

4541/1
Chemistry
Paper 1
2015
1 1/4 hours

Name

Form



JABATAN PELAJARAN MELAKA
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**PEPERIKSAAN SELARAS PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2015**

CHEMISTRY

Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini mengandungi 50 soalan.*
2. *Jawab **semua** soalan.*
3. *Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan.*
4. *Hitamkan **satu** ruangan sahaja bagi setiap soalan.*
5. *Rajah tidak dilukis mengikut skala **kecuali** dinyatakan*
6. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan*

Kertas soalan ini mengandungi 23 halaman bercetak.

INFORMATION FOR CANDIDATES

1. *This question paper consists of 50 questions.*
2. *Answer **all** questions.*
3. *Answer each question by blackening the correct space on the answer sheet.*
4. *Blacken only **one** space for each question.*
5. *If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.*
6. *The diagrams in the questions provided are not drawn to scale unless stated.*
7. *You may use a non-programmable scientific calculator.*

MAKLUMAT UNTUK CALON

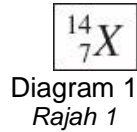
1. *Kertas soalan ini mengandungi 50 soalan.*
2. *Jawab **semua** soalan*
3. *Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan.*
4. *Hitamkan **satu** ruangan sahaja bagi setiap soalan.*
5. *Sekiranya anda hendak menukarkan jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapaaan yang baru.*
6. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
7. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan*

Question 1 to Question 50 are followed by four options **A, B, C** or **D**.

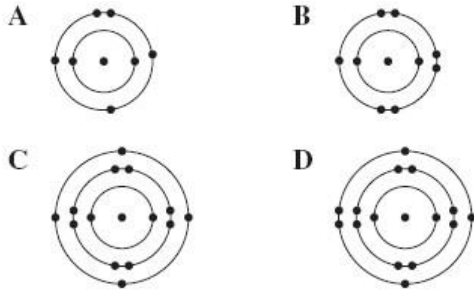
Choose the best option for each question and blackened the corresponding space on the objective answer sheet.

*Bagi **Soalan 1** hingga **Soalan 50**, tiap-tiap soalan diikuti oleh empat pilihan jawapan **A, B, C** dan **D**. Pilih satu jawapan yang terbaik bagi tiap-tiap soalan dan hitamkan ruangan yang sepadan pada kertas jawapan objektif anda*

1. Diagram 1 shows the atomic symbol of X.
Rajah 1 menunjukkan simbol atom bagi X.



Which of the following is the electron arrangement of atom X?
Antara berikut, yang manakah merupakan susunan elektron atom X?



2. Which of the following shows the correct classification of substances according to the type of particle?
Antara berikut, yang manakah menunjukkan pengelasan yang betul bagi setiap bahan berdasarkan jenis zarah?

	Atoms <i>Atom</i>	Molecules <i>Molekul</i>	Ions <i>Ion</i>
A	Sulphur trioxide <i>Sulfur trioksida</i>	Copper <i>Kuprum</i>	Ethanol <i>Etanol</i>
B	Copper <i>Kuprum</i>	Sulphur trioxide <i>Sulfur trioksida</i>	Silver chloride <i>Argentum klorida</i>
C	Copper <i>Kuprum</i>	Silver chloride <i>Argentum klorida</i>	Sulphur trioxide <i>Sulfur trioksida</i>
D	Ethanol <i>Etanol</i>	Sulphur trioxide <i>Sulfur trioksida</i>	Silver chloride <i>Argentum klorida</i>

3. Which of the following is true when liquid naphthalene freezes?
Antara berikut, manakah yang benar apabila cecair naftalena membeku?

- A The temperature of naphthalene does not change.
Suhu naftalena tidak berubah.
- B The energy of particles increases.
Zarah-zarah semakin bertenaga.
- C The distance between the particles increases.
Jarak antara zarah-zarah semakin jauh.
- D The particles absorb heat.
Zarah-zarah menyerap haba.

4. Diagram 2 shows the cooling curve for gas P.
Rajah 2 menunjukkan lengkung penyejukan bagi gas P.

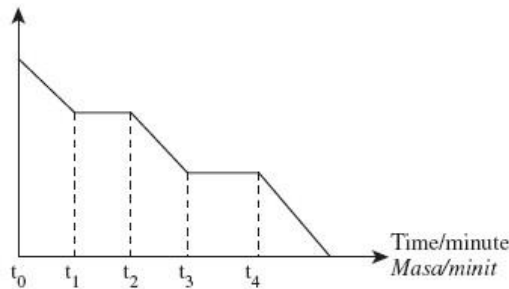


Diagram 2
Rajah 2

Which of the following statements is **correct**?
Antara pernyataan berikut, yang manakah benar?

- A Forces of attraction between particles become weaker from t_0 to t_1 .
Daya tarikan antara zarah semakin lemah dari t_0 kepada t_1 .
- B Heat energy is absorbed from t_1 to t_2 .
Tenaga haba diserap dari t_1 kepada t_2 .
- C Kinetic energy decreases from t_2 to t_3 .
Tenaga kinetik berkurangan dari t_2 kepada t_3 .
- D No heat energy is absorbed from t_3 to t_4 .
Tiada tenaga haba yang diserap dari t_3 kepada t_4 .

5. When an atom loses electrons, a charged particle is formed. Which of the following statements about the charged particle is **true**?

Apabila suatu atom kehilangan elektron, suatu zarah bercas akan terbentuk. Antara pernyataan berikut, yang manakah benar tentang zarah bercas?

- A It possesses a stable electron arrangement.
la mempunyai suatu susunan elektron yang stabil.
- B Its size is bigger than the atom.
Saiznya lebih besar daripada atomnya.
- C It move more freely than the atom.
la bergerak lebih bebas daripada atomnya.
- D It is negatively charged.
la bercas negatif.

6. A volume of chlorine gas that is stored in a container has 24×10^{23} chlorine atoms. What is the number of moles of chlorine molecules in the container?

[Avogadro number = 6.02×10^{23}]

Suatu isi padu gas klorin diisi dalam satu bekas mengandungi 24×10^{23} atom klorin. Apakah bilangan mol molekul klorin yang terkandung dalam bekas itu?

[Nombor Avogadro = 6.02×10^{23}]

- A 0.5 mole
- B 1 mole
- C 2 moles
- D 4 moles

7. The diagram below shows the apparatus set up to determine the empirical formula of a metal oxide.

Rajah di bawah menunjukkan susunan radas untuk menentukan formula empirik bagi suatu oksida logam.

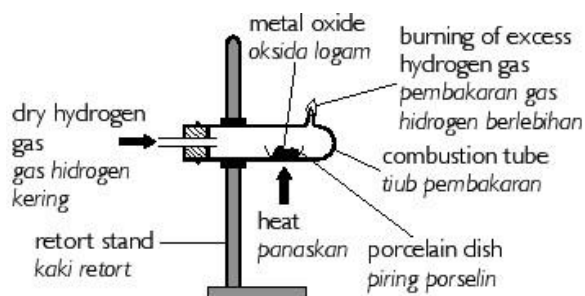


Diagram 3
Rajah 3

Which of the following metal oxides are suitable to be used in the experiment?

Antara pasangan oksida logam berikut, yang manakah sesuai digunakan dalam eksperimen ini?

- A Zinc oxide and copper II oxide
Zink oksida dan kuprum II oksida
- B Sodium oxide and lead II oxide
Natrium oksida dan plumbum II oksida
- C Lead II oxide and copper II oxide
Plumbum II oksida dan kuprum II oksida
- D Magnesium oxide and zinc oxide
Magnesium oksida dan zink oksida

8. Which of the following has the most number of molecules?
 [Relative atomic mass of H = 1, C = 12, O = 16, Ca=40]
Antara berikut, yang manakah mempunyai bilangan molekul yang paling banyak?
 [Jisim atom relatif: H= 1, C= 12, O= 16, Ca= 40]
- A 10.8 g of water, H₂O
10.8 g *air*, H₂O
 - B 18.2 g of ethene, C₂H₄
18.2 g *etena*, C₂H₄
 - C 18.4 g of ethanol, C₂H₅OH
18.4 g *etanol*, C₂H₅OH
 - D 30 g of marble, CaCO₃
30 g *marmar*, CaCO₃
9. Which of the following gases occupies 3.36 dm³ at s.t.p?
Antara gas berikut, yang manakah memenuhi 3.36 dm³ pada s.t.p?
 [Relative atomic mass: H = 1, N = 14, O =16 and 1 mol of gas occupies a volume of 22.4 dm³ at s.t.p]
 [Jisim atom relatif: H= 1, N= 14, O= 16 dan 1 mol gas menempati isipadu 22.4 dm³ pada s.t.p]
- A 4.25 g of NH₃
 - B 6.9 g of NO₂
 - C 9.8 g of N₂
 - D 11.2 g O₂
10. Element P has a proton number of 17. It can be deduced that
Unsur P mempunyai nombor proton 17. Boleh disimpulkan bahawa
- A it is located at Period 2
ia berada di kala 2
 - B it has 17 valence electrons
ia mempunyai 17 elektron valens
 - C it has three electrons in the outermost shell
ia mempunyai tiga elektron di petala terluar
 - D it has three shells filled with electrons
ia mempunyai tiga petala berisi elektron
11. A period of elements in the Periodic Table of Elements
Kala bagi unsur-unsur dalam Jadual Berkala Unsur
- A is a list of metals in order of reactivity.
adalah senarai logam dalam susunan kereaktifan
 - B is a horizontal row of element.
adalah baris melintang bagi unsur.
 - C is a vertical column of element.
adalah jalur menegak bagi unsur.
 - D contains the same number of electrons in their outermost shell.
mengandungi bilangan elektron yang sama di petala terluar.

12. Table 1 shows the proton number of five elements. Which elements are in the same group in the Periodic Table?
Jadual menunjukkan nombor proton bagi lima unsur. Unsur manakah berada di dalam kumpulan yang sama dalam Jadual Berkala?

Element <i>Unsur</i>	V	W	X	Y	Z
Proton number <i>Nombor proton</i>	3	5	8	10	11

Table 1
Jadual 1

- A** V and W
V dan W
- B** W and Z
W dan Z
- C** X and Y
X dan Y
- D** V and Z
V dan Z
13. Table 2 shows part of the Periodic Table of Elements.
Jadual 2 menunjukkan Jadual Berkala Unsur

X							
						Y	

Table 2
Jadual 2

What are the electron arrangements for atom of elements X and Y?
Apakah susunan elektron bagi atom unsur X dan Y?

	X	Y
A	2.1	2.7
B	2.1	2.8.7
C	2.8.1	2.7
D	2.8.1	2.8.7

14. Table 3 shows the proton number of three elements P, Q and R. Which of the following statements is **true**?

*Jadual 3 menunjukkan nombor proton bagi tiga unsur P, Q dan R. Manakah antara pernyataan berikut adalah **benar** ?*

Element <i>Unsur</i>	P	Q	R
Proton Number <i>Nombor proton</i>	11	13	17

Table 3
Jadual 3

- A** The electronegativity decreases in the order P, Q, R
Keelektronegatifan berkurang mengikut urutan P, Q, R
- B** P, Q and R are conductors of electricity.
P, Q dan R adalah konduktor elektrik.
- C** All the elements exist as diatomic molecules.
Semua unsur tersebut wujud sebagai molekul dwiatom.
- D** The atomic radius decreases in the order P, Q, R.
Jejari atom berkurang mengikut urutan P, Q, R.
15. Which of the following is a covalent compound?
Yang manakah antara berikut adalah sebatian kovalen?
- A** Lead(II) bromide
Plumbum (II) bromida
- B** Calcium chloride
Kalsium klorida
- C** Aluminium oxide
Aluminium oksida
- D** Nitrogen dioxide
Nitrogen dioksida
16. Which of the following is **not** the characteristic of an ionic compound?.
*Yang mana satu daripada berikut **bukan** ciri suatu sebatian ion?*
- A** It has high melting point and boiling point
la mempunyai takat lebur dan takat didih yang tinggi
- B** It usually dissolves in water but not in organic solvent
la biasanya larut dalam air tetapi tidak dalam pelarut organik
- C** It conducts electricity in all physical states
la mengkonduksikan elektrik dalam semua keadaan fizik
- D** It has high density
la mempunyai ketumpatan yang tinggi

17. Table 4 shows the electron arrangement of two elements K and M.
Jadual 4 menunjukkan susunan elektron dua unsur K dan M.

Element <i>Unsur</i>	Electron arrangement <i>Susunan elektron</i>
K	2.4
M	2.8.6

Table 4
Jadual 4

What is the chemical formula of the compound and the bond formed between elements K and M?

Apakah formula kimia dan jenis ikatan bagi sebatian yang terbentuk antara K dan M?

	Formula of compound <i>Formula sebatian</i>	Bond <i>Ikatan</i>
A	KM ₂	Covalent <i>Kovalen</i>
B	K ₂ M	Ionic <i>Ion</i>
C	KM ₂	Ionic <i>Ion</i>
D	K ₂ M	Covalent <i>Kovalen</i>

18. Table 5 shows proton number of elements J and Q.
Jadual 5 menunjukkan nombor proton bagi unsur J dan Q

Element <i>Unsur</i>	Proton number <i>Nombor proton</i>
J	11
Q	8

Table 5
Jadual 5

What is the relative formula mass of the compound formed between elements J and Q?

[Relative atomic mass Q=16, J=23]

Apakah jisim formula relatif bagi sebatian yang terbentuk antara unsur J dan Q?

[Jisim atom relatif bagi Q=16, J=23]

- A** 39
- B** 55
- C** 62
- D** 78

19. Diagram 4 shows a voltaic cell. Electrons flow from Y to Z.
Rajah 4 menunjukkan suatu sel voltan. Elektron mengalir dari Y ke Z.

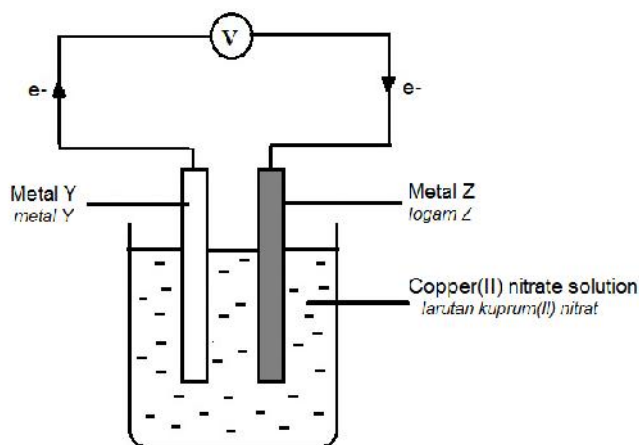


Diagram 4
Rajah 4

The possible pair for Y and Z is
Pasangan Y dan Z yang mungkin ialah

	Metal Y <i>Logam Y</i>	Metal Z <i>Logam Z</i>
A	copper <i>kuprum</i>	iron <i>ferum</i>
B	zinc <i>zink</i>	aluminium <i>aluminium</i>
C	zinc <i>zink</i>	iron <i>ferum</i>
D	aluminium <i>aluminium</i>	magnesium <i>magnesium</i>

20. What is the advantage of mercury cell over dry cell?
Apakah kelebihan sel merkuri berbanding sel kering?

- A** Easy to carry
Mudah dibawa
- B** Produce smaller and steady voltage
Menghasilkan voltan kecil dan mantap
- C** Can be rechargeable
Boleh dicaskan semula
- D** Environmental friendly
Mesra alam

21. Diagram 5 shows the set-up of apparatus to construct a chemical cell.
Rajah 5 menunjukkan susunan radas untuk membina sebuah sel kimia.

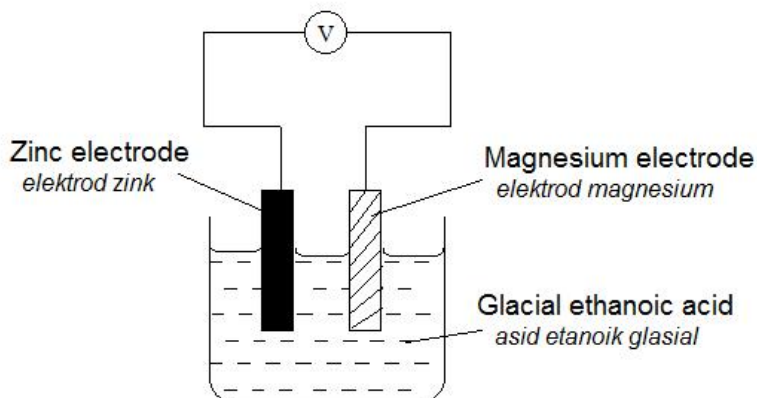


Diagram 5
Rajah 5

It was found that there is no deflection on the pointer of voltmeter. What should be done so that the voltmeter pointer deflects?

Didapati tiada pesongan pada penunjuk voltmeter. Apakah perlu dilakukan supaya penunjuk voltmeter terpesong?

- A Add dry cells in series in the circuit
Tambahkan sel kering secara bersiri ke dalam litar
- B Replace zinc electrode with a magnesium electrode
Gantikan elektrod zink dengan elektrod magnesium
- C Replace magnesium electrode with an iron electrode
Gantikan elektrod magnesium dengan elektrod ferum
- D Add some water into the glacial ethanoic acid
Tambahkan sedikit air ke dalam asid etanoik glasial

22. Table 6 shows information about three chemical cells.
Jadual 6 menunjukkan maklumat tentang tiga sel kimia.

Chemical Cell <i>Sel Kimia</i>	Pair of Metal <i>Pasangan logam</i>	Voltage/V <i>Voltan /V</i>	Positive Terminal <i>Terminal positif</i>
I	W, X	2.7	X
II	W, Y	1.5	Y
III	Y, Z	0.6	Y

Table 6
Jadual 6

Which of the following is the correct ascending order of these metals in the electrochemical series?

Antara berikut, yang manakah susunan secara menaik yang betul bagi logam-logam ini dalam siri elektrokimia?

- A Z, Y, X, W
- B W, Y, Z, X
- C W, Z, Y, X
- D X, Y, Z, W

23. Which of the following substance is alkaline?
Antara bahan berikut, yang manakah bersifat alkali?

- A Ammonia
Ammonia
- B Carbon dioxide
Karbon dioksida
- C Sulphur dioxide
Sulfur dioksida
- D Neon
Neon

24. Which acid contains the highest number of hydrogen ions?
Asid manakah yang mengandungi bilangan ion hidrogen yang tertinggi?

- A 25 cm³ 1 mol dm⁻³ nitric acid
25 cm³ asid nitrik 1 mol dm⁻³
- B 25 cm³ 1 mol dm⁻³ sulphuric acid
25 cm³ asid sulfurik 1 mol dm⁻³
- C 25 cm³ 1 mol dm⁻³ ethanoic acid
25 cm³ asid etanoik 1 mol dm⁻³
- D 25 cm³ 1 mol dm⁻³ hydrochloric acid
25 cm³ asid hidroklorik 1 mol dm⁻³

25. The following equation shows the reaction between copperII oxide and hydrochloric acid.
Persamaan berikut menunjukkan tindak balas kuprumII) oksida dengan asid hidroklorik.



3.0 g copperII oxide is added to 50.0 cm³ 1.0 mol dm⁻³ hydrochloric acid.
What is the mass of copperII oxide left at the end of the reaction?

[Relative atomic mass : O=16, Cu=64]

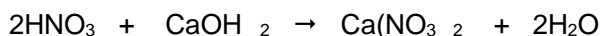
3.0g kuprumII) oksida ditambah kepada 50.0 cm³ asid hidroklorik 1.0 mol dm⁻³.

Berapakah jisim kuprumII) oksida yang tinggal pada akhir tindak balas itu?

[Jisim atom relatif : O=16, Cu=64]

- A 0.15 g
- B 1.00 g
- C 1.40 g
- D 2.00 g

26. The equation below represents a neutralisation reaction.
Persamaan berikut mewakili satu tindak balas peneutralan.



20.0 cm³ 0.1 mol dm⁻³ calcium hydroxide solution is titrated with 0.1 mol dm⁻³ nitric acid.
If the initial reading of the burette is 10.00 cm³, what is the final reading of the burette?

20.0 cm³ larutan kalsium hidroksida 0.1 mol dm⁻³ dititratkan dengan asid nitrik, 0.1 mol dm⁻³.

Jika bacaan awal buret ialah 10.00 cm³, berapakah bacaan akhir buret?

- A 20.00 cm³
- B 30.00 cm³
- C 40.00 cm³
- D 50.00 cm³

27. Which of the following salts is soluble?
Yang manakah antara berikut adalah garam terlarutkan?

- A Barium sulphate
Barium sulfat
- B Sodium carbonate
Natrium karbonat
- C Silver chloride
Argentum klorida
- D Lead II sulphate
Plumbum (II) sulfat

28. CopperII chloride salt can be prepared by mixing hydrochloric acid with
Garam kuprumII) klorida boleh disediakan dengan mencampurkan asid hidroklorik dengan

- A Copper
Kuprum
- B CopperII nitrate
KuprumII) nitrat
- C CopperII carbonate
KuprumII) karbonat
- D CopperII sulphate
KuprumII) sulfat

29. The following equation shows the decomposition of copperII carbonate when heated strongly.

Persamaan berikut menunjukkan penguraian kuprumII) karbonat apabila dipanaskan dengan kuat



What is the mass of copper II oxide produced when 12.4 g of copper II carbonate is decomposed completely?

[Relative atomic mass : C, 12 ; O, 16; Cu, 64]

Apakah jisim kuprum oksida yang terhasil apabila 12.4 g kuprum (II) karbonat terurai dengan lengkap?

[Jisim atom relatif : C, 12; O, 16; Cu, 64]

- A 4.0 g
- B 8.0 g
- C 12.4 g
- D 80.0 g

30. Which of the following are the properties of glass?
Antara berikut, yang manakah sifat-sifat kaca?
- I** Transparent
Lutsinar
 - II** Does not react with chemical substances
Tidak bertindak balas dengan bahan kimia
 - III** Can be cleaned easily
Senang dibersihkan
 - IV** Can insulate heat
Boleh menebat haba
- A** I and III only
I dan III sahaja
 - B** I, III and IV only
I, III dan IV sahaja
 - C** II, III and IV only
II, III dan IV sahaja
 - D** I, II, III and IV
I, II, III dan IV
31. Which of the following is a composite material?
Manakah antara yang berikut adalah bahan komposit?
- A** Polythene
Politena
 - B** Fiber glass
Gentian kaca
 - C** Stainless steel
Keluli nirkarat
 - D** Ceramic
Seramik
32. What are the reasons for making alloy?
Apakah sebab-sebab pengaloiian?
- I** To make it harder
Menjadikannya lebih keras
 - II** To make it more resistant to corrosion
Menjadikannya lebih tahan kakisan
 - III** To make it heavier so that it becomes stronger
Menjadikannya lebih berat supaya lebih kuat
 - IV** To improve its appearance
Memperbaiki rupanya
- A** I and II only
I dan II sahaja
 - B** II and III only
II dan III sahaja
 - C** I, II and IV only
I, II dan IV sahaja
 - D** I, III and IV only
I, III dan IV sahaja

33. Which of the following is the correct match of a low rate of reaction and a high rate of reaction?
 Antara yang berikut, yang manakah pasangan betul tindak balas yang mempunyai kadar tindak balas rendah dan kadar tindak balas tinggi?

	Low rate of reaction <i>Kadar tindak balas rendah</i>	High rate of reaction <i>Kadar tindak balas tinggi</i>
A	Fermentation of glucose solution <i>Penapaian larutan glukosa</i>	Double decomposition between lead(II) nitrate and potassium iodide <i>Penguraian ganda dua antara plumbum(II) nitrat dan kalium iodida</i>
B	Rusting of iron <i>Pengaratan besi</i>	Fermentation of glucose solution <i>Penapaian larutan glukosa</i>
C	Double decomposition between lead(II) nitrate and potassium iodide <i>Penguraian ganda dua antara plumbum(II) nitrat dan kalium iodida</i>	Neutralisation between hydrochloric acid and sodium hydroxide <i>Peneutralan antara asid hidroklorik dan natrium hidroksida</i>
D	Neutralisation between hydrochloric acid and sodium hydroxide <i>Peneutralan antara asid hidroklorik dan natrium hidroksida</i>	Rusting of iron <i>Pengaratan besi</i>

34. Table 7 shows the total volume of hydrogen gas collected for the reaction between zinc and hydrochloric acid at regular intervals.
 Jadual 7 menunjukkan jumlah isi padu gas hidrogen yang dikumpul bagi tindak balas antara zink dan asid hidroklorik pada sela masa yang sekata.

Time (min) <i>Masa (min)</i>	Total volume of hydrogen gas cm³ <i>Jumlah isi padu gas hidrogen (cm³)</i>
0.0	0.00
0.5	8.00
1.0	14.50
1.5	20.50
2.0	24.00
2.5	26.50
3.0	26.50
3.5	26.50

Table 7
 Jadual 7

What is the average rate of reaction?
 Berapakah kadar tindak balas purata?

- A** 0.10 cm³ min⁻¹ **B** 7.60 cm³ min⁻¹
C 10.60 cm³ min⁻¹ **D** 37.40 cm³ min⁻¹

35. Diagram 6 shows an experiment to determine the rate of reaction between sodium thiosulphate and sulphuric acid.
Rajah 6 menunjukkan suatu eksperimen untuk menentukan kadar tindak balas antara natrium tiosulfat dengan asid sulfurik.

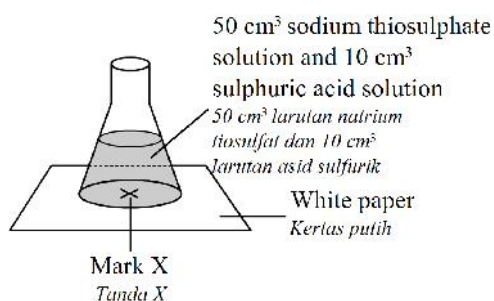


Diagram 6
Rajah 6

- Which combination takes the shortest time for the mark X to disappear from sight?
Kombinasi yang manakah mengambil masa paling singkat untuk tanda X hilang daripada penglihatan?

	Concentration of sodium thiosulphate / mol dm ⁻³ <i>Kepekatan natrium tiosulfat / mol dm⁻³</i>	Concentration of sulphuric acid / mol dm ⁻³ <i>Kepekatan asid sulfurik / mol dm⁻³</i>	Temperature / °C <i>Suhu / °C</i>
A	0.5	1.0	30
B	0.5	0.5	40
C	0.5	0.5	30
D	0.5	1.0	40

36. Diagram 7 shows the energy profile diagram of a chemical reaction.
Rajah 7 menunjukkan gambarajah profil tenaga bagi suatu tindak balas kimia.

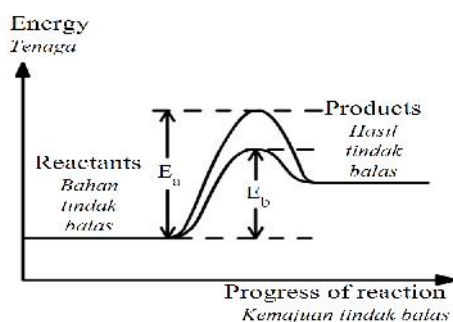


Diagram 7
Rajah 7

- What causes the changes from E_a to E_b ?
Apakah yang menyebabkan perubahan daripada E_a kepada E_b ?

- A Total surface area
Jumlah luas permukaan
- B Concentration
Kepekatan
- C Temperature
Suhu
- D Catalyst
Mangkin

37. The complete combustion of a hydrocarbon is represented by the following equation.
Pembakaran lengkap bagi satu hidrokarbon diwakili oleh persamaan yang berikut.

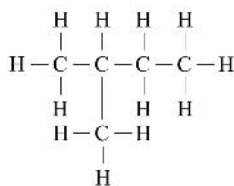


What is the value of x?

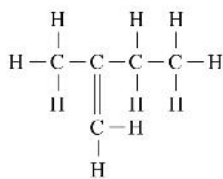
Apakah nilai bagi x?

- A** 2
B 3
C 4
D 5
38. What is the difference between octene and octane?
Apakah perbezaan antara oktana dan oktana?
- A** The carbon percentage per molecule of octane is higher than octene
Peratus karbon per molekul bagi oktana lebih tinggi daripada oktana
- B** Octene dissolved in water but octane does not
Oktana terlarut dalam air tetapi oktana tidak terlarut dalam air
- C** The number of hydrogen atoms per molecule of octene is higher than octane
Bilangan atom hidrogen per molekul oktana lebih tinggi daripada oktana
- D** Octene decolourised bromine water but octane does not
Oktana menyahwarnakan air bromin tetapi oktana tidak
39. Which of the following are structural formulae for isomers of pentane?
Antara berikut, yang manakah formula struktur bagi isomer-isomer pentana?

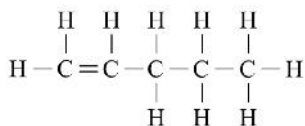
I



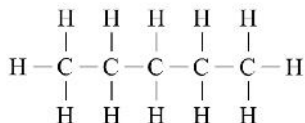
II



III



IV



- A** I and II
I dan II
- B** I and III
I dan III
- C** I and IV
I dan IV
- D** I, III and IV
I, III dan IV

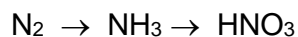
40. Butene can be converted to butane by the process of
Butena boleh ditukar kepada butana melalui proses

- A** dehydration
pendehidratan
- B** oxidation
pengoksidaan
- C** hydrogenation
penghidrogenan
- D** fermentation
penapaian

41. Which of the following is a redox reaction?
Antara berikut, yang manakah tindak balas redoks?

- A** Double decomposition
Penguraian ganda dua
- B** Esterification
Pengesteran
- C** Neutralisation
Peneutralan
- D** Displacement
Penyesaran

42. The manufacture of nitric acid can be represented as follows:
Pembuatan asid nitrik boleh diwakili seperti berikut:



Which of the following shows the correct oxidation state of nitrogen at each stage of the process?

Antara berikut, yang manakah menunjukkan keadaan pengoksidaan yang betul bagi nitrogen pada setiap proses?

- A** 0 → +3 → -3
- B** 0 → -3 → +5
- C** -3 → +3 → +5
- D** 0 → +3 → +5

43. Diagram 8 shows four pairs of metals in different test tubes.
Rajah 8 menunjukkan pasangan logam dalam tabung uji berlainan.

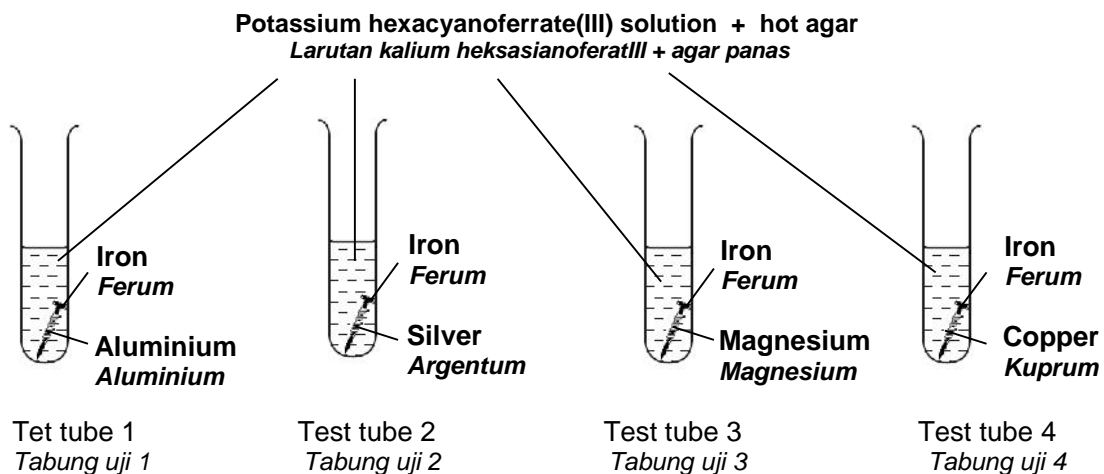


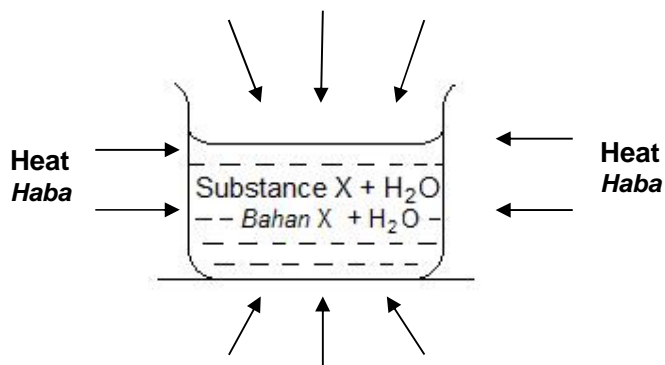
Diagram 8
Rajah 8

After one day, which test tubes contain blue spots?
Selepas satu hari, tabung uji manakah mengandungi tompok-tompok biru?

- I Test tube 1
 Tabung uji 1
- II Test tube 2
 Tabung uji 2
- III Test tube 3
 Tabung uji 3
- IV Test tube 4
 Tabung uji 4

- A I and II
 I dan II
- B I and III
 I dan III
- C II and IV
 II dan IV
- D III and IV
 III dan IV

44. Diagram 9 shows the reaction that occurs when substance X dissolves in water.
Rajah 9 menunjukkan tindak balas yang berlaku apabila bahan X melarut dalam air.



Which of the following statement about the reaction is **correct**?
Manakah antara pernyataan berikut adalah benar bagi tindak balas tersebut?

- A** Heat energy is converted to chemical energy.
Tenaga haba ditukarkan kepada tenaga kimia.
 - B** The reaction mixture and the container become hot.
Campuran tindak balas dan bekas menjadi panas.
 - C** The temperature of the surrounding increases.
Suhu persekitaran bertambah.
 - D** The reaction is exothermic.
Tindak balas adalah eksotermik.
45. The following ionic equation shows the formation of barium sulphate precipitate.
Persamaan ion berikut menunjukkan pembentukan mendakan barium sulfat.



Which of the following is true about the reaction?
Antara berikut, yang manakah benar mengenai tindak balas tersebut?

	Heat change <i>Perubahan tenaga</i>	Type of reaction <i>Jenis tindak balas</i>
A	Heat is absorbed <i>Haba diserap</i>	Endothermic <i>Endotermik</i>
B	Heat is released <i>Haba dibebaskan</i>	Endothermic <i>Endotermik</i>
C	Heat is absorbed <i>Haba diserap</i>	Exothermic <i>Eksotermik</i>
D	Heat is released <i>Haba dibebaskan</i>	Exothermic <i>Eksotermik</i>

46. Diagram 10 shows an instant cold pack.
Rajah 10 menunjukkan satu pek sejuk.



Diagram 10
Rajah 10

In the instant cold pack, there is solid salt Y and water which are separated by a thin film. When the cold pack is squeezed, the thin film breaks. Solid salt Y dissolves in the water endothermically to provide coldness. Heat is absorbed from the surroundings, for example the injured area of an athlete's body.

Di dalam pek sejuk terdapat pepejal garam Y dan air yang dipisahkan oleh lapisan filem yang nipis. Apabila pek sejuk ditekan, lapisan filem pecah. Pepejal garam Y melarut dalam air secara endotermik untuk menghasilkan kesan sejuk. Haba diserap daripada persekitaran, contohnya bahagian kecederaan pada badan atlet.

What is solid salt Y?

Apakah pepejal garam Y?

- A** Anhydrous magnesium sulphate
Magnesium sulfat kontang
- B** Calcium oxide
Kalsium oksida
- C** Ammonium chloride
Ammonium klorida
- D** Sodium acetate
Natrium asetat

47. Diagram 11 shows an energy level diagram.
Rajah 11 menunjukkan gambarajah aras tenaga.

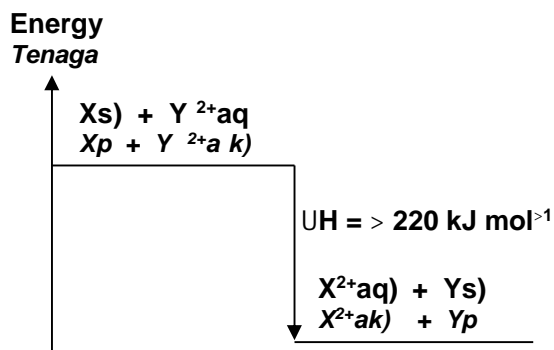


Diagram 11
Rajah 11

Based on Diagram 11, what is the increase in temperature of the solution if excess X powder is added to 50 cm³ 0.2 mol dm⁻³ solution Y?
[Specific heat capacity of solution : 4.0 J g⁻¹ °C⁻¹]
Berdasarkan Rajah 11, apakah pertambahan suhu bagi larutan jika serbuk X berlebihan ditambah kepada 50 cm³ larutan Y 0.2 mol dm⁻³?
[Muatan haba tentu larutan : 4.0 J g⁻¹ °C⁻¹]

- A** 4.4 °C
B 5.5 °C
C 8.8 °C
D 11.0 °C
48. Which of the following is an example of soap?
Antara yang berikut, manakah merupakan contoh sabun?
- A** Sodium ethanoate
Natrium etanoat
- B** Sodium alkyl sulphonate
Natrium alkil sulfonat
- C** Potassium stearate
Kalium stearat
- D** Potassium carbonate
Kalium karbonat
49. Which of the following is **NOT** a purpose of adding food additives to food?
Yang manakah **BUKAN** tujuan menambahkan bahan tambah makanan?
- A** To ensure that the food can last longer
Memastikan makanan boleh tahan lebih lama
- B** To make sure that the food is a balanced meal
Memastikan makanan itu sajian yang seimbang
- C** To enhance the taste of food
Meningkatkan rasa makanan
- D** To add more nutrients to the food
Menambahkan nutrien kepada makanan

50. Adam is diagnosed as a psychiatric patient. He has difficulty falling asleep and is always restless. Which of the following medicine should be prescribed to him?
Adam disahkan sebagai pesakit psikiatrik. Dia mengalami masalah sukar untuk tidur dan sering gelisah. Ubat yang manakah sesuai digunakan untuk merawatnya?

- A Barbiturate
Barbiturat
- B Codeine
Kodeina
- C Streptomycin
Streptomisin
- D Aspirin
Aspirin

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END OF QUESTION PAPER
KERTAS SOALAN TAMAT

SULIT
4541/2
Chemistry
Paper 2
2015
2 1/2 hours

Name



Form

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PEPERIKSAAN SELARAS PERCUBAAN
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CHEMISTRY
KIMIA

Paper 2
Kertas 2

Two hours and thirty minutes
Dua jam dan tiga puluh minit

DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO

- This question paper consists of three sections: **Section A, Section B and Section C.***
- Answer **all** questions in **Section A.** Write your answers for **Section A** in the spaces provided in the question paper.*
- Answer **one** question from **Section B** and one question from **Section C.** Answers questions in **Section B** and **Section C** in detail. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.*
- Show your working. It may help you to get marks.*
- The diagrams in the questions are not drawn to scale unless stated.*
- Marks allocated for each question or part question are shown in brackets.*
- You may use a non-programmable scientific calculator.*
- Hand in your answer sheets at the end of the examination.*

For Examiner's use only		
Section	No.	Marks
A	1	
	2	
	3	
	4	
	5	
	6	
Total		
B	7	
	8	
Total		
C	9	
	10	
Total		
Total marks		

This question paper consists of 20 printed pages

INFORMATION FOR CANDIDATES

MAKLUMAT UNTUK CALON

<https://cikguadura.wordpress.com/>

1. This question paper consists of three sections: **Section A**, **Section B** and **Section C**.
Kertas soalan ini mengandungi tiga bahagian: Bahagian A, Bahagian B dan Bahagian C.
2. Answer **all** questions in Section A. Write your answers for **Section A** in the spaces provided in the question paper.
Jawab semua soalan dalam Bahagian A. Tuliskan jawapan bagi Bahagian A dalam ruang yang disediakan dalam kertas soalan.
3. Answer one question from **Section B** and one question from **Section C**.
Write your answers for **Section B** and **Section C** on the 'writing paper' (examination pad)
Answer questions in **Section B** and **Section C** in detail.
You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.
Jawab satu soalan daripada Bahagian B dan satu soalan daripada Bahagian C. Tuliskan jawapan bagi Bahagian B dan Bahagian C pada kertas tulis (kertas jawapan). Jawab Bahagian B dan Bahagian C dengan terperinci. Anda boleh menggunakan persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.
4. Show your working. It may help you to get marks.
Tunjukkan kerja mengira. Ini membantu anda mendapatkan markah.
5. If you wish to change your answer, neatly cross out the answer that you have done. Then write down the new answer.
Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu.
6. The diagrams in the questions are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.
7. Marks allocated for each question or part question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraihan soalan ditunjukkan dalam kurungan.
8. The time suggested to answer **Section A** is 90 minutes, **Section B** is 30 minutes and **Section C** is 30 minutes.
Masa yang dicadangkan untuk menjawab Bahagian A ialah 90 minit, Bahagian B ialah 30 minit dan Bahagian C ialah 30 minit.
9. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.
10. Hand in your answer sheets at the end of the examination.
Serahkan semua kertas jawapan anda di akhir peperiksaan.

Section A
Bahagian A

Answer all question
Jawab semua soalan
<https://cikguadura.wordpress.com/>

1. Diagram 1 shows some examples of modern medicine.
Rajah 1 menunjukkan beberapa contoh ubatan moden.

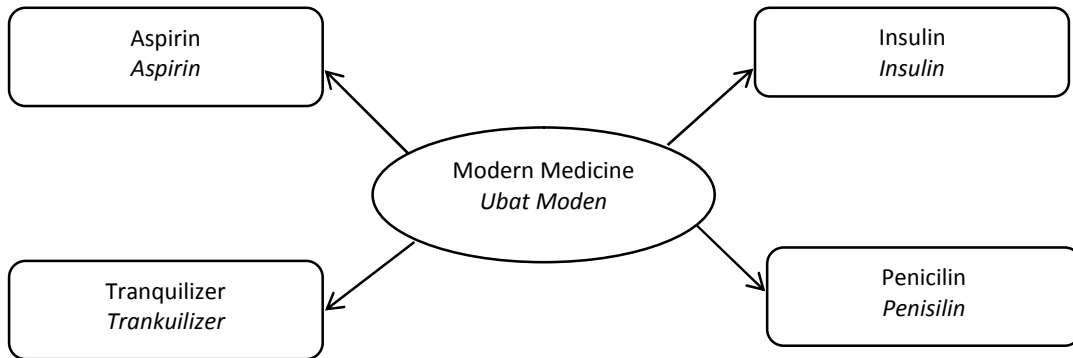


Diagram 1
Rajah 1

- (a) Which of the examples is produced by fungi?
Yang manakah antara contoh tersebut dihasilkan daripada kulat?

.....
[1 mark / 1 markah]

- (b) What is the function of a tranquilizer?
Apakah fungsi trankuiliser?

.....
[1 mark / 1 markah]

- (c) What is the function of aspirin?
Apakah fungsi aspirin?

.....
[1 mark / 1 markah]

- (d) Why is aspirin not prescribed to a patient who has gastric problems?
Mengapa aspirin tidak diberikan kepada pesakit yang mempunyai masalah gastrik?

.....
[1 mark / 1 markah]

- (e) Suggest a medicine that can be used to replace aspirin.
Cadangkan satu ubat yang boleh digunakan untuk menggantikan aspirin.

.....
[1 mark/ 1 markah]

- (f) Why should a course of penicilin prescribed by the doctor be completed according to schedule ?
Mengapakah penisilin yang diberikan oleh doktor seharusnya dihabiskan mengikut jadual?

.....
[1 mark/ 1 markah]

- (g) (i) What is the health problem that can be treated by using insulin?
Apakah masalah kesihatan yang boleh dirawat dengan menggunakan insulin?

.....
[1 mark/ 1 markah]

- (ii) State the function of insulin in (g)(i)
Nyatakan fungsi insulin di (g)(i)

.....
[1 mark/ 1 markah]

2. Diagram 2 shows the symbols for three elements, P, Q, and R
Rajah 2 menunjukkan simbol bagi tiga unsur, P, Q dan R

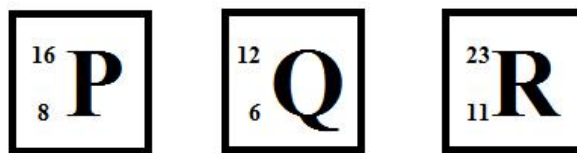


Diagram 2
Rajah 2

- (a) (i) Write the electron arrangement of atom R.
Tuliskan susunan elektron atom R.

.....
[1 mark/ 1 markah]

- (ii) State the group in which element R is found in the Periodic Table of Elements.
Nyatakan kumpulan di mana unsur R ditemui dalam Jadual Berkala Unsur.

.....
[1 mark/ 1 markah]

- (iii) Name one element which is in the same group as element R in the Periodic Table of Elements.
Namakan satu unsur yang berada dalam kumpulan yang sama dengan unsur R dalam Jadual Berkala Unsur.

.....
[1 mark/ 1 markah]

- (b) (i) Element P and Q are in the same period. Explain.
Unsur P dan Q terletak pada kala yang sama. Jelaskan.

.....
[1 mark/ 1 markah]

- (ii) Write the chemical formula of the compound formed between element P and Q.
Tuliskan formula kimia bagi sebatian yang terbentuk antara unsur P dan Q.

.....
[1 mark/ 1 markah]

(c) Element P can combine with element R.

Unsur P boleh berpadu dengan unsur R.

(i) State the type of bond which is formed between P and R.

Nyatakan jenis ikatan yang terbentuk antara P dan R.

.....
[1 mark/ 1 markah]

(ii) Write the chemical equation for the reaction between P and R.

Tuliskan persamaan kimia bagi tindak balas yang berlaku antara P dan R.

.....
[1 mark/ 1 markah]

(iii) Draw the electron arrangement of the compound formed between P and R.

Lukiskan susunan elektron bagi sebatian yang terbentuk antara P dan R.

[2 marks/ 2 markah]

(d) Element Q can form a compound with chlorine. State one difference in physical property of this compound and the compound formed between Q and P.

Unsur Q boleh membentuk sebatian dengan klorin. Nyatakan satu perbezaan sifat fizik sebatian ini dengan sebatian terbentuk antara Q dan P.

.....
[1 mark/ 1 markah]

3. Diagram 3 shows the set-up of apparatus to study the electrolysis of 1.0 mol dm^{-3} copper (II) sulphate solution using copper electrodes. The electrolysis process is carried out for 20 minutes.

Rajah 3 menunjukkan susunan radas untuk mengkaji elektrolisis bagi 1.0 mol dm^{-3} larutan kuprum(II) sulfat menggunakan elektrod-elektrod kuprum. Proses elektrolisis dijalankan selama 20 minit.

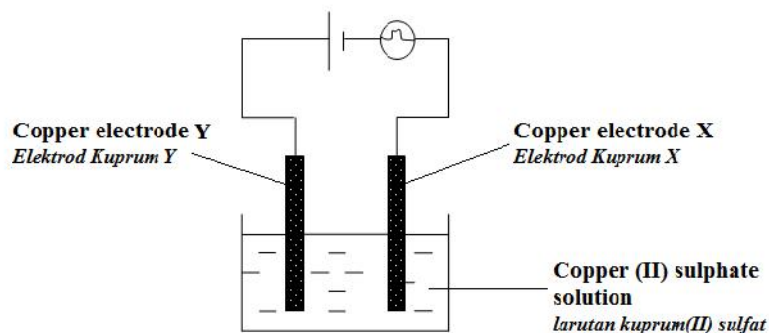


Diagram 3
Rajah 3

- (a) Write the formulae for all cations present in copper(II) sulphate solution.
Tuliskan semua formula kation yang hadir dalam larutan kuprum(II) sulfat.

.....
[1 mark / 1 markah]

- (b) Based on copper electrode X,
Berdasarkan elektrod kuprum X,

- (i) State one observation.
Nyatakan satu pemerhatian.

.....
[1 mark/ 1 markah]

- (ii) What ion will be discharged at electrode X?
Apakah ion yang akan dinyahcaskan di elektrod X?

.....
[1 mark/ 1 markah]

- (iii) Write the half equation for the reaction that occurs in b(ii).
Tuliskan persamaan setengah bagi tindak balas yang berlaku di b(ii).

.....
[1 mark/ 1 markah]

(c) After the experiment has been carried out, it is found that there is no change in the intensity of the blue copper(II) sulphate solution. Explain.

Selepas eksperimen dijalankan, didapati tiada perubahan keamatan warna biru larutan kuprum(II) sulfat. Terangkan.

.....
.....
.....

[2 marks / 2 markah]

(d) The electrolysis is repeated by using carbon electrodes to replace the two copper electrodes.

Elektrolisis diulang dengan menggantikan kedua-dua elektrod kuprum dengan elektrod karbon.

(i) Name the product formed at carbon electrode Y

Namakan hasil yang terbentuk di elektrod karbon Y.

.....

[1 mark/ 1 markah]

(ii) Describe a chemical test to confirm the product formed in d(i).

Huraikan satu ujian kimia untuk mengesahkan hasil yang terbentuk di d(i).

.....
.....

[2 marks/ 2 markah]

(e) The apparatus set-up in Diagram 3 can be used to electroplate an iron spoon with copper.

Which electrode should be replaced with the iron spoon?

Susunan radas dalam Rajah 3 boleh digunakan untuk menyadur sudu besi dengan kuprum.

Elektrod yang manakah perlu digantikan dengan sudu besi?

.....

[1 mark/ 1 markah]

4. Diagram 4 shows four test tubes P, Q, R and S that contain glacial ethanoic acid, dilute ethanoic acid, dilute hydrochloric acid and aqueous solution X respectively.

Rajah 4 menunjukkan empat tabung uji P, Q, R, S yang masing-masing mengandungi asid etanoik glasial, asid etanoik cair, asid hidroklorik cair dan larutan akueus X.

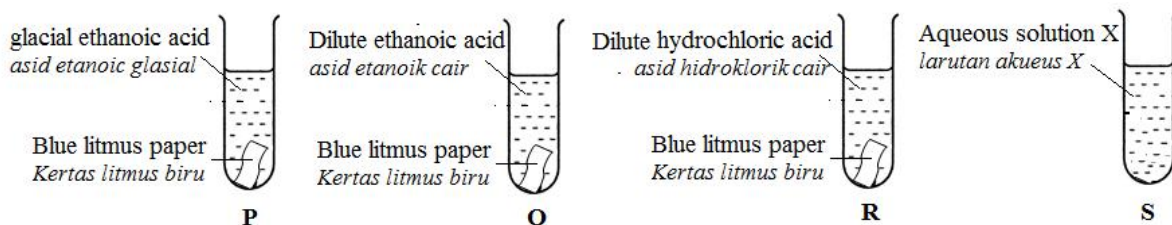


Diagram 4
Rajah 4

- (a) (i) State the colour change of the blue litmus paper in test tubes Q and R.
Nyatakan perubahan warna kertas litmus biru dalam tabung uji Q dan R.

[1 mark / 1 markah]

- (ii) Write the formula of ion which causes the colour change of the blue litmus paper.
Tuliskan formula ion yang menyebabkan perubahan warna kertas litmus biru.

[1 mark / 1 markah]

- (b) Is there any changes of colour of blue litmus paper in test tube P? Explain.
Adakah perubahan warna kertas litmus biru dalam tabung uji P? Jelaskan

[2 marks / 2 markah]

- (c) Table 4 shows the pH values of aqueous solution of ethanoic acid and dilute hydrochloric acid of the same molarity.

Jadual 4 menunjukkan nilai pH larutan akueus asid etanoik dan asid hidroklorik cair pada kemolaran yang sama.

Type of Acid <i>Jenis Asid</i>	Aqueous solution ethanoic acid <i>Larutan akueus asid etanoik</i>	Dilute hydrochloric acid <i>Asid hidroklorik cair</i>
Molarity <i>Kemolaran</i>	0.1 mol dm^{-3}	0.1 mol dm^{-3}
pH value <i>Nilai pH</i>	1.0	2.9

Table 4
Jadual 4

Explain why the pH value of aqueous solution of ethanoic acid is higher than that of dilute hydrochloric acid.

Terangkan mengapa nilai pH larutan akueus asid etanoik adalah lebih tinggi berbanding asid hidroklorik cair.

.....

.....

.....

[2 marks / 2 markah]

- (d) Calcium carbonate powder is added into test tube R. Write the chemical equation for the reaction that takes place.

Serbuk kalsium karbonat ditambahkan ke dalam tabung uji R. Tuliskan persamaan kimia bagi tindak balas yang berlaku.

.....

[2 marks / 2 markah]

- (e) Aqueous solution of X is acidic. Describe a chemical test to identify the acidic property of solution X.

Larutan akueus X adalah bersifat asid. Huraikan suatu ujian kimia untuk mengenal pasti sifat asid larutan X.

.....

.....

.....

.....

[2 marks / 2 markah]

5. Diagram 5 shows the apparatus set-up to investigate the reactions that take place in test tubes A and B.

Rajah 5 menunjukkan susunan radas bagi menyiasat tindak balas yang berlaku dalam tabung uji A dan B.

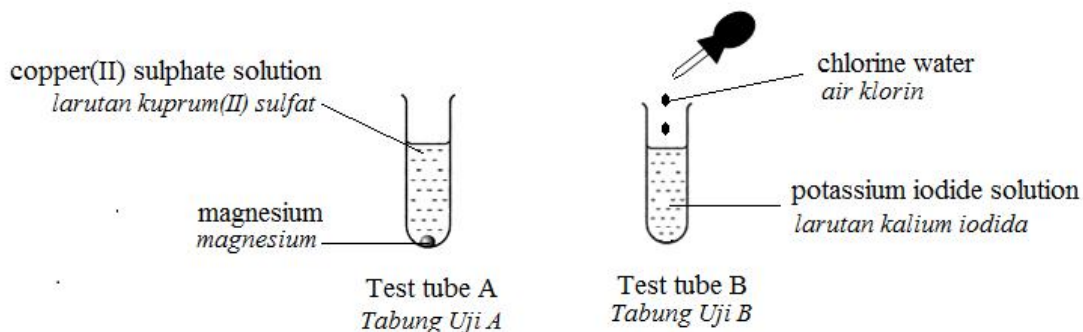


Diagram 5
Rajah 5

(a) State the type of reaction that occurs in both test tubes A and B.
Nyatakan jenis tindak balas yang berlaku dalam kedua-dua tabung uji A dan B.

.....
[1 mark / 1 markah]

(b) Based on the reaction that occurs in test tube A,
Berdasarkan tindak balas yang berlaku dalam tabung uji A,

(i) state one observation.
nyatakan satu pemerhatian.

.....
[1 mark / 1 markah]

(ii) write the ionic equation.
tuliskan persamaan ion.

.....
[1 mark / 1 markah]

(iii) what is the change in the oxidation number of magnesium?
apakah perubahan nombor pengoksidaan bagi magnesium?

.....
[1 mark / 1 markah]

(c) By referring to the reaction that takes place in test tube B.
Dengan merujuk kepada tindak balas yang berlaku dalam tabung uji B.

(i) State the function of potassium iodide solution.
Nyatakan fungsi larutan kalium iodida.

.....
[1 mark / 1 markah]

- (ii) Write the ionic equation for the reaction.
Tuliskan persamaan ion bagi tindak balas tersebut.

.....
[1 mark / 1 markah]

- (iii) Name another reagent that can replace chlorine water.
Namakan reagen lain yang boleh menggantikan air klorin.

.....
[1 mark / 1 markah]

(d) You are give a list of apparatus as follows:

• U-tube	<i>Tiub U</i>
• Connecting wires	<i>Wayar penyambung</i>
• Galvanometer	<i>Galvanometer</i>
• Carbon electrodes	<i>Elektrod-elektrod karbon</i>

By using the given apparatus and the chemicals as in test tube B and diluted sulphuric acid, draw a labeled diagram to investigate electron transfer at a distance. In the diagram, mark the positive and negative terminals of the cell.

Dengan menggunakan radas yang diberikan dan bahan kimia seperti dalam tabung uji B dan asid sulfurik cair, lukiskan suatu gambarajah berlabel untuk mengkaji pemindahan elektron pada suatu jarak. Pada rajah, tandakan terminal positif dan negatif sel tersebut.

[3 marks / 3 markah]

6. A student carried out an experiment to determine the heat of displacement for the reaction between copper and silver nitrate solution. Diagram 6 shows the set-up of apparatus used in the experiment.

Seorang pelajar telah menjalankan satu eksperimen untuk menentukan haba penyesaran bagi tindak balas antara kuprum dan larutan argentum nitrat. Rajah 6 menunjukkan susunan radas yang telah digunakan dalam eksperimen itu.

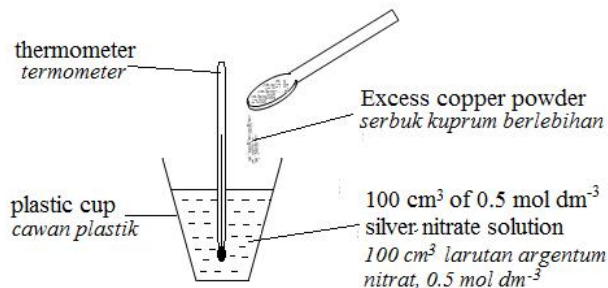


Diagram 6
Rajah 6

The following data was obtained:

Data berikut diperoleh:

Initial temperature of silver nitrate solution <i>Suhu awal larutan argentum nitrat</i>	29.0°C
Highest temperature of the mixture <i>Suhu tertinggi campuran</i>	41.5°C

- (a) Based on this experiment, what is meant by the heat of displacement?
Berdasarkan eksperimen ini, apakah yang dimaksudkan dengan haba penyesaran?

.....
.....
[1 mark / 1 markah]

- (b) (i) State the change in colour of the solution.
Nyatakan perubahan warna larutan.

.....
[1 mark / 1 markah]

- (ii) State the reason for your answer in (b) (i)
Nyatakan sebab bagi jawapan anda dalam (b)(i)

.....
[1 mark / 1 markah]

(c) Given that the specific heat capacity of solution is $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$ and the density of the solution is 1 g cm^{-3} . Calculate

Diberi bahawa muatan haba tentu bagi larutan ialah $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$ dan ketumpatan larutan ialah 1 g cm^{-3} . Hitungkan

(i) the change in heat in this experiment
perubahan haba dalam eksperimen ini.

[1 mark / 1 markah]

(ii) the number of moles of silver ions reacted
bilangan mol ion argentum yang telah bertindak balas

[1 mark / 1 markah]

(iii) the heat of displacement in this reaction.
haba penyesaran dalam eksperimen ini.

[2 marks / 2 markah]

(d) Draw the energy level diagram for the reaction.
Lukiskan gambarajah aras tenaga bagi tindak balas ini.

[3 marks / 3markah]

Section B
Bahagian B

Answer **one** question only
Jawab **satu** soalan sahaja
<https://cikguadura.wordpress.com/>

7. a(i) Q is a substance which has a melting point of 48 °C and a boiling point of 89 °C. Sketch a graph of temperature against time when substance Q is heated from room temperature to 100 °C.

Q merupakan suatu bahan yang mempunyai takat lebur 48 °C dan takat didih 89 °C. Lakarkan satu graf suhu melawan masa apabila bahan Q dipanaskan daripada suhu bilik kepada 100 °C.

[3 marks / 3 markah]

- (ii) What is meant by isotope?

Isotopes are used in agriculture, medicine, archaeology and industry fields. By choosing **one** of the above mentioned fields, name an isotope and its use.

Apakah maksud isotop?

*Isotop digunakan dalam bidang pertanian, perubatan, arkeologi dan industri. Dengan memilih **satu** daripada bidang yang dinyatakan, namakan satu isotop dan kegunaannya.*

[3 marks / 3 markah]

- (b) Explain the following:

Terangkan yang berikut:

- (i) The elements of Group 18 in the Periodic Table of Elements are chemically inert.
Unsur-unsur daripada Kumpulan 18 Jadual Berkala Unsur adalah lengai secara kimia.

[2 marks/ 2 markah]

- (ii) The melting points and boiling points of Group 17 elements increase when going down the group.

Takat lebur dan takat didih unsur-unsur Kumpulan 17 meningkat apabila menurun kumpulan.

[3 marks/ 3 markah]

- (iii) The atomic radii of Period 3 elements decrease from left to right across the period.
Jejari atom unsur-unsur Kala 3 berkurang apabila merentasi kala dari kiri ke kanan.

[3 marks/ 3 markah]

- (c) Element X reacts with chlorine to form a compound. Describe how the bonds between atom of element X and chlorine atoms are formed.

Unsur X bertindak balas dengan klorin untuk membentuk suatu sebatian. Huraikan bagaimana ikatan antara atom X dan atom klorin terbentuk.

[Proton number: X =6, Cl=17]

[Nombor proton: X = 6, Cl=17]

[6 marks / 6 markah]

8. An experiment is carried out to investigate the factors affecting the rate of reaction between hydrochloric acid and marble chips. Time taken to collect 50 cm³ of gas in each experiment is recorded in Table 8.

Suatu eksperimen dijalankan untuk mengkaji faktor-faktor yang mempengaruhi kadar tindak balas antara asid hidroklorik dan ketulan marmar. Masa yang diambil untuk mengumpul 50 cm³ gas dalam setiap eksperimen dicatatkan dalam Jadual 8.

Eksperiment <i>Eksperimen</i>	Reactants <i>Bahan tindak balas</i>	Temperature (°C) <i>Suhu (°C)</i>	Time (s) <i>Masa (s)</i>
I	40 cm ³ of 0.1 mol dm ⁻³ hydrochloric acid + 5 g of marble chips <i>40 cm³ asid hidroklorik 0.1 mol dm⁻³ + 5 g ketulan marmar</i>	30	100
II	40 cm ³ of 0.2 mol dm ⁻³ hydrochloric acid + 5 g of marble chips <i>40 cm³ asid hidroklorik 0.2 mol dm⁻³ + 5 g ketulan marmar</i>	30	60
III	40 cm ³ of 0.2 mol dm ⁻³ hydrochloric acid + 5 g of marble chips <i>40 cm³ asid hidroklorik 0.1 mol dm⁻³ + 5 g ketulan marmar</i>	40	25

Table 8
Jadual 8

- (a) What is meant by rate of reaction in this experiment?

Apakah yang dimaksudkan dengan kadar tindak balas dalam eksperimen ini?

[1 mark / 1 markah]

- (b) Write a chemical equation for the reaction between hydrochloric acid and marble chips.

Tuliskan satu persamaan kimia bagi tindak balas antara asid hidroklorik dan ketulan marmar.

[2 marks / 2 markah]

- (c) Draw a labelled diagram for the set-up of apparatus in this experiment.

Lukis suatu rajah berlabel bagi susunan radas dalam eksperimen ini.

[2 marks / 2 markah]

- (d) Calculate the maximum volume of carbon dioxide gas released for Experiment I.

Hitungkan isi padu maksimum gas karbon dioksida bagi Eksperimen I.

[1 mole of gas occupies 24 dm³ at room condition]

[1 mol gas menempati 24 dm³ pada keadaan bilik]

[3 marks / 3 markah]

(e) Compare the rate of reaction for the following experiments.

Bandingkan kadar tindak balas bagi eksperimen berikut:

- Experiment I and Experiment II
Eksperimen I dan Eksperimen II
- Experiment II and Experiment III
Eksperimen II dan Eksperimen III

By using the collision theory, explain the difference in the rate of reaction.

Dengan menggunakan teori perlanggaran, terangkan perbezaan dalam kadar tindak balas.

[8 marks / 8 markah]

(f) Explain the application of the factors affecting the rate of reaction in the following cases:

Jelaskan aplikasi faktor-faktor yang mempengaruhi kadar tindak balas dalam kes-kes berikut:

(i) Time taken for smaller pieces of food to cook is shorter.
Masa yang diambil untuk memasak kepingan makanan yang lebih kecil adalah lebih singkat.

[2 marks / 2 markah]

(ii) Food kept in a refrigerator stays fresh for a longer period.
Makanan yang disimpan di dalam peti sejuk tetap segar bagi tempoh yang lebih lama.

[2 marks / 2 markah]

Section C
Bahagian C

<https://cikguadura.wordpress.com/>

Answer **one** question only

Jawab **satu** soalan sahaja

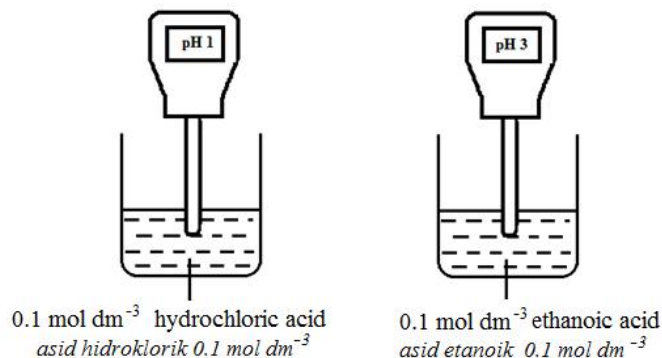


Diagram 9

Rajah 9

9. (a) Diagram 9 shows the readings of pH meter when tested with hydrochloric acid and ethanoic acid of same concentration. Explain the observation.

Rajah 9 menunjukkan bacaan meter pH apabila diuji dengan asid hidroklorik dan asid etanoik dengan kepekatan yang sama. Terangkan pemerhatian ini.

[4 marks / 4 markah]

(b)

- **nitric acid** *asid nitrik*
- **zinc chloride solution** *larutan zink klorida*
- **potassium carbonate solution** *larutan kalium karbonat*

You are given the above solutions. By using suitable laboratory apparatus, describe how you can prepare a sample of zinc nitrate crystals. In your description, include chemical equations that are involve in the reaction.

Anda dibekalkan larutan-larutan seperti di atas. Dengan menggunakan radas makmal yang sesuai, huraikan bagaimana anda boleh menyediakan suatu sampel hablur zink nitrat. Dalam huraian anda, sertakan semua persamaan kimia yang terlibat dalam tindak balas.

[10 marks / 10 markah]

- (c) By using suitable reagents, describe how you can identify the cation and anion found in zinc nitrate solution.

Dengan menggunakan reagen yang sesuai, terangkan bagaimana anda mengenal pasti kation dan anion yang terdapat dalam larutan zink nitrat.

[6 marks / 6 markah]

10. (a) What is meant by exothermic and endothermic reaction?
Explain the changes in the energy content of the reactants and products for both the reactions.

Apakah yang dimaksudkan dengan tindak balas eksotermik dan endotermik?

Huraikan perubahan kandungan tenaga bahan dan hasil tindak balas bagi kedua-dua tindak balas tersebut?

[4 marks/ 4 markah]

- (b) Diagram 10 shows an energy level diagram for a chemical reaction.

Rajah 10 menunjukkan gambar rajah aras tenaga bagi satu tindak balas kimia

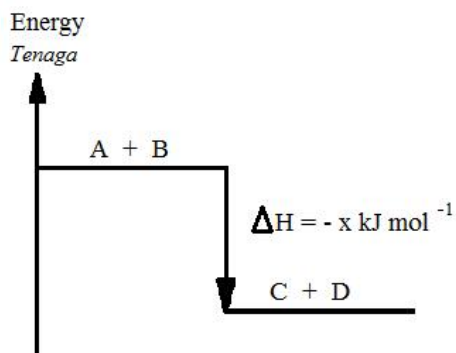


Diagram 10

Rajah10

State four information that can be obtained from the energy level diagram.

Nyatakan empat maklumat yang dapat diperolehi daripada gambar rajah aras tenaga itu.

[4 marks / 4 markah]

- (c) Describe an experiment to determine the heat of combustion of ethanol.

Your description should include the following:

Huraikan satu eksperimen untuk menentukan haba pembakaran etanol.

Penerangan anda perlu mengandungi perkara-perkara berikut:

- Procedure of experiment
Prosedur eksperimen
- Results and calculation
Keputusan dan pengiraan

[12 marks/ 12 markah]

<https://cikguadura.wordpress.com/>

**END OF QUESTION PAPER
KERTAS SOALAN TAMAT**

PERIODIC TABLE OF ELEMENTS

← Proton Number ← Symbol of Elements ← Name of the element																	
Transition Elements																	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 H Hydrogen 1	2 He Helium 4	3 Li Lithium 7	4 Be Beryllium 9	5 B Boron 11	6 C Carbon 12	7 N Nitrogen 14	8 O Oxygen 16	9 F Fluorine 19	10 Ne Neon 20	11 Na Sodium 23	12 Mg Magnesium 24	13 Al Aluminum 27	14 Si Silicon 28	15 P Phosphorus 31	16 S Sulfur 32	17 Cl Chlorine 35.5	18 Ar Argon 40
19 K Potassium 39	20 Ca Calcium 40	21 Sc Scandium 45	22 Ti Titanium 48	23 V Vanadium 51	24 Cr Chromium 52	25 Mn Manganese 55	26 Fe Iron 56	27 Co Cobalt 59	28 Ni Nickel 58.7	29 Cu Copper 63.5	30 Zn Zinc 65.4	31 Ga Gallium 70	32 Ge Germanium 72.6	33 As Arsenic 75	34 Se Selenium 79	35 Br Bromine 79.9	36 Kr Krypton 84
37 Rb Rubidium 85.5	38 Sr Strontium 88	39 Y Yttrium 89	40 Zr Zirconium 91	41 Nb Niobium 93	42 Mo Molybdenum 96	43* Tc Technetium 98	44 Ru Ruthenium 101	45 Rh Rhodium 103	46 Pd Palladium 106.4	47 Ag Silver 108	48 Cd Cadmium 112.4	49 In Indium 115	50 Sn Tin 119	51 Sb Antimony 122	52 Te Tellurium 128	53 I Iodine 127	54 Xe Xenon 131
55 Cs Cesium 132.9	56 Ba Barium 137.3	57 La Lanthanum 139	72 Hf Hafnium 178.5	73 Ta Tantalum 181	74 W Tungsten 184	75 Re Rhenium 187	76 Os Osmium 192	77 Ir Iridium 192.2	78 Pt Platinum 195.1	79 Au Gold 197	80 Hg Mercury 200.6	81 Tl Thallium 204.4	82 Pb Lead 207.2	83 Bi Bismuth 209	84 Po Polonium 210	85 At Astatine 210	86 Rn Radon 222
87 Fr Francium 223	88 Ra Radium 226	89 Ac Actinium 227	104* *Un q	105* *Un p	106* *Un h	107* *Un s	108* *Un o	109* *Un e	109* *Un e	109* *Un e	109* *Un e	109* *Un e	109* *Un e	109* *Un e	109* *Un e	109* *Un e	109* *Un e
* - Not exist naturally * - elements not yet discovered																	
Lanthanide Series																	
Actinide Series																	
58 Ce Cerium 140	59 Pr Praseodymium 141	60 Nd Neodymium 145	61* Pm Promethium 145	62 Sm Samarium 150	63 Eu Europium 152	64 Gd Gadolinium 157	65 Tb Terbium 159	66 Dy Dysprosium 163	67 Ho Holmium 165	68 Er Erbium 167	69 Tm Thulium 169	70 Yb Ytterbium 173	71 Lu Lutetium 175	103* La Lanthanum 139	102* No Nobelium 259	101* Md Mendelevium 258	100* Fm Fermium 257

4541/3
Chemistry
Paper 3

1 1/2 hours

Name

Form



PEJABAT PENDIDIKAN DAERAH ALOR GAJAH

PEPERIKSAAN SELARAS PERTENGAHAN TAHUN
SIJIL PELAJARAN MALAYSIA 2015
<https://cikguadura.wordpress.com/>

CHEMISTRY

Paper 3

One hour and thirty minutes

DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO

1. Write your *name* and *form* in the space provided.
2. This question's paper consists of bilingual.
3. Candidates must read information in page 2 and 3.

For Examiner's use only		
Question	Full Marks	Obtained Marks
1	33	
2	17	
Total	50	

This question paper consists of 9 printed pages

INFORMATION FOR CANDIDATES

MAKLUMAT UNTUK CALON

<https://cikguadura.wordpress.com/>

1. This question paper consists of **tiga** questions. Answer **all** questions.
*Kertas soalan ini mengandungi **tiga** soalan. Jawab **semua** soalan.*
2. Write your answer for **Question 1 and 2** in the spaces provided in the question paper.
*Tulis jawapan bagi **Soalan 1 dan 2** dalam ruang yang disediakan dalam kertas soalan.*
3. Write your answers for **Question 3** on the writing paper provided by the invigilators. You may use equations, diagrams, tables, graph and other suitable methods to explain your answer.
*Tuliskan jawapan untuk **Soalan 3** pada kertas tulis yang disediakan
Anda boleh menggunakan persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
4. Show your working, it may help you to get marks.
Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.
5. If you wish to change your answer, neatly cross out the answer that you have done. Then write down the new answer.
Sekiranya anda hendak menukar jawapan, batalkan dengan kemas jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.
6. The diagrams in the questions are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
7. Marks allocated for each question or part question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.
8. The time suggested to answer each of the questions is 30 minutes.
Masa yang dicadang untuk menjawab setiap soalan adalah 30 minit.
9. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.
10. Hand in your answer sheets at the end of the examination.
Serahkan kertas jawapan anda di akhir peperiksaan.

Marks awarded :
Pemberian markah :

Mark Markah	Description Penerangan
3	Excellent : The best response Cemerlang : <i>Respons yang paling baik</i>
2	Satisfactory : An average response Memuaskan : <i>Respons yang sederhana</i>
1	Weak : An inaccurately response Lemah : <i>Respons yang kurang tepat</i>
0	No response <u>or</u> wrong response <i>Tiada respons <u>atau</u> respons salah</i>

1. A student carried out an experiment to compare the hardness of pure copper and bronze. The experiment was carried out according to the following steps
 Seorang pelajar telah menjalankan satu eksperimen untuk membandingkan kekerasan kuprum tulen dengan gangsa. Eksperimen itu dijalankan mengikut langkah-langkah berikut:

Step 1 <i>Langkah 1</i>	Cellophane tape was used to stick a steel ball bearing onto the copper block. <i>Pita selofan digunakan untuk melekatkan bebola keluli di atas bongkah kuprum.</i>
Step 2 <i>Langkah 2</i>	A one kilogram weight was hung at a height of 50 cm above the ball bearing as shown in Diagram 1.1 <i>Pemberat satu kilogram digantung pada ketinggian 50 cm di atas bebola keluli itu seperti yang ditunjukkan dalam Rajah 1.1</i>
Step 3 <i>Langkah 3</i>	The weight was dropped so that it hit the ball bearing. <i>Pemberat itu dilepaskan supaya menghentam bebola keluli tersebut.</i>
Step 4 <i>Langkah 4</i>	The diameter of dent made on the copper block was measured and the reading was recorded. <i>Diameter lekuk yang terbentuk pada bongkah kuprum diukur dan bacaannya direkodkan.</i>
Step 5 <i>Langkah 5</i>	Step 1 to 4 was repeated twice on the other parts of the same copper block in order to obtain the average diameter. <i>Langkah 1 hingga 4 diulang sebanyak dua kali lagi atas bahagian lain bongkah kuprum yang sama untuk mendapatkan purata diameter.</i>
Step 6 <i>Langkah 6</i>	Step 1 to 5 was repeated by replacing the copper block with the bronze block. <i>Langkah 1 hingga 5 diulang dengan menggantikan bongkah kuprum dengan bongkah gangsa.</i>

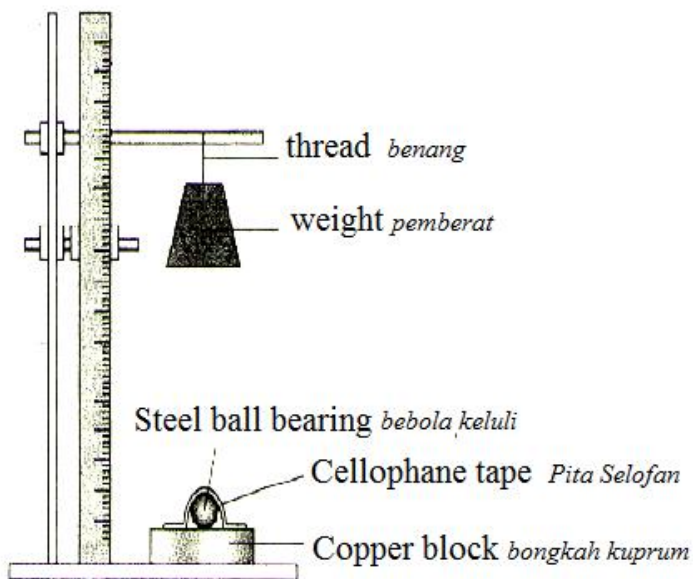


Diagram 1.2 (a) shows the dents for the three results on the copper block.

Rajah 1.2(a) menunjukkan lekuk bagi tiga keputusan ke atas bongkah kuprum.

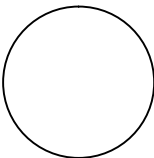
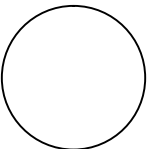
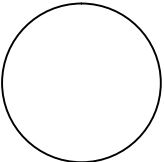
<i>Dent 1 Lekuk 1</i>	<i>Dent 2 Lekuk 2</i>	<i>Dent 3 Lekuk 3</i>
		
Diameter :cm	Diameter :cm	Diameter :cm

Diagram 1.2 (a)

Rajah 1.2 (a)

Diagram 1.2 (b) shows the dents for the three results on the bronze block.

Rajah 1.2(b) menunjukkan lekuk bagi tiga keputusan ke atas bongkah gangsa.




<i>Dent 1 Lekuk 1</i>	<i>Dent 2 Lekuk 2</i>	<i>Dent 3 Lekuk 3</i>
		
Diameter :cm	Diameter :cm	Diameter :cm

Diagram 1.2 (b)

Rajah 1.2 (b)

- (a) By using a ruler, measure and record the diameter of dents in the space provided.
 Dengan menggunakan pembaris, ukur dan catatkan diameter lekuk pada ruang yang disediakan.
 Dengan menggunakan pembaris, ukur diameter lekuk dan catatkan pada ruang yang disediakan.

[3 marks / 3 markah]

- (b) Construct a table and record the diameter of dents formed on copper block and bronze block.
Bina satu jadual dan rekodkan diameter lekuk-lekuk yang terbentuk pada bongkah kuprum dan bongkah gangsa.

[3 marks / 3 markah]

- (c) Calculate the average diameter of dents on,
Hitungkan nilai purata diameter lekuk pada,

(i) Copper block
Bongkah kuprum

(ii) Bronze block
Bongkah gangsa

[3 marks / 3 markah]

- (d) (i) State one observation that can be obtained from this experiment
Nyatakan satu pemerhatian yang dapat diperolehi daripada eksperimen ini.

.....
.....
.....

[3 marks / 3 markah]

- (ii) What is your inference based on the answer in (d) (i).
Apakah inferens anda berdasarkan jawapan anda dalam (d)(i)?

.....
.....

[3 marks / 3 markah]

- (iii) Explain your answer in (d)(ii) according to the arrangement of particles in the materials.
Terangkan jawapan anda dalam (d)(ii) berdasarkan susunan zarah-zarah dalam bahan-bahan itu.

.....
.....
.....
.....
.....
.....

[3 marks / 3 markah]

- (e) For this experiment, state:
Bagi eksperimen ini, 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]

- (f) (i) State one hypothesis for this experiment
Nyatakan satu hipotesis bagi eksperimen ini.

.....
.....

[3 marks / 3 markah]

(ii) Based on Diagram 1.2 (a) and (b), state the operational definition for this experiment.
Berdasarkan Rajah 1.2(a) dan (b), nyatakan definisi secara operasi bagi eksperimen ini.

.....
.....
.....
.....

[3 marks / 3 markah]

(g) The following is a list of substances:
Berikut ialah senarai beberapa bahan :

Iron <i>Ferum</i>	Tin <i>Stanium</i>	Brass <i>Loyang</i>
Pewter <i>Piuter</i>	Steel <i>Keluli</i>	Copper <i>Kuprum</i>

Classify these substances into pure metal and it's alloy.
Kelaskan bahan-beahan berikut kepada logam tulen dan aloinya.

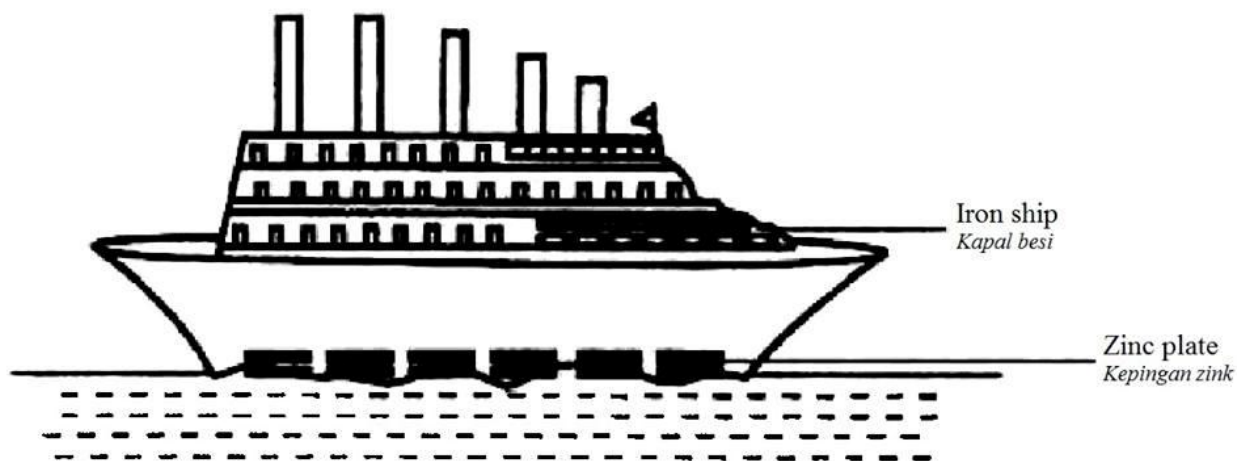
[3 marks / 3 markah]

(h) The experiment is repeated by using 500 g weight to replace one kilogram weight. Predict the average diameter of dent on copper block.
Eksperimen diulang dengan menggunakan pemberat 500 g bagi menggantikan pemberat satu kilogram.
Ramalkan purata diameter lekuk di atas bongkah kuprum.

.....

[3 marks / 3 markah]

2.



You are given iron nails, magnesium ribbon and copper strip. Referring to the situation above, plan a laboratory experiment to investigate the effect of other metals on the rusting of iron.

Anda diberi paku besi, pita magnesium dan jalur kuprum. Merujuk kepada situasi di atas, rancangkan satu eksperimen makmal untuk mengkaji kesan logam-logam lain ke atas pengamatan besi.

Your planning should include the following aspects:

Perancangan anda hendaklah mengandungi aspek-aspek berikut:

- a) Problem statement
Pernyataan masalah
- b) All the variables
Semua pembolehubah
- c) Statement of the hypothesis
Pernyataan hipotesis
- d) Lists of materials and apparatus
Senarai bahan dan radas
- e) Procedure for the experiment
Prosedur eksperimen
- f) Tabulation of data
Penjadualan data

[17 marks]
[17 markah]

<https://cikguadura.wordpress.com/>

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

MARKING SCHEME TRIAL CHEMISTRY PAPER 1

<https://cikguadura.wordpress.com/>

SOALAN	JAWAPAN	SOALAN	JAWAPAN
1	A	26.	D
2	B	27.	B
3	A	28.	C
4	C	29.	B
5	A	30.	D
6	C	31.	B
7	C	32.	C
8	B	33.	A
9	B	34.	C
10.	D	35.	D
11.	B	36.	D
12.	D	37.	A
13.	B	38.	D
14.	D	39.	C
15.	D	40.	C
16.	C	41.	D
17.	A	42.	B
18.	C	43.	C
19.	C	44.	A
20.	B	45.	D
21.	D	46.	C
22.	D	47.	D
23.	A	48.	C
24.	B	49.	B
25.	D	50.	A

MARK SCHEME
PEPERIKSAAN SELARAS PERCUBAAN SPM 2015
CHEMISTRY PAPER 2

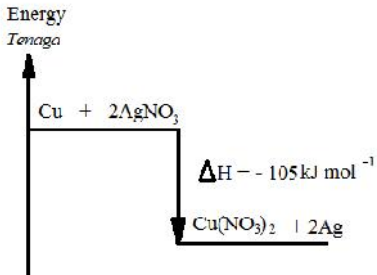
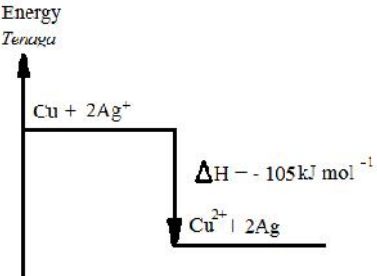
QUESTION			SUGGESTED ANSWER https://cikguadura.wordpress.com/	MARKS
1	a		Penicilin	1
	b		To calm down the patient	1
	c		To relieve pain	1
	d		It is acidic	1
	e		Paracetamol / Codeine	1
	f		To ensure all bacteria are completely killed	1
	g	(i)	Diabetes mellitus / diabetes	1
		(ii)	To control the glucose level in blood	1
	h		By injection, because insulin will be digested in stomach if taken orally	1
			Total	10

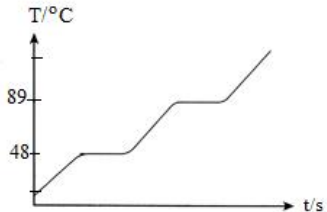
QUESTION			SUGGESTED ANSWER	MARKS
2	a	(i)	2.8.1	1
		(ii)	Group 1	1
		(iii)	Any name of group 1 metal except sodium, Na	1
	b	(i)	They have same number of shells occupied with electrons	1
		(ii)	QP ₂ // CO ₂	1
	c	(i)	Ionic	1
		(ii)	4R + P ₂ → 2R ₂ P // 4Na + O ₂ → 2Na ₂ O	1
		(iii)		2
	d		QCl ₄ is insoluble in water but QP ₂ is soluble in water.	1
			Total	10

QUESTION			SUGGESTED ANSWER	MARKS
3	a		Cu^{2+} , H^+	1
	b	(i)	Brown solid formed/deposited // Electrode X becomes thicker // Mass of electrode X increases	1
		(ii)	Cu^{2+}	1
		(iii)	$\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$	1
	c		- Number of Cu^{2+} ions discharged at cathode is the same as number of Cu^{2+} ions formed at the anode	1
			- Concentration of Cu^{2+} ions remains the same / constant / unchanged	1
	d	(i)	oxygen	1
		(ii)	- Insert a glowing wooded splinter into a test tube containing the gas	1
			- The gas relights/ignites/rekindles the glowing wooded splinter	1
	e		Electrode X / cathode	1
Total				10

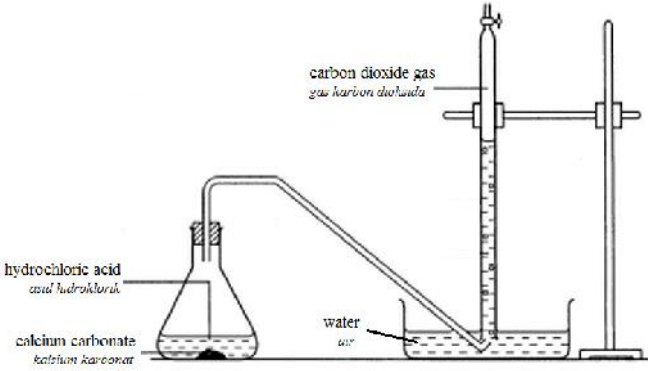
QUESTION			SUGGESTED ANSWER	MARKS
4	a	(i)	From blue to red	1
		(ii)	H^+	1
	b		No Absence of water / H^+ ions	1 1
	c		1. Ethanoic acid is weak acid, hydrochloric acid is strong acid 2. The concentration of H^+ ion in ethanoic acid is lower // The concentration of H^+ ions in hydrochloric acid is higher	1 1
	d		$\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$ - semua formula bahan dan hasil betul ...1m - persamaan kimia seimbang ...1m	2
	e		1. [Material : Name of reactive metal / name of carbonate salt] 2. [to test gas produced] 3. [observation] Example 1 : Procedure : 1. Magnesium is added into the aqueous solution X 2. Lower a lighted wooded splinter Observation: A 'pop' sound is heard.	1 1 1 1
			Example 2: 1. Calcium carbonate is added into the aqueous solution X 2. Bubble the gas released into lime water Observation: Lime water turned chalky/ milky / cloudy	1 1
Total				10

QUESTION		SUGGESTED ANSWER	MARKS
5	a	Redox reaction // oxidation-reduction // displacement reaction	1
	b	(i) Blue solution turns colourless // Brown solid deposited	1
		(ii) $Mg + Cu^{2+} \rightarrow Mg^{2+} + Cu$	1
		(iii) From 0 to +2	1
	c	(i) As reducing agent	1
		(ii) $2I^{-} + Cl_2 \rightarrow 2Cl^{-} + I_2$	1
		(iii) Acidified potassium manganate (VII) solution // Bromine water// Acidified potassium dichromate(VI) // Any suitable oxidising agent	1
	d	<ol style="list-style-type: none"> Functional set-up of apparatus Label : carbon, potassium iodide solution, chlorine water, diluted sulphuric acid Negative terminal : carbon immersed in potassium iodide solution Positive terminal : carbon immersed in chlorine water 	1 1 1
Total			10

QUESTION		SUGGESTED ANSWER	MARKS
6	a	Heat released when one mole of silver is displaced from its salt solution by copper	1
	b	(i) The colourless solution turns blue	1
		(ii) Copper(II) nitrate solution is formed	1
	c	(i) $100 \times 4.2 \times 12.5 = 5250J$ / 5.25kJ	1
		(ii) $\frac{100 \times 0.5}{1000} = 0.05 \text{ mol}$	1
		(iii) 1. $\Delta H = -\frac{5250}{0.5}$ // $\Delta H = -\frac{5.25}{0.5}$ 2. $= -105000 \text{ J mol}^{-1}$ // $= -105 \text{ kJ mol}^{-1}$	1 1
	d	1. Axis of energy correct and has two energy levels 2. Reactants and products at correct position of exothermic reaction 3. Label ΔH with sign, value and unit	1 1 1
		<p style="text-align: center;">Energy Tenaga</p>  <p style="text-align: center;">ATAU</p> 	
		Total	10

QUESTION			SUGGESTED ANSWER https://cikguadura.wordpress.com/	MARKS																														
7	a	(i)	 <ul style="list-style-type: none"> - Label axes correctly and correct shape of graph - Shows melting point on the graph - Show boiling point on the graph 	1 1 1																														
		(ii)	Isotopes are atoms of the same element which have the same number of protons / proton number but different number of neutrons / nucleon number	1																														
			Any suitable examples for the chosen field and its correct usage																															
			<table border="1" data-bbox="406 756 1218 1134"> <thead> <tr> <th>Field</th> <th>Isotope</th> <th>Use</th> </tr> </thead> <tbody> <tr> <td>Medical</td> <td>cobalt-60</td> <td>Treatment of cancer</td> </tr> <tr> <td></td> <td>phosphorus-32 strontium-90</td> <td>Treatment of skin cancer</td> </tr> <tr> <td></td> <td>plutonium-238</td> <td>Used in a heart pacemaker</td> </tr> <tr> <td></td> <td>iodine-131</td> <td>Treatment of thyroid diseases</td> </tr> <tr> <td>Agriculture</td> <td>phosphorus-32</td> <td>Used to study the metabolism of phosphorus by plants</td> </tr> <tr> <td>Archaeology</td> <td>carbon-14</td> <td>Used to estimate the age of fossils or artefacts</td> </tr> <tr> <td>Industry</td> <td>Sodium-24</td> <td>To detect the leakage of gas or oil pipes</td> </tr> <tr> <td></td> <td>Cobalt-60</td> <td>Destroy bacteria during food processing</td> </tr> <tr> <td></td> <td>Krypton-85</td> <td>Control the thickness of plastic sheets</td> </tr> </tbody> </table>	Field	Isotope	Use	Medical	cobalt-60	Treatment of cancer		phosphorus-32 strontium-90	Treatment of skin cancer		plutonium-238	Used in a heart pacemaker		iodine-131	Treatment of thyroid diseases	Agriculture	phosphorus-32	Used to study the metabolism of phosphorus by plants	Archaeology	carbon-14	Used to estimate the age of fossils or artefacts	Industry	Sodium-24	To detect the leakage of gas or oil pipes		Cobalt-60	Destroy bacteria during food processing		Krypton-85	Control the thickness of plastic sheets	1+1
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	b	(i)	<ul style="list-style-type: none"> - have achieved stable duplet or octet electron arrangement - will not donate or accept or share electron with other elements 	1 1																														
		(ii)	<ul style="list-style-type: none"> - The molecular size of halogen/ Group 17 elements increases down the group - Force of attraction between molecules become stronger - More heat energy is needed to overcome the stronger forces during melting or boiling 	1 1 1																														
		(iii)	<ul style="list-style-type: none"> - All atoms of period 3 elements have 3 / same number of shells occupied by electrons. - Their proton number/ nucleus charge increases from left to right of the period - Force of attraction between nucleus and electrons becomes stronger // electrons are pulled closer to the nucleus 	1 1 1																														
	c		<ol style="list-style-type: none"> 1. X atom has electron arrangement of 2.4 / 4 valence electrons 2. It contributes 4 valence electrons for sharing to achieve stable octet electron arrangement 3. Chlorine atom has electron arrangement of 2.8.7 / 7 valence electrons 4. A chlorine atom contributes one valence electron for sharing 5. To achieve the stable octet electron arrangement 6. Four chlorine atom share electrons with an X atom // each of four chlorine atoms share a pair of electrons with an X atom 	1 1 1 1 1 1																														

			Total	20
--	--	--	-------	----

QUESTION		SUGGESTED ANSWER	MARKS
8	a	The volume of carbon dioxide gas produced per unit of time (per second)	1
	b	$\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$ <ul style="list-style-type: none"> - Correct formula of reactants and products...1m - Balanced chemical equation ...1m 	2
	c	 <p>Functional diagram ...1m Correct label ...1m</p>	2
	d	<p>Experiment I</p> <p>No. of mole of HCl</p> $= \frac{(0.1)(40)}{1000} = 0.004 \text{ mol}$ <p>2 moles HCl produce 1 mole CO₂</p> <p>No. of mole of CO₂ = 0.002 mol</p> <p>Volume of CO₂ gas</p> $= 0.002(24)$ $= 0.048 \text{ dm}^3$	1 1 1
	e	<p>Experiment I and II</p> <ul style="list-style-type: none"> - Rate of reaction of Exp II is higher than Exp I - concentration of H⁺ is higher in Exp II - The number of H⁺ per unit volume is higher in Exp II - Frequency of collision between H⁺ and CO₃²⁻ is higher - Frequency of effective collision is higher <p>Experiment II and III</p> <ul style="list-style-type: none"> - Rate of reaction of Exp III is higher than Exp II - The temperature in Exp III is higher - The reacting H⁺ and CO₃²⁻ move faster - Frequency of collision between H⁺ and CO₃²⁻ is higher - Frequency of effective collision is higher 	1 1 1 } 1 1 1 1 } 1

	f	(i)	- The total surface area on a smaller piece of food is larger - The food can absorb more heat	1 1
		(ii)	- The temperature in refrigerator is lower - Rate of decomposition of food which caused by bacteria is lower.	1 1
			Total	20

QUESTION		SUGGESTED ANSWER	MARKS
9	a	<ul style="list-style-type: none"> - Hydrochloric acid is a strong acid while ethanoic acid is a weak acid - Hydrochloric acid ionises completely in water to produce H⁺ with high concentration - Ethanoic acid ionises partially in water to produce H⁺ with low concentration - Under same concentration, H⁺ produce by hydrochloric acid is more than ethanoic acid 	1 1 1 1
	b	<ol style="list-style-type: none"> 1. [20 – 50 cm³] of zinc chloride solution and [20 – 50 cm³] of potassium carbonate solution is mixed in a beaker 2. The mixture is filtered with filter paper and the white residue on the filter paper is zinc carbonate 3. Zinc carbonate is rinsed with distilled water 4. Add the zinc carbonate into a beaker contained [20 – 50 cm³] hot dilute nitric acid 5. The mixture is filtered and the filtrate is heated until saturated 6. The saturated solution is left cool 7. Filter the white solid and rinse with a little of distilled water. 8. Dry the crystals between two pieces of filter paper <p><u>Chemical Equation</u></p> $\text{K}_2\text{CO}_3 + \text{ZnCl}_2 \rightarrow \text{ZnCO}_3 + 2\text{KCl}$ $\text{ZnCO}_3 + 2\text{HNO}_3 \rightarrow \text{Zn}(\text{NO}_3)_2 + \text{CO}_2 + \text{H}_2\text{O}$	1 1 1 1 1 1 1 1 1 1
	c	<p><u>Identification of Zn²⁺ ion</u></p> <ol style="list-style-type: none"> 1. Add a little of NaOH solution into a test tube that contains 2 cm³ of sample 2. White precipitate that soluble in excess NaOH formed showing that Zn²⁺ is present <p><u>Identification of NO₃⁻ ion</u></p> <ol style="list-style-type: none"> 1. Add 2 cm³ iron(II) sulphate solution and 2 cm³ dilute sulphuric acid into a test tube that contains 2 cm³ of sample 	1 1 1

			2. Shake the mixture	1
			3. Slowly add some concentrated sulphuric acid to the mixture from the inner wall of the test tube	1
			4. A brown ring is formed showing that NO_3^- is present	1
			Total	20

QUESTION		SUGGESTED ANSWER	MARKS
10	a	1. Exothermic reaction is a reaction that releases heat to the surrounding 2. Energy content of reactants is higher than that of products 3. Endothermic reaction is a reaction that absorbs heat from the surroundings 4. Energy content of reactants is lower than that of products	1 1 1 1
	b	1. A and B are reactants while C and D are products 2. The reaction is exothermic // heat is released 3. Temperature of the mixture increases 4. Total / content of energy of 1 mole reactants is more than the total / content energy of 1 mole products.	1 1 1 1
	c	<p>Procedures:</p> 1. [100 – 200], V cm ³ of water is measured using a measuring cylinder 2. Pour into a copper container 3. The initial temperature of the water is measured and recorded 4. A spirit lamp containing ethanol is weighed and recorded 5. The wick of the spirit lamp is lighted 6. When temperature of water increase 30°C, the flame is put off 7. The highest temperature is recorded 8. The spirit lamp is weighed again <p>Result</p> Initial temperature of water = T_1 °C Highest temperature of water = T_2 °C Rise in temperature = $T_2 - T_1 = T$ °C Mass of lamp + ethanol before combustion = m_1 g Mass of lamp + ethanol after combustion = m_2 g Mass of ethanol burnt = $(m_1 - m_2)$ g <p>Calculation</p> Number of mole of ethanol burnt	1 1 1 1 1 1 1 1 1 1

			$= \frac{(m_1 - m_2)}{46} = n$	1
			Heat Change = $V \times 4.2 \times T = q J$ Heat of combustion = $-\frac{q}{n \times 1000} kJmol^{-1}$	1
			Total	20

END OF MARK SCHEME
<https://cikguadura.wordpress.com/>

SKEMA KIMIA KERTAS 3
PEPERIKSAAN PERCUBAAN SELARAS ALOR GAJAH
TAHUN 2015 <https://cikguadura.wordpress.com/>

Question	Rubric	Score
1(a)	Able to record all diameter correct to one decimal place. Suggested Answer : 2.0, 1.9, 2.1 1.1, 0.9, 1.0	3
	Able to record any 4 diameter correct to one decimal place.	2
	Able to record any 2 diameter correctly	1
	No response or wrong response.	0

Question	Rubric	Score															
1(b)	Able to construct a table which recorded all diameter of dent of copper and bronze accurately with unit Suggested answer : <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2"><i>Material</i></th> <th colspan="3"><i>Diameter of dent (cm)</i></th> </tr> <tr> <th><i>I</i></th> <th><i>II</i></th> <th><i>III</i></th> </tr> </thead> <tbody> <tr> <td><i>Copper</i></td> <td><i>2.0</i></td> <td><i>1.9</i></td> <td><i>2.1</i></td> </tr> <tr> <td><i>Bronze</i></td> <td><i>1.1</i></td> <td><i>0.9</i></td> <td><i>1.0</i></td> </tr> </tbody> </table>	<i>Material</i>	<i>Diameter of dent (cm)</i>			<i>I</i>	<i>II</i>	<i>III</i>	<i>Copper</i>	<i>2.0</i>	<i>1.9</i>	<i>2.1</i>	<i>Bronze</i>	<i>1.1</i>	<i>0.9</i>	<i>1.0</i>	3
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	Able to construct a table which recorded all diameter of dent of copper and bronze accurately without unit	2															
	Able to construct a table which recorded all diameter of dent of copper and bronze less accurately.	1															
	No response or wrong response.	0															

Question	Rubric	Score
1(c)	<p>Able to calculate the average diameter accurately for both copper and bronze with unit</p> <p>Suggested Answer :</p> <p>(i) Copper</p> $= \frac{2.0 + 1.9 + 2.1}{3} = 2.0 \text{ cm}$ <p>(ii) Bronze</p> $= \frac{1.1 + 0.9 + 1.0}{3} = 1.0 \text{ cm}$	3
	Able to calculate the average diameter accurately for both copper and bronze without unit	2
	Able to give the average diameter accurately without showing working	1
	No response or wrong response.	0

Question	Rubric	Score
1(d)(i)	<p>Able to state an observation correctly</p> <p>Suggested Answer :</p> <p><i>The size / diameter of dents on bronze block are smaller than that of copper block. //</i></p> <p><i>The size / diameter of dents on copper block are bigger than that of bronze block.</i></p>	3
	<p>Able to state an observation less correctly</p> <p>Suggested Answer :</p> <p><i>The size / diameter of dents on bronze block are smaller //</i></p> <p><i>The size / diameter of dents on copper block are bigger</i></p>	2
	<p>Able to give an idea of observation</p> <p>Suggested Answer :</p> <p><i>Dents of bronze block is small //</i></p> <p><i>Dents of copper block is big //</i></p> <p><i>Bronze is harder // Copper is less hard</i></p>	1
	No response or wrong response.	0

Question	Rubric	Score
1(d)(ii)	Able to state the inference of experiment correctly. Suggested Answer : <i>Bronze is harder than copper // Copper is less hard than bronze</i>	3
	Able to state the inference of experiment less correctly. Suggested Answer : <i>Bronze is hard and copper is less hard // Copper is less hard and bronze is hard</i>	2
	Able to give idea of inference of experiment Suggested Answer : <i>Bronze is hard // copper is less hard</i>	1
	No response or wrong response.	0

Question	Rubric	Score
1(d)(iii)	Able to explain the inference correctly. Suggested Answer : <ol style="list-style-type: none"> 1. Atoms of pure copper are of the same size, atoms of bronze are of different size. 2. Atoms of pure copper are in orderly arrangement, atoms of bronze are not in orderly arrangement due to the presence of foreign atom. 3. Layers of atom in pure copper can slides easily, layers of atoms in bronze cannot slides easily. 	3
	Able to explain the inference less correctly. Suggested Answer : <i>Any two statements of the suggested answer in score 3</i>	2
	Able to give an idea to explain the inference Suggested Answer : <i>Any statement of the suggested answer in score 3</i>	1
	No response or wrong response	0

Question	Rubric	Score
1(e)	Able to state all variables correctly. Suggested Answer : <i>Manipulated : Different type of materials // copper and bronze</i> <i>Responding : Diameter of dent</i> <i>Constant : size/ diameter and mass of steel ball bearing //</i> <i>Height of the weight //</i> <i>Mass of weight</i>	3
	Able to state any two variables correctly.	2
	Able to state any one variable correctly.	1
	No response or wrong response	0

Question	Rubric	Score
1(f)(i)	Able to state the hypothesis correctly. Suggested Answer : <i>Bronze is harder than copper //</i> <i>Copper is less hard than bronze.</i>	3
	Able to state the hypothesis less correctly. Suggested Answer : <i>Bronze is hard and copper is less hard //</i> <i>copper is less hard and bronze is hard</i>	2
	Able to give an idea of hypothesis Suggested Answer : <i>Bronze is hard //</i> <i>Copper is less hard</i>	1
	No response or wrong response	0

Question	Rubric	Score
1(f)(ii)	<p>Able to state the operational definition correctly.</p> <p>Suggested Answer :</p> <ol style="list-style-type: none"> 1. When a 1kg weight is dropped from a height of 50 cm onto a steel ball bearing that has been tape onto a metal block, 2. the diameter of dent on the block formed indicates the hardness of the material. 3. The smaller/ bigger the diameter of dent, the harder/less hard the material. 	3
	<p>Able to state the operational definition less correctly.</p> <p>Suggested Answer : Any two statements in score 3</p>	2
	<p>Able to give an idea of operational definition</p> <p>Suggested Answer : Any statement in score 3</p>	1
	No response or wrong response	0

Question	Rubric	Score								
1(g)	<p>Able to classify the materials into 3 correct pairs.</p> <p>Suggested Answer :</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td style="text-align: center;"><i>Pure Metal</i></td> <td style="text-align: center;"><i>Alloy</i></td> </tr> <tr> <td style="text-align: center;"><i>iron</i></td> <td style="text-align: center;"><i>Steel</i></td> </tr> <tr> <td style="text-align: center;"><i>tin</i></td> <td style="text-align: center;"><i>Pewter</i></td> </tr> <tr> <td style="text-align: center;"><i>copper</i></td> <td style="text-align: center;"><i>brass</i></td> </tr> </tbody> </table>	<i>Pure Metal</i>	<i>Alloy</i>	<i>iron</i>	<i>Steel</i>	<i>tin</i>	<i>Pewter</i>	<i>copper</i>	<i>brass</i>	3
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<i>iron</i>	<i>Steel</i>									
<i>tin</i>	<i>Pewter</i>									
<i>copper</i>	<i>brass</i>									
	Able to classify the materials into 2 correct pairs.	2								
	Able to classify the materials into 1 correct pair.	1								
	No response or wrong response	0								

Question	Rubric	Score
1(h)	Able to predict the average diameter of dent correctly with unit. Suggested Answer : <i>Any value in the range of 1.0 -1.9 cm</i>	3
	Able to predict the average diameter of dent correctly without unit. Suggested Answer : <i>Any value in the range of 1.0 -1.9</i>	2
	Able to predict the average diameter of dent Suggested Answer : <i>Any value less than 2.0</i>	1
	No response or wrong response	0

2 (a)	Able to give the statement of the problem accurately and response is in question form. Sample answer: What is the effect on rusting when iron is in contact with another metals?	3
	Able to give the statement of the problem correctly. Sample answer: To investigate the effect of other metals on the rusting or iron.	2
	Able to state an idea the statement of problem. Sample answer: To study the rusting of iron.	1
	No response or wrong response	0

2 (b)	Able to state the three variables correctly. Sample answer: Manipulated variable: Type of metals in contact with iron Responding variable: Rusting of iron // Presence of blue colour Controlled variable: Iron nails // temperature	3
	Able to state any two variables correctly	2
	Able to state any one variable correctly	1
	No response or wrong response	0
2 (c)	Able to give the hypothesis accurately. Sample answer: When a more electropositive metal is in contact with iron, iron does not rust. // When a less electropositive metal is in contact with iron, iron rusts.	3
	Able to give the hypothesis almost accurately. <u>Sample answer:</u> When a more reactive metal is in contact with iron, iron does not rust.	2
	Able to state the idea of hypothesis. <u>Sample answer:</u> When a less electropositive metal is in contact with iron, the iron does not rust.	1
	No response or wrong response	0

2 (d)	<p>Able to give the list of the apparatus and substances correctly and completely.</p> <p><u>Sample answer:</u></p> <p><u>Materials</u></p> <ol style="list-style-type: none"> 1 3 iron nails 2 Magnesium ribbon, copper strip 3 Hot agar// jelly solution mixed with a little potassium hexacyanoferrate(III) solution and phenolphthalein indicator 4 Sand paper <p><u>Apparatus</u></p> <ol style="list-style-type: none"> 1 3 test tubes 2 Test tube rack 	3
	<p>Able to give a list of materials and apparatus correctly but not completely.</p> <p><u>Sample answer:</u></p> <p><u>Materials</u></p> <ol style="list-style-type: none"> 1 Iron nails 2 Magnesium 3 copper strip 3 Hot jelly solution with a little potassium hexacyanoferrate(III) and phenolphthalein <p><u>Apparatus</u></p> <p>Test tube/beaker/any container</p>	2
	<p>Able to give an idea of materials and apparatus.</p> <p><u>Sample answer:</u></p> <p>Sample answer:</p>	1

	<p><u>Material</u></p> <p>Any metal</p> <p><u>Apparatus</u></p> <p>Test tube/beaker/ any container</p>	
	No response or wrong response	0
2 (e)	<p>Able to state the following five steps:</p> <p><u>Sample answer:</u></p> <ol style="list-style-type: none"> 1 Clean all the metals with sand paper. 2 Label the test tube A, B and C. 3 In test tube A, place an iron nail. 4 In test tube B and C, place an iron nail which has been coiled with magnesium ribbon and copper strip. 5 Pour the same volume of hot agar-agar // jelly solution has been mixed with potassium hexacyanoferrate(III) and phenolphthalein indicator. 6 Leave the test tubes aside for 1-2 days. 7 Record the observations. 	3
	<p>Able to state 5 steps of procedures correctly.</p> <p>Steps 1, 3, 4, 5 and 7</p>	2
	<p>Able to state 2 steps of procedures correctly.</p> <p>Steps 4 and 5</p>	1
	No response or wrong response	0

2 (f)	<p>Able to exhibit the tabulation of data correctly.</p> <p>Tabulation of data has 4 columns and 3 rows</p> <p><u>Sample answer:</u></p> <table border="1" data-bbox="337 369 1052 615"> <tr> <td>Test tube</td> <td>A</td> <td>B</td> <td>C</td> </tr> <tr> <td>Intensity of blue colour</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Intensity of pink colour</td> <td></td> <td></td> <td></td> </tr> </table>	Test tube	A	B	C	Intensity of blue colour				Intensity of pink colour				3
Test tube	A	B	C											
Intensity of blue colour														
Intensity of pink colour														
	<p>Able to exhibit the tabulation of data less accurately</p> <p>Tabulation of data has 4 columns and 2 rows</p> <p><u>Sample answer:</u></p> <table border="1" data-bbox="337 932 1052 1052"> <tr> <td>Test tube</td> <td>A</td> <td>B</td> <td>C</td> </tr> <tr> <td>Observation</td> <td></td> <td></td> <td></td> </tr> </table>	Test tube	A	B	C	Observation				2				
Test tube	A	B	C											
Observation														
	<p>Able to state an idea about the tabulation of data</p> <p>Tabulation of data has 2 columns and 2 rows</p> <p><u>Sample answer:</u></p> <table border="1" data-bbox="337 1333 1052 1453"> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </table>					1								
	No response or wrong response	0												

<https://cikguadura.wordpress.com/>
END OF MARK SCHEME