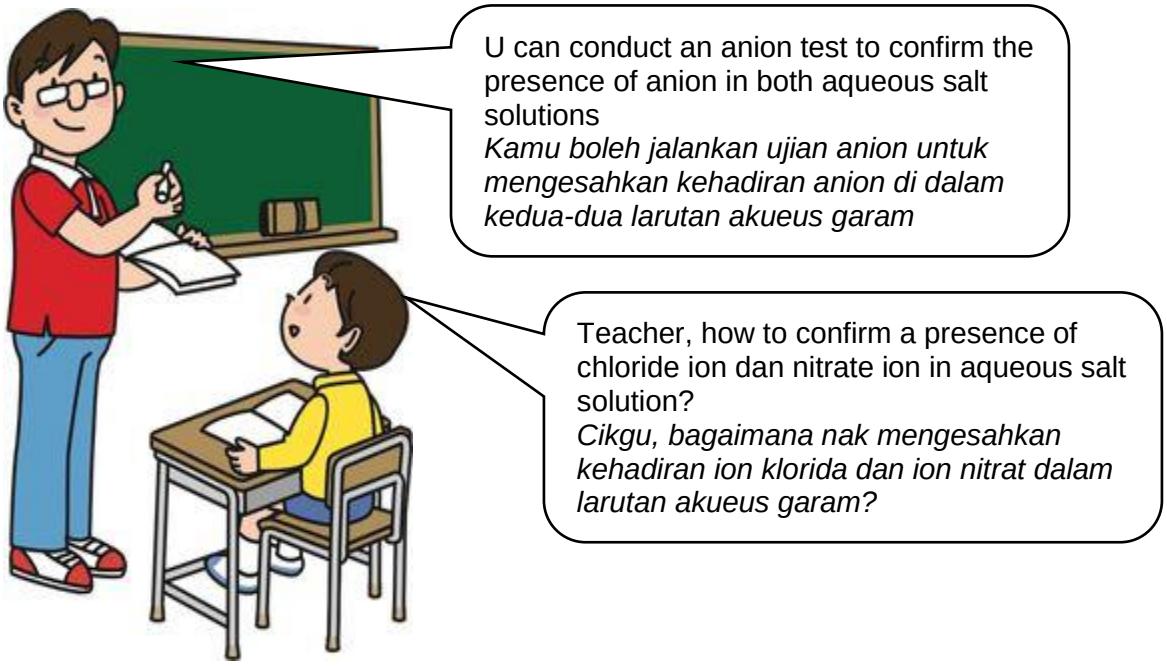
(iii) Suggest a method must be applied while conducting experiment to ensure a good quality plating is obtained.
Cadangkan satu kaedah yang perlu diaplikasikan semasa menjalankan eksperimen untuk memastikan penyaduran yang baik diperolehi.

……

……..... [3 marks]
[3 markah]

2. The dialogue below shows a part of a conversation between a teacher and his student about a test to confirm a presence of anion in chloride aqueous salt solution and in nitrate aqueous salt solution.

Dialog di bawah menunjukkan sebahagian daripada perbualan di antara guru dengan muridnya berkaitan ujian pengesahan anion di dalam larutan akueus garam klorida dan larutan akueus garam nitrat.



Based on the conversation above, plan a laboratory experiment to confirm a presence of chloride ion and nitrate ion in both aqueous salt solutions.
Give one suitable example for chloride aqueous salt solution and nitrate aqueous salt solution.

Berdasarkan perbualan di atas, rancang satu ekperimen makmal untuk mengesahkan kehadiran ion klorida dan ion nitrat di dalam kedua-dua larutan garam akueus.
Beri satu contoh yang sesuai untuk larutan garam klorida dan larutan garam nitrat.

Your planning should include the following aspects:
Perancangan anda hendaklah mengandungi aspek-aspek berikut:

(a) Aim of experiment
Tujuan eksperimen

(b) All the variables
Semua pemboleh ubah

(c) Statement of the hypothesis
Pernyataan hipotesis

(d) List of the materials and apparatus
Senarai bahan dan radas

(e) Procedure for the experiment
Prosedur eksperimen

(f) Tabulation of data
Penjadualan data

[17 marks]
[*17 markah*]

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT

Disediakan oleh,	Disemak&Disahkan oleh,
……	…….……
(Pn Suraya bt Said@Shued)	(Pn Hjh Noor Hayati bt Salleh)
	GK Sains dan Matematik