

MODUL KECEMERLANGAN PERCUBAAN

SIJIL PELAJARAN MALAYSIA 2016

SIJIL PELAJARAN MALAYSIA

CHEMISTRY

Kertas 1

1 ¼ jam

Satu jam lima belas minit

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

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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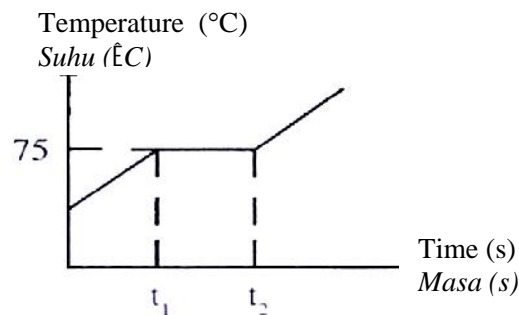
- 1. Kertas soalan ini adalah dalam dwibahasa*
- 2. Soalan di bahagian atas adalah dalam Bahasa Inggeris. Soalan di bawah dalam tulisan condong adalah dalam Bahasa Melayu yang sepadan.*
- 3. Calon dikehendaki membaca maklumat di halaman belakang .*

Kertas soalan ini mengandungi 21 halaman bercetak

1. Before carrying out an experiment, which steps should be taken?
Sebelum menjalankan eksperimen, apakah langkah yang perlu diambil?
 - A Making a hypothesis
Membuat hipotesis
 - B Analysing data
Menganalisis data
 - C Interpreting data
Mentafsirkan data
 - D Making a conclusion
Membuat kesimpulan

2. Which of the following scientists did not contribute to the development of the Atomic Model?
Antara ahli sains berikut, yang manakah tidak menyumbang terhadap kemajuan Model Atom?
 - A John Dalton
 - B Lothar Meyer
 - C James Chadwick
 - D Ernest Rutherford

3. Diagram below shows a graph of temperature against time for the heating of substance Y.
Rajah di bawah menunjukkan lengkung suhu melawan masa bagi pemanasan bahan Y



- Which statement is correct about the property of substance Y based on the graph?
Pernyataan manakah yang betul mengenai sifat bahan Y berdasarkan graf itu?
- A Is a gas at room temperature
Adalah gas pada suhu bilik
 - B Releases heat at time interval t_1 and t_2
Membebaskan haba pada sela masa t_1 dan t_2
 - C Experiences physical changes at temperature $75\text{ }^\circ\text{C}$
Mengalami perubahan keadaan fizik pada suhu $75\text{ }^\circ\text{C}$
 - D Only in liquid condition at time interval t_1 and t_2
Berada dalam keadaan cecair sahaja pada sela masa t_1 dan t_2

4. Diagram below shows elements in the Periodic Table of Elements.
Rajah di bawah menunjukkan unsur-unsur dalam Jadual Berkala Unsur.

								W	
X						Y			Z

Which element is an alkali metal?
Unsur manakah adalah logam alkali?

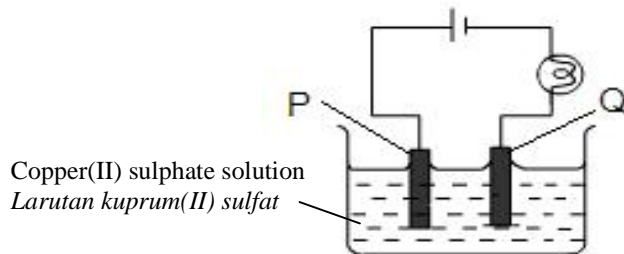
- A W
 B X
 C Y
 D Z
5. Which chemical equation represents the reaction between sodium metal and oxygen gas?
Persamaan kimia manakah yang mewakili tindak balas antara logam dan gas oksigen?
- A $\text{Na} + \text{O}_2 \rightarrow \text{NaO}_2$
 B $\text{Na} + \text{O}_2 \rightarrow \text{Na}_2\text{O}$
 C $2\text{Na} + \text{O}_2 \rightarrow \text{Na}_2\text{O}$
 D $4\text{Na} + \text{O}_2 \rightarrow 2\text{Na}_2\text{O}$
6. Which of the following pairs are the properties of naphthalene, C_{10}H_8 ?
Antara pasangan berikut, yang manakah sifat naftalena, C_{10}H_8 ?

	Solubility <i>Keterlarutan</i>	Electrical conductivity in molten state <i>Kekonduksian elektrik dalam leburan</i>
A	Insoluble in water <i>Tidak larut dalam air</i>	Not Conducting <i>Tidak Mengkonduksi</i>
B	Soluble in water <i>Larut dalam air</i>	Conducting <i>Mengkonduksi</i>
C	Insoluble in water <i>Tidak larut dalam air</i>	Conducting <i>Mengkonduksi</i>
D	Soluble in water <i>Larut dalam air</i>	Not conducting <i>Tidak mengkonduksi</i>

7. Which of the following is an example of electrolyte?
Antara berikut, yang manakah adalah contoh elektrolit?

- A Sugar solution
Larutan gula
- B Molten naphthalene
Leburan naftalena
- C Solid sodium chloride
Pepejal natrium klorida
- D Molten lead(II) bromide
Leburan plumbum(II) bromide

8. Diagram below shows the set up of the apparatus for the electrolysis of 0.01 mol dm^{-3} copper(II) sulphate solution using carbon electrodes.
Rajah di bawah menunjukkan susunan radas bagi elektrolisis larutan kuprum sulfat 0.01 mol dm^{-3} menggunakan elektrod- elektrod karbon.



Which of the following are the products formed at the electrodes P and Q?
Antara berikut yang manakah hasil yang terbentuk pada elektrod P dan Q?

	Electrode P <i>Elektrod P</i>	Electrode Q <i>Elektrod Q</i>
A	Hydrogen <i>Hidrogen</i>	Oxygen <i>Oksigen</i>
B	Oxygen <i>Oksigen</i>	Hydrogen <i>Hidrogen</i>
C	Copper <i>Kuprum</i>	Oxygen <i>Oksigen</i>
D	Oxygen <i>Oksigen</i>	Copper <i>Kuprum</i>

9. What is the particle that causes aqueous ammonia solution to show its alkaline property?
Apakah zarah yang menyebabkan larutan ammonia akues menunjukkan sifat alkalinnya?

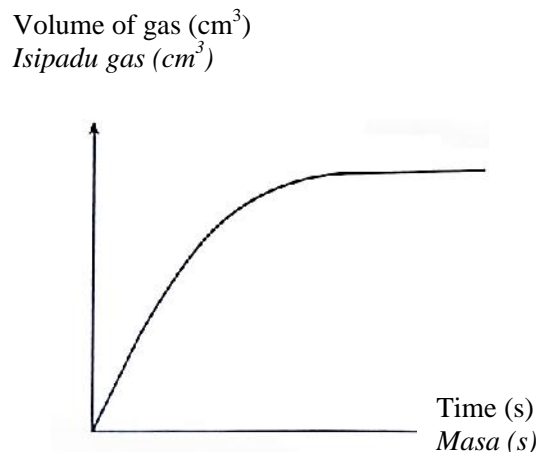
- A H_3O^+
- B OH^-
- C NH_4^+
- D NH_3

10. Which of the following compounds is an insoluble salt?
Antara sebatian berikut yang manakah garam tak terlarutkan?
- A Zinc chloride
Zink klorida
- B Lead(II) sulphate
Plumbum(II) sulfat
- C Sodium nitrate
Natrium nitrat
- D Potassium carbonate
Kalium karbonat
11. Which of the following ions form a precipitate that dissolved in excess of ammonia solution?
Antara ion-ion berikut, yang manakah akan menghasilkan mendakan yang larut dalam larutan ammonia berlebihan?
- I Zn^{2+}
- II Al^{3+}
- III Pb^{2+}
- IV Cu^{2+}
- A I and IV only
- B II and IV only
- C I and III only
- D I, II and III only
12. Sulphuric acid has many uses. The following is the uses of sulphuric acid except
Asid sulfurik mempunyai banyak kegunaan. Berikut adalah kegunaan asid sulfurik kecuali
- A for manufacturing soap
Untuk menghasilkan sabun
- B for manufacturing of paint
Untuk menghasilkan cat
- C for manufacturing synthetic fertilizer
Untuk menghasilkan baja sintetik
- D as an electrolyte in lead-acid accumulator
Sebagai elektrolit dalam akumulator asid-plumbum
13. What are the major components in glass and ceramic?
Apakah komponen utama dalam kaca dan seramik?

	Glass/Kaca	Ceramic/Seramik
A	Silicon dioxide <i>Silikon dioksida</i>	Iron(III) oxide <i>Ferum (III) oksida</i>
B	Aluminium silicate <i>Aluminium silikat</i>	Silicon dioxide <i>Silikon dioksida</i>
C	Iron(III) oxide <i>Ferum (III) oksida</i>	Silicon dioxide <i>Silikon dioksida</i>
D	Silicon dioxide	Aluminium silicate

Silikon dioksida	Aluminium silikat
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14. What is the meaning of the rate of reaction?
Apakah maksud kadar tindak balas?
- A decrease in the amount product
Pengurangan jumlah hasil tindak balas
- B decrease in the amount product against time
Pengurangan jumlah hasil tindak balas dengan masa
- C increase in the amount of product against time
Peningkatan jumlah hasil tindak balas dengan masa
- D increase in the amount of reactant against time
Peningkatan jumlah hasil bahan tindak balas dengan masa
15. Diagram below shows the graph of volume of hydrogen gas against time when magnesium ribbon is placed into dilute sulphuric acid.
Rajah di bawah menunjukkan graf isipadu melawan masa bagi gas hidrogen melawan masa apabila pita magnesium diletakkan ke dalam asid sulfurik cair



- Which of the following statements explain the change in the gradient of the curve?
Antara berikut, pernyataan manakah menerangkan perubahan kecerunan lengkung?
- A Total surface area of magnesium ribbon increase
Jumlah luas permukaan pita magnesium meningkat
- B Temperature of the reacting mixture decreases
Suhu campuran bahan tindak balas berkurang
- C Mass of magnesium sulphate formed decrease
Jisim magnesium sulfat terbentuk meningkat
- D Concentration of sulphuric acid decreases
Kepekatan asid sulfurik berkurang

16. What should be added to latex so that it stays in liquid form?
Apakah yang perlu ditambahkan kepada lateks bagi mengekalkannya dalam bentuk cecair?
- A ethanol
etanol
 - B ethanoic acid
Asid etanoik
 - C Ammonia solution
Larutan ammonia
 - D Hydrochloric acid
Asid hidroklorik
17. Which substance is used to change iron(II) ion to iron(III) ion?
Bahan manakah digunakan untuk menukarkan ion ferum(II) kepada ion ferum(III)?
- A Magnesium
Magnesium
 - B Potassium iodide solution
Larutan kalium iodida
 - C Potassium dichromate(VI) solution
Larutan kalium dikromat(VI)
 - D Acidified potassium manganate(VII) solution
Larutan berasid kalium manganat(VII)
18. Which of the following is an example of endothermic reaction?
Antara yang berikut, yang manakah contoh bagi tindak balas endotermik?
- A Solid sodium hydroxide dissolve in distilled water
Pepejal natrium hidroksida melarut dalam air suling
 - B Solid ammonium nitrate dissolved in distilled water
Pepejal ammonium nitrat melarut dalam air
 - C Dilute hydrochloric acid added to silver nitrate solution
Asid hidroklorik cair ditambahkan kepada larutan argentum nitrat
 - D Dilute hydrochloric acid added to potassium hydroxide solution
Asid hidroklorik cair ditambahkan kepada kalium hidroksida
19. What is the food additive used to prevent margarine from turning rancid and changing its taste?
Apakah bahan tambah makanan yang digunakan untuk mencegah marjerin daripada menjadi tengit dan berubah rasa?
- A Stabiliser
Penstabil
 - B Flavouring
Perisa
 - C Antioxidant
Antioksida
 - D Preservative

Pengawet

20. Which of the following statements is true about streptomycin?
Pernyataan yang manakah benar mengenai streptomisin?
- A Can kill viruses
Boleh membunuh virus
 - B A type of analgesic
Sejenis analgesik
 - C Obtained from animal cells
Diperoleh daripada sel haiwan
 - D Treat patients with diseases caused by bacteria
Merawat pesakit yang berpenyakit disebabkan oleh bakteria
21. The proton number of element Z is 17. How many valence electrons does element Z have?
Bilangan proton unsur Z adalah 17. Berapakah bilangan elektron valens yang dipunyai oleh unsur Z?
- A 4
 - B 5
 - C 6
 - D 7
22. In an experiment, 24 g of element X react with 32 g sulphur to form a compound. What is the empirical formula of that compound ?
[Relative atomic mass ; X = 6, S = 32]
Dalam satu eksperimen, didapati 24g unsur X bertindakbalas dengan 32g sulfur membentuk sebatian.
Apakah formula empirik sebatian itu?
[Jisim atom relatif ; X = 6, S = 32]
- A XS
 - B X₂S
 - C X₂S₃
 - D X₄S
23. Which of the following contains 1.204×10^{24} atom?
(Avogadro number = 6.02×10^{23})
Antara yang berikut, yang manakah mengandungi 1.204×10^{24} atom?
(Nombor Avogadro = 6.02×10^{23})
- A 1 mol of nitrogen gas
1 mol gas nitrogen
 - B 1 mol of argon
1 mol argon
 - C 1 mol of ammonia
1 mol ammonia
 - D 1 mol of carbon dioksida
1 mol karbon dioksida

- 24 Diagram below shows a Periodic Table with four elements represented by letters A, B, C and D. Which of these elements has an electron arrangement of 2.8?
Rajah di bawah menunjukkan empat unsur yang diwakili oleh A,B,C dan D dalam Jadual Berkala. Antara unsur berikut yang manakah mempunyai susunan elektron 2.8

	1	2		13	14	15	16	17	18
	A							C	B
		D							

- 25 Which of the following atoms has a tendency to donate electrons?
Antara atom yang berikut, yang manakah mempunyai kecenderungan untuk menderma elektron ?
- A Clorine
Klorin
 - B Argon
Argon
 - C Magnesium
Magnesium
 - D Bromine
Bromin

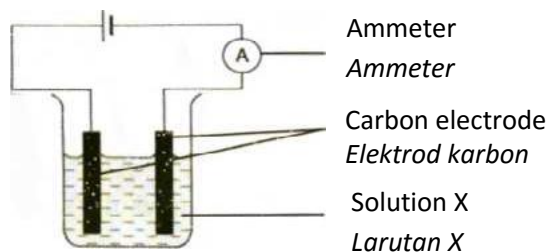
- 26 Table below shows the proton number of several elements.
Jadual di bawah menunjukkan nombor proton bagi beberapa unsur.

Element <i>Unsur</i>	S	T	U	V
Nombor of proton <i>Nombor proton</i>	11	12	14	17

Which of the following pairs of elements react to form an ionic compound?
Antara pasangan unsur-unsur berikut yang manakah bertindak balas membentuk sebatian ionik ?

- I S and V
- II T and V
- III S and U
- IV U and V
- A I and II
- B I and III
- C II and III
- D III and IV

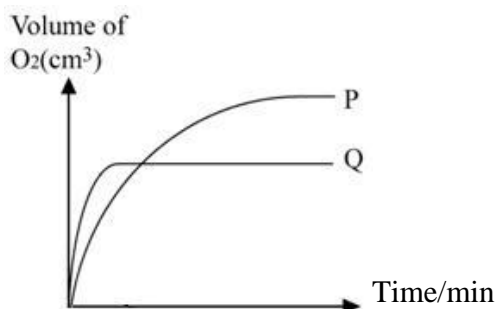
- 27 Diagram below shows the apparatus set up to determine an electrolyte or a non-electrolyte
Rajah di bawah menunjukkan susunan radas untuk menentukan elektrolit atau bukan elektrolit.



- If the ammeter does not show a reading, what is solution X?
Sekiranya ammeter tidak menunjukkan bacaan, apakah larutan X?
- A Ethanoic Acid
Asid etanoik
- B Silver chloride
Argentum klorida
- C Propanone
Propanon
- D Sodium chloride
Natrium klorida
- 28 Which characteristics of hydrogen chloride enables to show acidic properties in water?
Ciri hidrogen klorida yang manakah membolehkannya menunjukkan sifat keasidan dalam air?
- A Ionises in water to form hydrogen ions
Mengion dalam air untuk membentuk ion-ion hidrogen
- B Contains hydrogen in its molecule
Mengandugi hidrogen dalam molekulnya
- C Contains chlorine in its molecule
Mengandungi klorin dalam molekul
- D Dissolve in water and organic solvent
Larut dalam air dan pelarut organik
- 29 Which of the following reactants are used to prepare the soluble salt, magnesium chloride, $MgCl_2$?
Antara yang berikut, yang manakah bahan tindak balas untuk menyediakan garam terlarutkan, magnesium klorida, $MgCl_2$
- A Nitric acid and magnesium
Asid nitrik dan magnesium
- B Phosphoric acid and zinc
Asid fosforik dan zink
- C Sulphuric acid and zinc
Asid sulfurik dan zink
- D Hydrochloric acid and magnesium
Asid hidroklorik dan magnesium

- 30 The rate of catalytic decomposition of 20 cm^3 of 1.0 mol dm^{-3} of hydrogen peroxide is shown in curve Q.

Kadar penguraian bermangkin 20 cm^3 1.0 mol dm^{-3} hidrogen peroksida ditunjukkan sebagai lengkung Q.

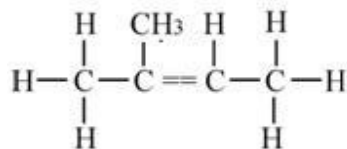


Which of the following changes to the experiment will produce curve P?

Yang mana satukah perubahan terhadap eksperimen berikut yang menghasilkan lengkung P?

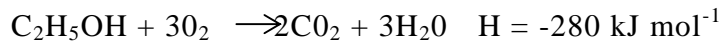
- A** Cool the hydrogen peroxide solution to lower temperature.
Sejukkan larutan hidrogen peroksida ke suhu yang lebih rendah
- B** Repeat the experiment by using 50 cm^3 of 0.5 mol dm^{-3} of hydrogen peroxide solution.
Ulang eksperimen dengan menggunakan 50 cm^3 0.5 mol dm^{-3} larutan hidrogen peroksida
- C** Repeat the experiment by using 20 cm^3 of 1.5 mol dm^{-3} of hydrogen peroxide solution.
Ulang eksperimen dengan menggunakan 20 cm^3 1.5 mol dm^{-3} larutan hidrogen peroksida
- D** Adding more catalyst to the 20 cm^3 of 1.0 mol dm^{-3} of hydrogen peroxide solution.
Tambah lebih banyak mangkin kepada 20 cm^3 1.0 mol dm^{-3} larutan hidrogen peroksida

- 31 Diagram below shows the structural formula of an organic compound. .
Rajah di bawah menunjukkan formula struktur bagi satu sebatian organik



- What is the IUPAC name for this compound?
Apakah nama IUPAC bagi sebatian ini?
- A 2-pentene
2-pentena
- B 2-methyl-but-1-ene
2-metil-but-1-ena
- C 2-methyl-but-2-ene
2-metil-but-2-ena
- D 3-methyl-but-3-ene
3-metil-but-3-ena
- 32 What is the product when ethane burn in excess oxygen?
Apakah bahan yang terhasil apabila etana terbakar dalam oksigen berlebihan?
- A Carbon dioxide and and water
Karbon dioksida dan air
- B Oxygen and carbon monoxide
Oksigen dan karbon monoksida
- C Oxygen and carbon dioxide
Oksigen dan karbon dioksida
- D Hydrogen and water
Hidrogen dan air
- 33 Which of the following is not a redox reaction?
Antara yang berikut, yang manakah bukan tindak balas redoks?
- A $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$
- B $\text{H}_2\text{S} + \text{Cl}_2 \rightarrow \text{S} + 2\text{HCl}$
- C $\text{Zn} + \text{CuSO}_4 \rightarrow \text{Cu} + \text{ZnSO}_4$
- D $\text{H}_2\text{SO}_4 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$

- 34 The following thermochemical equation shows a combustion reaction.
Persamaan termokimia berikut menunjukkan tindak balas pembakaran.



Based on the equation, which statement is correct?

Berdasarkan persamaan itu, pernyataan manakah yang betul?

- A The reaction is endothermic
Tindak balas adalah endotermik
- B The activation energy is 280 kJ mol⁻¹
Tenaga pengaktifan ialah 280 kJ mol⁻¹
- C The temperature of mixture increases
Suhu campuran meningkat
- D The total energy of the reactants is lower than the total energy products
Jumlah tenaga bahan tindak balas adalah lebih rendah daripada hasil balas
- 35 A student discovered that a green apple that was cut into smaller pieces turned brown after 15 minutes. Which of the following substances should be added to prevent the browning of apple?
Seorang pelajar mendapati potongan kecil epal hijau bertukar keperangan setelah dibiarkan selama 15 minit. Antara berikut, bahan yang manakah boleh ditambah untuk mencegah keperangan epal tersebut ?
- A Alcohol
Alkohol
- B Sugar
Gula
- C Lecithine
Lesitin
- D Ascorbic acid
Asid Askorbik
- 36 Substances R has a melting point of -100°C and a boiling point of -35°C.
What is substances R?
Bahan R mempunyai takat lebur -100°C dan takat didih -35°C. Apakah bahan R?
- A Sulphur
Sulfur
- B Alcohol
Alkohol
- C Carbon dioxide
Karbon dioksida
- D Natrium hydroxide
Natrium hidroksida

- 37 A compound with formula X_2CO_3 has a relative formula mass of 138. What is the relative atomic mass of X?

[relative atomic mass of C = 12 and O = 16]

Sebatian yang berformula X_2CO_3 mempunyai jisim formula relatif 138.

Apakah jisim atom relatif bagi X?

[jisim atom relatif bagi C = 12 dan O = 16]

A 11

B 39

C 55

D 78

- 38 3.2g of copper(II) oxide powder is reacted with excess dilute nitric acid.

What is the mass of copper(II) nitrate formed in the reaction?

[Relative atomic mass ; N = 14, O = 16 and Cu = 64]

3.2g serbuk kuprum(II) oksida di tindak balaskan dengan asid nitrik cair

berlebihan. Berapakah jisim kuprum(II) nitrat yang terbentuk dalam tindak balas itu?

[Jisim atom relatif ; N = 14, O = 16 and Cu = 64]

A 3.45g

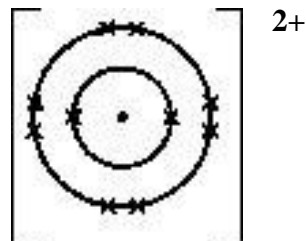
B 4.95g

C 5.04g

D 7.52g

- 39 Diagram below shows the electron arrangement of a X^{2+} ion.

Rajah di bawah menunjukkan susunan elektron bagi ion X^{2+} .



What is the number of electron valence of atom X?

Berapakah bilangan elektron valens bagi atom X?

A 2

B 4

C 6

D 8

- 40 Table below shows information about three simple voltaic cells.
Jadual di bawah menunjukkan maklumat tentang tiga sel voltan ringkas.

Pair of metal <i>Pasangan logam</i>	Potential difference(V) <i>Beza keupayaan(V)</i>	Positive terminal <i>Terminal positif</i>
W and X	0.7	X
X and Y	2.0	Y
W and Z	1.6	Z

What is the potential difference of a voltaic cell which uses Y and Z as electrodes?
Berapakah beza keupayaan sel voltan yang menggunakan Y dan Z sebagai elektrod?

- A 1.3 V
 B 1.1V
 C 0.9V
 D 0.4V
- 41 The equation represents a neutralisation reaction.
Persamaan mewakili satu tindak balas peneutralan



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

10.0 cm³ larutan barium hidroksida 0.1 mol dm⁻³ dititrat 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

- 42 Table below shows fertilisers and their respective relative molecular mass.
Jadual di bawah menunjukkan beberapa baja dan jisim molekul relatif masing-masing.

Fertiliser/ <i>Baja</i>	Relative molecular mass <i>Jisim Molekul relatif</i>
Ammonium sulphate, $(\text{NH}_4)_2\text{SO}_4$ <i>Ammonium sulfat</i>	132
Ammonium nitrate, NH_4NO_3 <i>Ammonium nitrat</i>	80
Potassium nitrate, KNO_3 <i>Kalium nitrat</i>	101
Urea, $\text{CO}(\text{NH}_2)_2$ <i>Urea</i>	60

Which of the following fertilisers contains the highest percentage of nitrogen by mass?
 [Relative atomic mass of N = 14]

Yang manakah antara baja berikut mengandungi peratus nitrogen mengikut jisim yang paling tinggi?

[jisim atom relatif N=14]

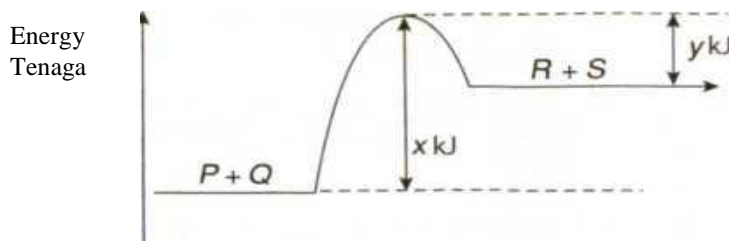
- A Urea
Urea
- B Ammonium nitrate
Ammonium nitrat
- C Potassium nitrate
Kalium nitrat
- D Ammonium sulphate
Ammonium sulfat
- 43 Which pair of solutions produce an insoluble salt?
Pasangan larutan manakah menghasilkan satu garam tak terlarutkan?
- A Nitric acid and silver nitrate solution
Asid nitrik dan larutan argentum nitrat
- B Potassium sulphate and zinc chloride solution
Larutan kalium sulfat dan larutan zink klorida
- C Copper(II) sulphate and lead (II) nitrate solution
Larutan kuprum (II) sulfat dan larutan plumbum (II) nitrat
- D Magnesium nitrate solution and copper(II) chloride solution
Larutan magnesium nitrat dan larutan kuprum (II) klorida

- 44 Diagram below shows meat which is sliced into a small size.
Rajah di bawah menunjukkan daging yang dipotong kecil untuk dimasak



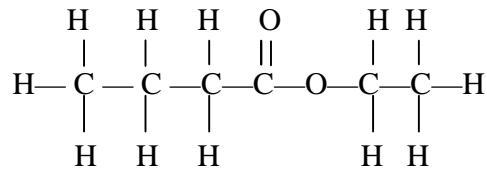
- Based on the collision theory which statements is correct about the meat?
Berdasarkan teori perlanggaran, pernyataan manakah yang betul tentang daging tersebut?
- A The frequency of effective collision between the particles increase
Frekuensi perlanggaran berkesan antara zarah-zarah meningkat
 - B The total surface area of the meat is small
Jumlah luas permukaan daging kecil
 - C Collision between the particles is more frequent
Perlanggaran antara zarah-zarah lebih kerap
 - D Cooking time is longer due to the small size
Masa untuk memasak daging lebih lama

- 45 Diagram below shows the energy profile diagram of a reaction
Rajah di bawah menunjukkan gambar rajah profil tenaga bagi suatu tindakbalas



- Which of the following is true about the diagram?
Antara yang berikut, yang manakah benar tentang gambar rajah tersebut?
- A The reaction is an exothermic reaction
Tindakbalas tersebut ialah tindakbalas eksotermik
 - B The activation energy is x kJ
Tenaga Pengaktifan ialah x kJ
 - C The heat of reaction is + y kJ
Haba tindakbalas ialah + y kJ
 - D The presence of a catalyst increases the value of x
Kehadiran mangkin meningkatkan nilai x

- 46 The diagram below represent the structural formula of a carbon compound
Rajah di bawah mewakili formula struktur bagi sebatian karbon

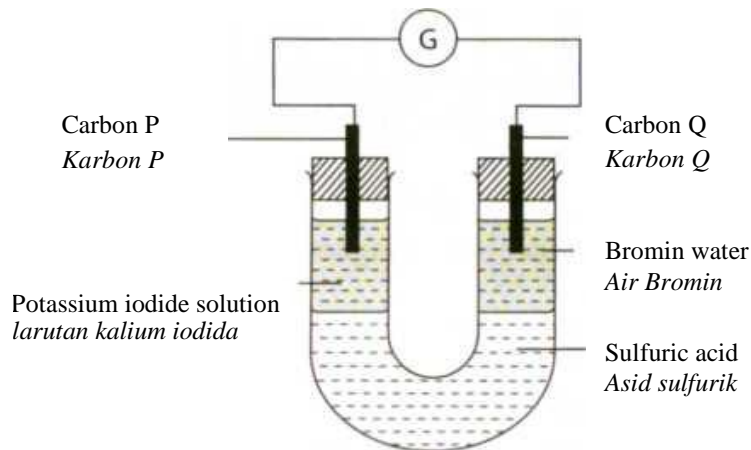


The compound is produced by the reaction between
Sebatian ini terhasil daripada tindak balas antara

- A Ethanol with propanoic acid
 Etanol dengan asid propanoik
- B Ethanol with butanoic acid
 Etanol dengan asid butanoik
- C Propanol with ethanoic acid
 Propanol dengan asid etanoik
- D Butanol with ethanoic acid
 Butanol dengan asid etanoik
- 47 Which of the following is the correct match of oxidation number of manganese with its corresponding compound?
Antara berikut yang manakah nombor pengoksidaan mangan, Mn yang sepadan dengan sebatianannya?

	KMnO ₄	MnO ₂	Mn ₂ O ₃
A	+7	+2	+3
B	+3	+4	+2
C	+7	+4	+3
D	+4	+2	+6

- 48 Diagram below shows the apparatus arrangement to investigate the oxidation and reduction in terms of the transfer of electron at a distance.
Rajah di bawah menunjukkan susunan radas bagi mengkaji pengoksidaan dan penurunan berdasarkan pemindahan elektron pada satu jarak.

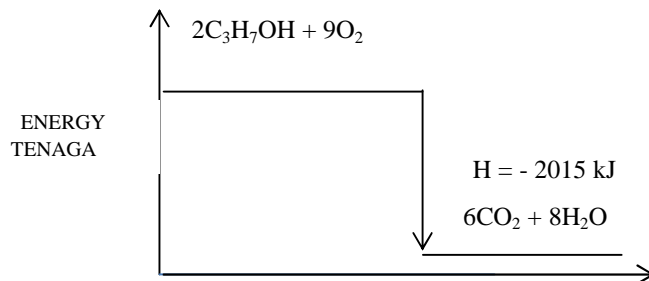


What is the change in oxidation number for bromine and iodine in the reaction
Apakah perubahan nombor pengoksidaan bagi bromin dan iodin dalam tindak balas itu?

	Iodine/Iodin	Bromine/Bromin
A	-1 → 0	0 → -1
B	0 → -1	-1 → 0
C	-2 → 0	0 → 2
D	Tiada perubahan	Tiada perubahan

- 49 The reaction between 25 cm^3 0.5 mol dm^{-3} copper (II) sulphate solution with Excess zinc powder release heat 2626 J
Tindakbalas antara 25 cm^3 0.5 mol dm^{-3} larutan kuprum (II) sulfat, CuSO_4 dengan serbuk zink berlebihan membebaskan 2625 J haba
 Calculate the temperature change
Hitungkan perubahan suhu larutan campuran tersebut
[muatan haba tentu larutan = $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$, ketumpatan larutan = 1 g cm^{-3}]
- A 10 $^\circ\text{C}$
 B 15 $^\circ\text{C}$
 C 20 $^\circ\text{C}$
 D 25 $^\circ\text{C}$

- 50 Diagram below shows an energy level diagram for the combustion of propanol
Rajah di bawah menunjukkan aras tenaga untuk tindakbalas pembakaran propanol.



What is the heat released when 6 g of propanol is burnt?

[Relative atomic mass : C = 12, H = 1 , O = 16]

Berapakah haba yang dibebaskan apabila 6 g propanol dibakar?

[Jisim atom relatif : C =12, H = 1, O = 16]

- A 100.75 kJ
- B 1007.50 kJ
- C 201.50 kJ
- D 20150 kJ

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **50** questions.
Kertas soalan ini mengandungi 50 soalan.
2. Answer **all** questions.
*Jawab **semua** soalan.*
3. Each question is followed by four alternative answers, **A,B,C** and **D**.
For each question, choose one answer only. Blacken your answer on the objective answer sheet provided.
*Tiap-tiap soalan diikuti oleh empat pilihan jawapan. iaitu **A,B,C** dan **D**. Bagi setiap soalan, pilih satu jawapan sahaja. Hitamkan jawapan anda pada kertas jawapan objektif yang disediakan.*
4. If you wish to change your answer, erase the blackened mark that you have made. Then blacken the new answer.
Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.
6. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
7. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

Nama: Tingkatan:

SULIT
4541/2
Chemistry
Paper 2
Ogos
2016
 2 ½ jam

MODUL KECEMERLANGAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2016

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

CHEMISTRY

Paper 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Tuliskan nama dan tingkatan pada ruang yang disediakan.
2. Jawab **semua** soalan daripada **Bahagian A**. Tuliskan jawapan anda dalam ruang yang disediakan
3. Jawab **satu** soalan daripada **Bahagian B** dan **satu** soalan daripada **Bahagian C**. Jawapan kepada **bahagian B** dan **Bahagian C** hendaklah ditulis pada kertas tulis.
4. Anda diminta menjawab dengan lebih terperinci untuk Bahagian B dan Bahagian C. Jawapan mestilah jelas dan logik. Persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.
5. Anda hendaklah menyerahkan kertas tulis dan kertas tambahan, jika digunakan bersama-sama dengan kertas soalan.
6. Penggunaan kalkulator saintifik yang tidak boleh diprogramkan adalah dibenarkan.

Bahagian	Soalan	Markah penuh	Markah diperolehi
A	1	09	
	2	09	
	3	10	
	4	10	
	5	11	
	6	11	
B	7	20	
	8	20	
C	9	20	
	10	20	
Jumlah			

Kertas soalan ini mengandungi **28** halaman bercetak

[lihat halaman sebelah]

Section A
Bahagian A

(60 marks)
[60 markah]

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

Answer **all** question from this section.

Jawab **semua** soalan daripada bahagian ini.

1. Diagram 1.1 shows Pn Aminah is frying chicken in the kitchen while Ali and his father are at the living room.

Rajah 1.1 menunjukkan Pn Aminah sedang menggoreng ayam di dapur, manakala Ali dan ayahnya berada di ruang tamu.

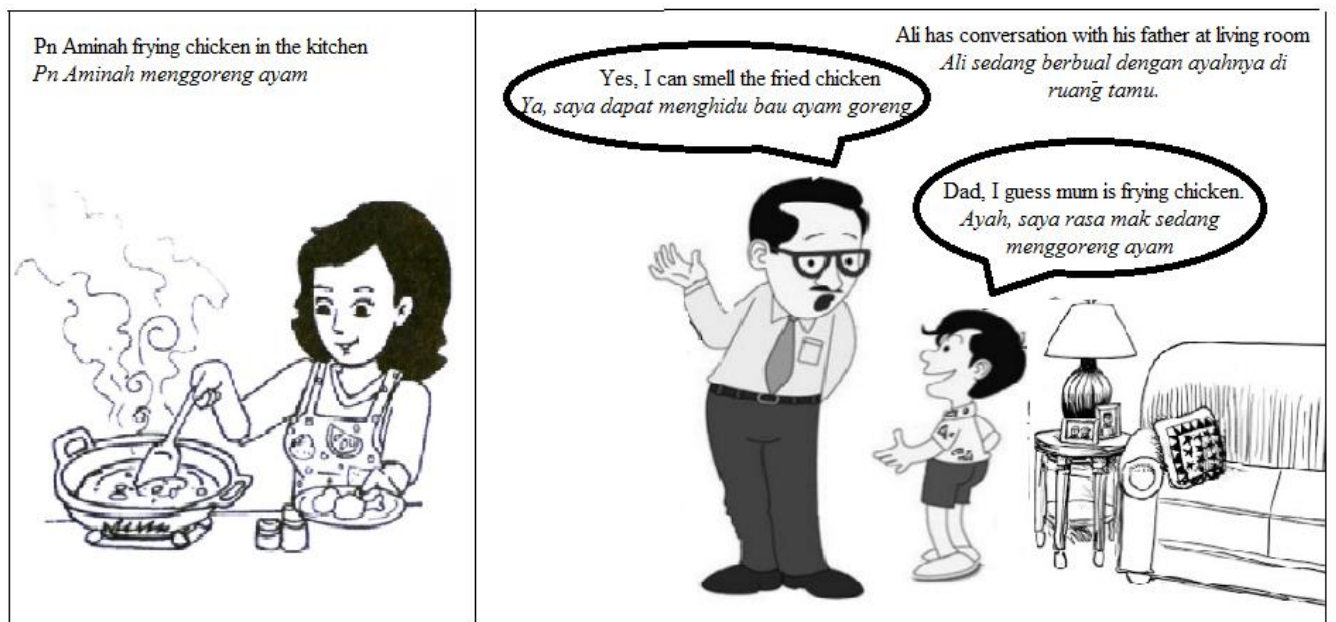


Diagram 1.1

Rajah 1.1

- (a) (i) The smell of fried chicken spreads to the living room. Name the process that occurred.

Bau ayam goreng merebak hingga ke ruang tamu. Namakan proses yang berlaku

.....

[1 mark]

[1 markah]

- (ii) Explain your answer in a(i) by using kinetic theory of matter.
Terangkan jawapan anda di a(i) dengan menggunakan teori kinetik jirim.

.....

.....

.....

.....

[3 marks]
[3 markah]

- (b) Diagram 1.2 shows the heating curve for solid naphthalene.
Rajah 1.2 menunjukkan lengkung pemanasan bagi pepejal naftalena.

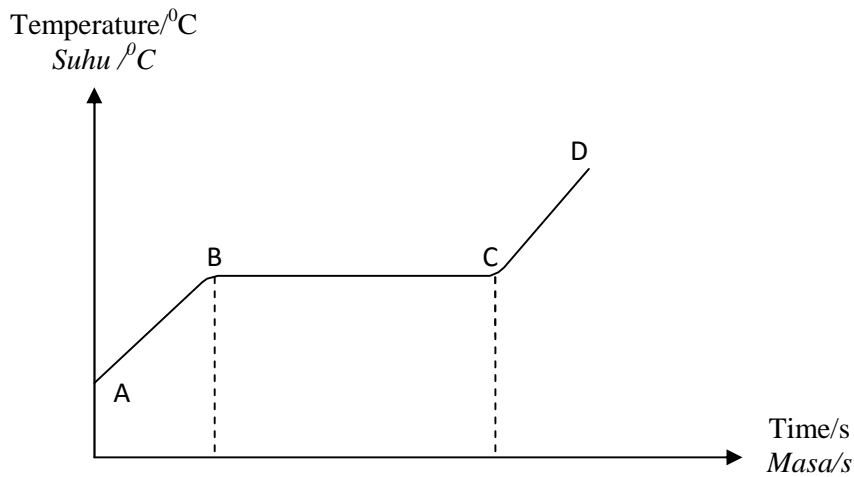


Diagram 1.2
Rajah 1.2

- (i) On the graph above, show and label the melting point of naphthalene.
Pada graf di atas, tunjuk dan labelkan takat lebur naftalena.

[1 mark]
[1 markah]

- (ii) Draw the arrangement of particles of naphthalene at AB and CD.
Lukis susunan zarah naftalena pada AB dan CD.



AB



CD

[2 marks]
[2 marks]

(iii) Explain why the temperature remains constant from B to C.

Terangkan mengapa suhu tidak berubah dari B ke C.

.....

[2 marks]

[2 marks]

2. Diagram 2 shows the apparatus set-up to determine the empirical formula of copper(II) oxide.

Rajah 2 menunjukkan susunan radas untuk menentukan formula empirik kuprum(II) oksida.

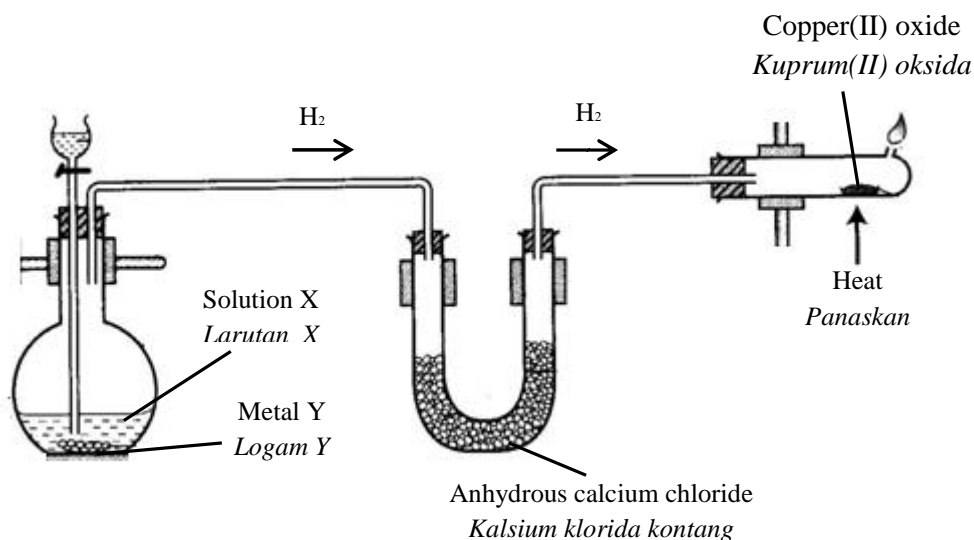


Diagram 2
Rajah 2

(a) State the meaning of empirical formula.
Nyatakan maksud formula empirik.

.....

[1 mark]
 [1 markah]

(b) Solution X and metal Y reacts to produce hydrogen gas.
 State the name of solution X and metal Y.
*Larutan X dan logam Y bertindak balas menghasilkan gas hidrogen.
 Nyatakan nama bagi larutan X dan logam Y.*

Solution X :

Metal Y :

[2 marks]
 [2 markah]

- (c) What is the function of anhydrous calcium chloride?

Apakah fungsi kalsium klorida kontang?

.....

[1 mark]
[1 markah]

- (d) (i) State the empirical formula of copper(II) oxide

Nyatakan formula empirik bagi kuprum(II) oksida.

.....

[1 mark]
[1 markah]

- (ii) Write a balanced chemical equation for the reaction between hydrogen gas and copper(II) oxide

Tuliskan persamaan seimbang bagi tindak balas antara gas hidrogen dan kuprum(II) oksida

.....

[1 mark]
[1 markah]

- (e) How to ensure that all of the copper(II) oxide has been reduced to copper?

Bagaimana untuk memastikan semua kuprum(II) oksida telah diturunkan kepada kuprum?

.....

[1 mark]
[1 markah]

- (f) Can the empirical formula for aluminium oxide be determine by using this method?

Give **one** reason for your answer.

Bolehkan formula empirik bagi aluminium oksida ditentukan dengan menggunakan kaedah ini?

*Berikan **satu** alasan bagi jawapan anda.*

.....

.....

[2 marks]
[2 markah]

3. Diagram 3 shows some of the elements in the periodic table of elements.
Rajah 3 menunjukkan sebahagian unsur-unsur kala 3 dalam Jadual Berkala Unsur.

Na	Mg											Al				Cl	Ar

Diagram 3
Rajah 3

- (a) Based on Diagram 3, answer the following question.

Berdasarkan Rajah 3, jawab soalan berikut:

- (i) State group of Cl in the Periodic Table of Elements.

Nyatakan kumpulan bagi unsur Cl dalam Jadual Berkala Unsur.

.....

[1 mark]

[1 markah]

- (ii) State which element that exists as a metal

Nyatakan unsur manakah yang wujud sebagai logam.

.....

[1 mark]

[1 markah]

- (b) (i) State which element formed an amphoteric oxide.

Nyatakan unsur manakah yang membentuk oksida amfoterik

.....

[1 mark]

[1 markah]

- (ii) Based on answer in (b)(i), write the formula for the compound formed.

Berdasarkan jawapan di (b)(i), tuliskan formula bagi sebatian yang terbentuk.

.....

[1 mark]

[1 markah]

- (c) Element Mg and Cl can react to form a compound.
Unsur Mg dan Cl boleh bertindak balas membentuk satu sebatian.

- (i) Write the chemical formula of the compound formed.
Tuliskan formula kimia bagi sebatian yang terbentuk.

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

- (ii) Explain how the compound in (c)(i) formed.
Terangkan bagaimana pembentukan sebatian (c)(i) terhasil.

Mg =

Cl =

[2 marks]
[2 markah]

- (iii) Draw the electron arrangement for the compound formed.
Lukis susunan elektron bagi sebatian yang terbentuk

[2 marks]
[2 markah]

- (iv) State one physical property of these compounds.
Nyatakan satu sifat fizik sebatian ini.

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

4. (a) Diagram 4.1 shows the pH value of hydrochloric acid and acid X of the same molarity.

Rajah 4.1 menunjukkan nilai pH bagi asid hidroklorik dan asid X yang mempunyai kemolaran yang sama.

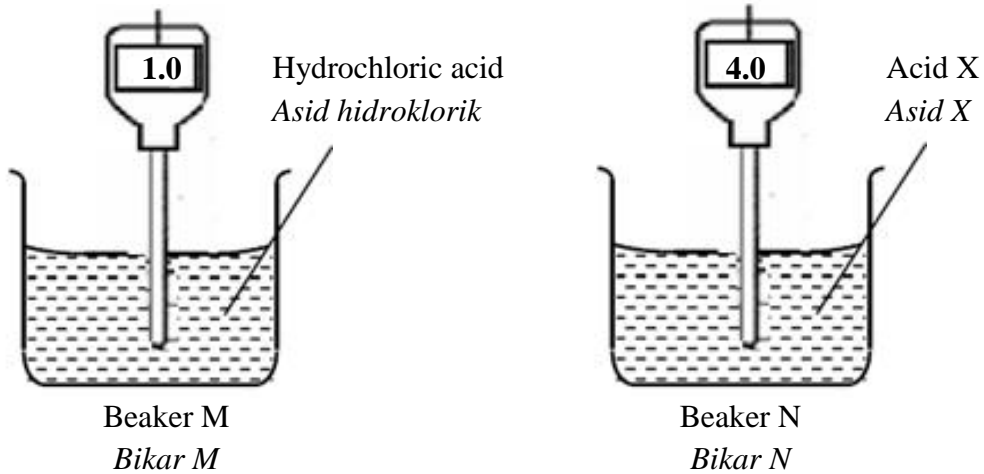


Diagram 4.1
Rajah 4.1

- (i) Based on the information in Diagram 4.1, suggest acid X.
Berdasarkan maklumat dalam Rajah 4.1, cadangkan asid X.

.....
[1 mark]
[1 marks]

- (ii) Explain why the pH value of aqueous solution of acid X is higher than the pH value of hydrochloric acid
Jelaskan mengapa nilai pH larutan akueus asid X lebih tinggi berbanding nilai pH asid hidroklorik.

.....
.....
[2 marks]
[2 markah]

- (iii) When water is added into beaker M, what happen to the pH value of the hydrochloric acid? Give reason to your answer.

Apabila air ditambahkan ke dalam bikar M, apakah yang akan terjadi pada nilai pH asid hidroklorik? Berikan alasan anda.

.....

[2 marks]

[2 markah]

- (b) Diagram 4.2 shows the steps involved in the preparation of a standard solution X.
Rajah 4.2 menunjukkan langkah-langkah yang terlibat dalam penyediaan larutan piawai X.

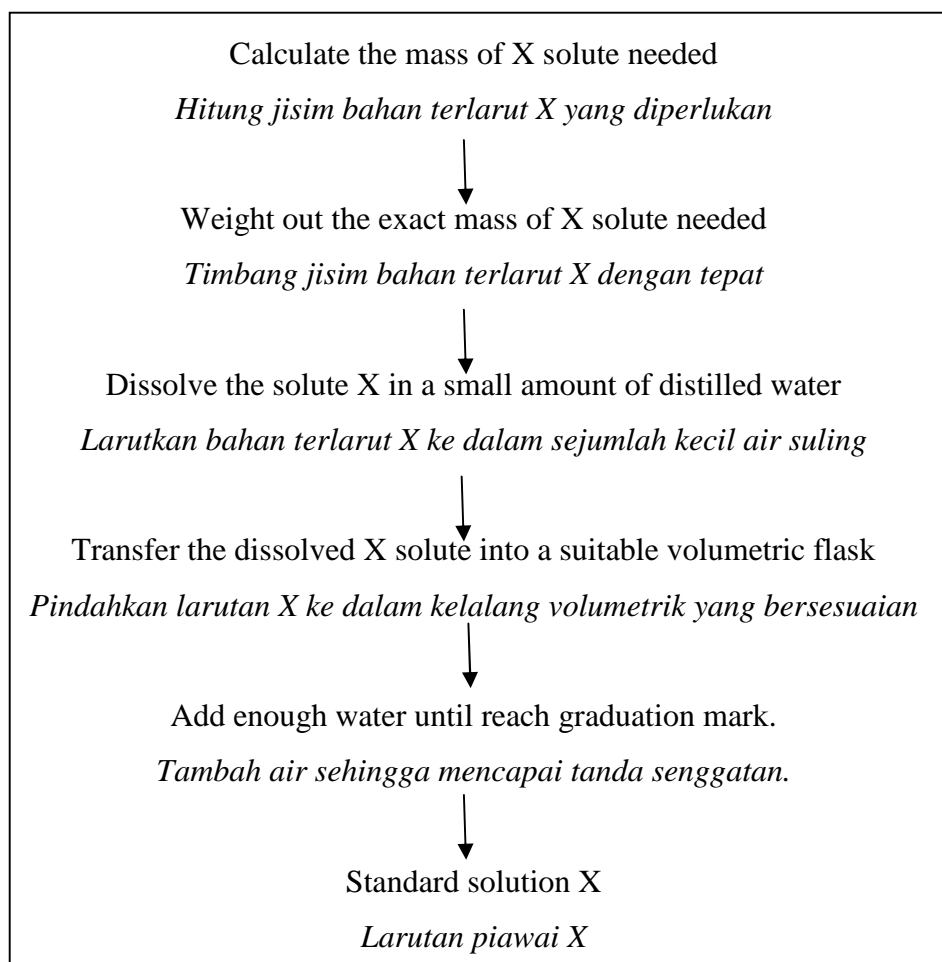


Diagram 4.2

Rajah 4.2

- (i) State the meaning of standard solution
Nyatakan maksud larutan piawai.

.....

[1 mark]

[1 markah]

- (ii) The concentration of standard solution X produced is 1.0 mol dm^{-3} . By using the standard solution produced, Nazmi need to prepare solution X with a lower concentration. Name the method used to prepare a solution with lower concentration.

Kepekatan larutan piawai X yang terhasil adalah 1.0 mol dm^{-3} . Dengan menggunakan larutan piawai yang dihasilkan, Nazmi perlu menyediakan larutan X dengan kepekatan yang lebih rendah. Namakan kaedah yang perlu digunakan untuk menyediakan larutan dengan kepekatan yang lebih rendah.

.....

[1 mark]

[1 markah]

- (iii) A volumetric flask is more suitable to be used to prepare standard solution rather than a beaker. Why?

Kelalang volumetric lebih sesuai digunakan untuk menyediakan larutan piawai berbanding bikar. Mengapa?

.....

.....

[1 mark]

[1 marks]

- (iv) Calculate the volume of 2.0 mol dm^{-3} sulphuric acid, H_2SO_4 needed to prepare 100 cm^3 of 1.0 mol dm^{-3} sulphuric acid, H_2SO_4 .

Hitung isipadu 2.0 mol dm^{-3} asid sulfurik, H_2SO_4 yang diperlukan untuk menyediakan 100 cm^3 1.0 mol dm^{-3} asid sulfurik, H_2SO_4 .

[2 marks]

[2 markah]

5. Diagram 5 shows a flowchart for the formation of precipitate V and solution W.
Rajah 5 menunjukkan carta alir bagi penghasilan mendakan V dan larutan W.

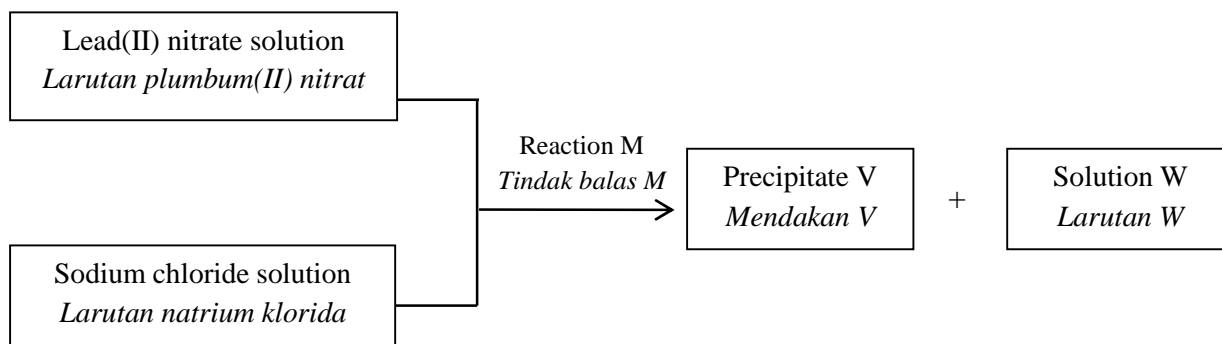


Diagram 5
Rajah 5

- (a) Identify precipitate V and solution W.
Kenal pasti mendakan V dan larutan W.

Precipitate V :.....
Mendakan V

Solution W :.....
Larutan W

[2 marks]

[2 markah]

- (b) (i) State the name of reaction M.
Nyatakan nama bagi tindak balas M.

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

- (ii) Write the chemical equation for reaction M.
Tuliskan persamaan kimia bagi tindak balas M.

.....
 [2 marks]
 [2 markah]

- (c) Calculate the mass of precipitate V formed in the reaction if 50 cm³ of 1.0 mol dm⁻³ lead (II) nitrate solution is used.

[Relative atomic mass : Cl=35 ; Pb=207]

Hitungkan jisim mendakan V yang terbentuk di dalam tindak balas itu jika 50 cm³ larutan plumbum (II) nitrat 1.0 mol dm⁻³ digunakan.

[Jisim atom relatif Cl=35; Pb=207]

[2 marks]

[2 markah]

- (d) Describe briefly chemical test to verify the anion in solution W.

Huraikan secara ringkas ujian kimia untuk menentusah anion dalam larutan W.

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

[3 marks]

[3 markah]

- (e) If sodium chloride solution is replaced with potassium chloride solution of the same volume and concentration, predict the mass of the precipitate formed.

Jika larutan natrium klorida digantikan dengan larutan kalium klorida yang sama isipadu dan kepekataannya ramalkan jisim mendakan terbentuk.

.....

[1 mark]

[1 markah]

6. Diagram 6 shows the flow chart for the conversion of carbon compound.

Rajah 6 menunjukkan carta alir bagi penukaran sebatian karbon.

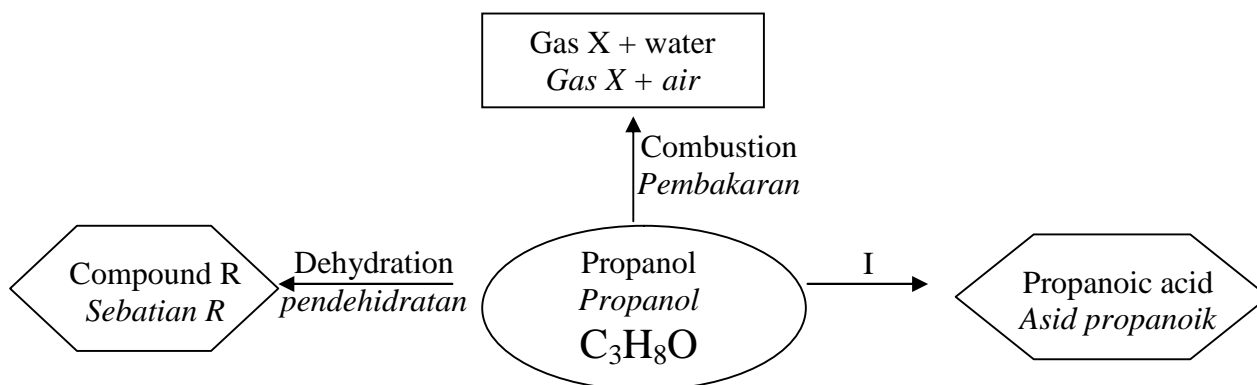


Diagram 6

Rajah 6

Based on Diagram 6,

Berdasarkan Rajah 6,

(a) State the name of gas X.

Nyatakan nama gas X.

.....

[1 mark]

[1 markah]

(b) (i) State the functional group of propanol

Nyatakan kumpulan berfungsi bagi propanol.

.....

[1 mark]

[1 markah]

(ii) Draw the structural formula for isomers of propanol

Lukis formula struktur untuk isomer-isomer bagi propanol.

[2 marks]

[2 markah]

- (c) (i) State the process at I
Nyatakan proses di I

.....

[1 mark]

[1 markah]

- (ii) What is the substance that needs to be added in process I to produce propanoic acid?
Apakah bahan yang perlu ditambahkan dalam proses I untuk menghasilkan asid propanoik?

.....

[1 mark]

[1 markah]

- (d) (i) State the name of compound R
Nyatakan nama bagi sebatian R

.....

[1 mark]

[1 markah]

- (ii) Draw a labelled diagram how the dehydration reaction can be carried out in the laboratory.
Lukis rajah berlabel bagaimana tindak balas pendehidratatan boleh dijalankan dalam makmal.

[2 marks]

[2 markah]

- (e) Aliya mother sells pineapple cookies for last Eid. Aliya want to expand her mother business. The problem faced by Aliya is the pineapple is not enough. Aliya thought of using pineapple flavors to produce pineapple cookies. The chemical flavor formula for pineapple is $C_3H_7COOC_2H_5$. Can you help Aliya to name two carbon compounds that can be used to produce pineapple flavor?

Emak Aliya menjual biskut nanas untuk sambutan hari raya yang lepas. Aliya ingin mengembangkan perniagaan emaknya. Masalah yang dihadapi oleh Aliya ialah nanas tidak mencukupi. Aliya terfikir untuk menggunakan perisa nanas untuk menghasilkan biskut nanas. Formula kimia bagi perisa nanas adalah $C_3H_7COOC_2H_5$. Bolehkah anda membantu Aliya untuk menamakan dua sebatian karbon yang digunakan untuk menghasilkan perisa nanas?

.....
[2 marks]

[2 markah]

Section B
Bahagian B

[20 marks]
[20 markah]

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

Answer any **one** question.

*Jawab mana-mana **satu** soalan*

7. (a) Diagram 7.1 shows a few types of materials made up of polymers.
Rajah 7.1 menunjukkan beberapa jenis bahan yang diperbuat daripada polimer.

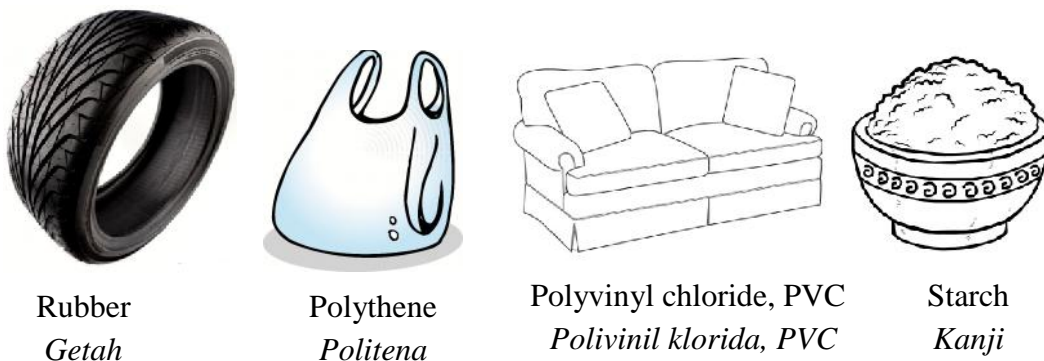


Diagram 7.1
Rajah 7.1

- (i) Classify the polymers shown in Diagram 7.1 into natural polymers and synthetic polymers.
Kelaskan polimer-polimer yang ditunjukkan dalam Rajah 7.1 kepada polimer semula jadi dan polimer sintetik.

[4 marks]

[4 markah]

- (ii) Draw and state the name for monomer of rubber.
Lukis dan nyatakan nama bagi monomer getah.

[2 mark]

[2 markah]

- (b) Latex can be extracted from rubber tree for the uses in various rubber productions.
Lateks boleh diekstrak daripada pokok getah untuk digunakan dalam pembuatan pelbagai barangan getah.
- (i) Diagram 7.2 shows the latex become soft solid after a rubber tapper left the liquid latex in the cup for a few days.
Explain why this situation occurs.
*Rajah 7.2 menunjukkan lateks berubah menjadi pepejal lembut selepas seorang penoreh getah membiarkan cecair lateks di dalam cawan untuk beberapa hari.
Terangkan mengapa situasi ini berlaku.*



Diagram 7.2

Rajah 7.2

[4 marks]
[4 markah]

- (ii) Diagram 7.3 shows the effect of ethanoic acid and ammonia solution on the coagulation of latex.

Rajah 7.3 menunjukkan kesan asid etanoik dan ammonia terhadap penggumpalan lateks.

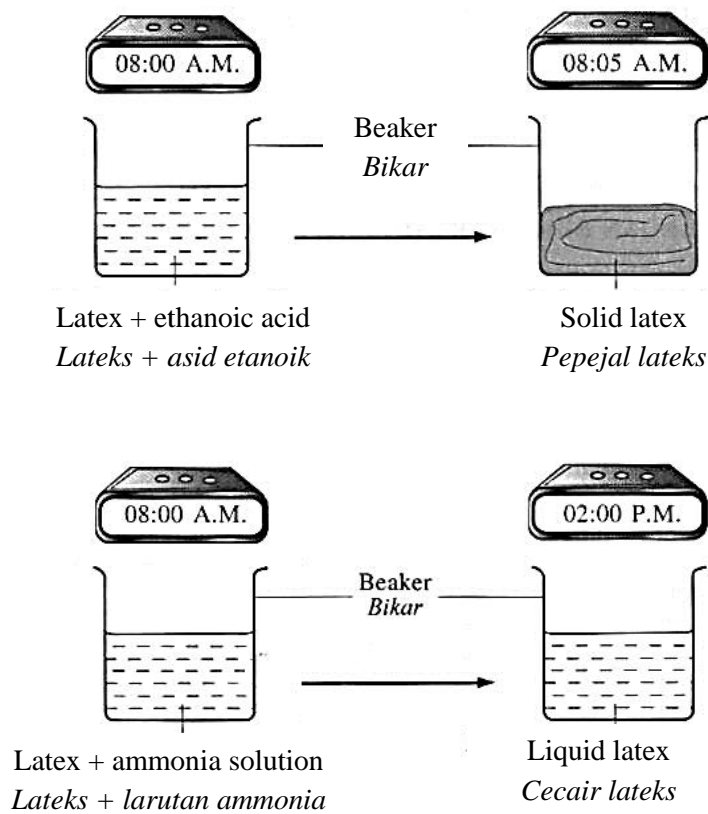


Diagram 7.3

Rajah 7.3

Explain why there is a difference in the observation.

Terangkan mengapa terdapat perbezaan pada pemerhatian itu.

[5 marks]

[5 markah]

- (c) Diagram 7.4 shows how compound Z is produced.
Rajah 7.4 menunjukkan bagaimana sebatian Z dihasilkan.

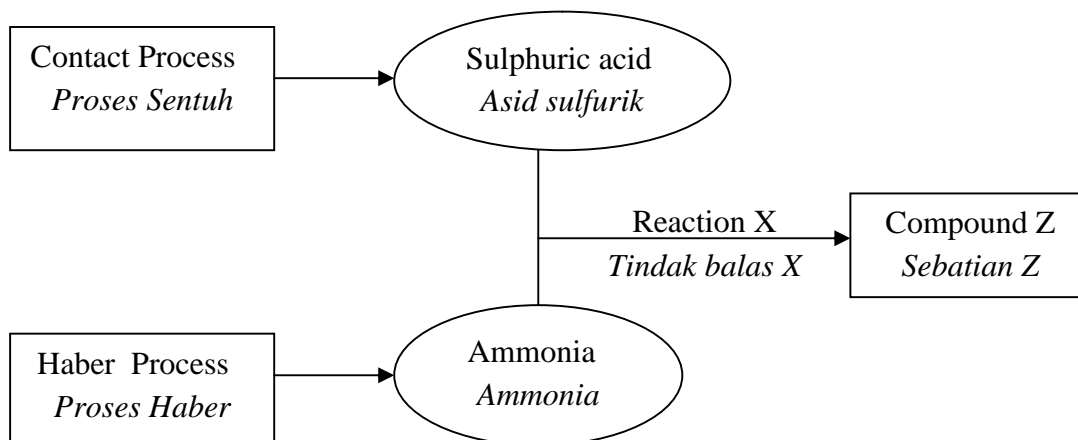


Diagram 7.4
Rajah 7.4

- (i) Compound Z produced from Reaction X is used to manufacture fertiliser. Identify compound Z and reaction X.
Sebatian Z yang dihasilkan daripada Tindak balas X digunakan untuk menghasilkan baja.

Kenal pasti sebatian Z dan tindak balas X.

[2 marks]

[2 markah]

- (ii) Calculate the mass of compound Z produced when an excess of ammonia gas is passed through 100 cm³ of 2.0 mol dm⁻³ sulphuric acid.

[Molar mass of compound Z = 132 g mol⁻¹]

Hitung jisim sebatian Z yang dihasilkan apabila gas ammonia berlebihan dialirkan ke dalam 100 cm³ asid sulfurik 2.0 mol dm⁻³.

[Jisim molar sebatian Z = 132 g mol⁻¹]

[3 marks]

[3 markah]

8. (a) Table 8 shows the heat of neutralisation of two different acids with sodium hydroxide solution.

Jadual 8 menunjukkan haba peneutralan bagi dua jenis asid berlainan dengan larutan natrium hidroksida.

Experiment <i>Eksperimen</i>	Reactants <i>Bahan tindak balas</i>	Heat of neutralisation (kJmol^{-1}) <i>Haba peneutralan (kJmol^{-1})</i>
I	50 cm ³ of 1.0 mol dm ⁻³ sodium hydroxide solution + 50 cm ³ of 1.0 mol dm ⁻³ hydrochloric acid <i>50 cm³ larutan natrium hidroksida 1.0 mol dm³ + 50cm³ asid hidroklorik 1.0 mol dm⁻³</i>	-57.0
II	50 cm ³ 1.0 mol dm ⁻³ sodium hydroxide solution + 50 cm ³ of 1.0 mol dm ⁻³ ethanoic acid <i>50 cm³ larutan natrium hidroksida 1.0 mol dm³ + 50cm³ asid etanoik 1.0 mol dm⁻³</i>	-55.0

Table 8
Jadual 8

- (i) State the meaning of heat of neutralisation in the experiment.
Nyatakan maksud haba peneutralan dalam eksperimen itu.

[1 marks]

[1 markah]

- (ii) Write the thermochemical equation for the reaction in Experiment I.
Tuliskan persamaan termokimia bagi tindak balas dalam eksperimen I.

[2 marks]

[2 markah]

- (iii) Explain why there is a difference in the values of the heat of neutralisation in Experiment I and Experiment II.

Terangkan mengapa terdapat perbezaan dalam nilai haba peneutralan dalam Eksperimen I dan Eksperimen II.

[4 marks]

[4 markah]

- (b) In another experiment, 50 cm^3 of 2 mol dm^{-3} hydrochloric acid is added to 50 cm^3 of 2 mol dm^{-3} ammonia solution in a plastic cup. The temperature increases from 29.0 to $35.5 \text{ }^\circ\text{C}$.

[Specific heat capacity of solution: $4.2 \text{ Jg}^{-1} \text{ }^\circ\text{C}^{-1}$. Density of solution: 1 g cm^{-3}]

Dalam satu eksperimen lain, 50 cm^3 asid hidroklorik 2 mol dm^{-3} ditambahkan kepada 50 cm^3 larutan ammonia 2 mol dm^{-3} di dalam cawan plastik. Suhu meningkat daripada 29.0 kepada $35.5 \text{ }^\circ\text{C}$.

[Muatan haba tentu larutan: $4.2 \text{ Jg}^{-1} \text{ }^\circ\text{C}^{-1}$. Ketumpatan larutan: 1 g cm^{-3}]

- (i) State why plastic cup is used in the experiment.

Nyatakan mengapa cawan plastik digunakan dalam eksperimen ini.

[1 mark]

[1 markah]

- (ii) Calculate the heat of neutralisation.

Hitung haba peneutralan.

[5 marks]

[5 markah]

- (iii) If the hydrochloric acid is replaced by nitric acid, predict the value of heat of neutralisation. Explain your answer.

Jika asid hidroklorik digantikan kepada asid nitrik, ramalkan nilai haba peneutralannya. Terangkan jawapan anda.

[2 marks]

[2 markah]

- (c) Diagram 8 shows the energy level diagram for the neutralisation reaction between sodium hydroxide and dilute hydrochloric acid.

Rajah 8 menunjukkan gambar rajah aras tenaga bagi tindak balas peneutralan antara natrium hidroksida dan asid hidroklorik .

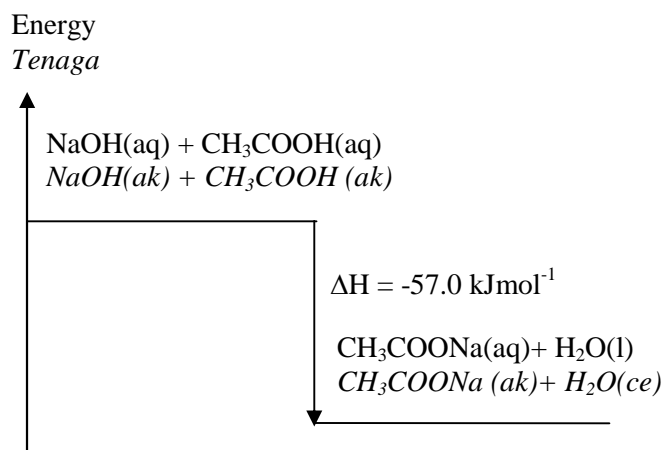


Diagram 8

Rajah 8

Based on Diagram 8, describe the energy level diagram for the neutralisation reaction.

Berdasarkan Rajah 8, huraikan gambar rajah aras tenaga bagi tindak balas peneutralan itu.

[5 marks]

[5 markah]

Section C
Bahagian C

[20 marks]

[20 markah]

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

Answer any **one** question.

Jawab mana-mana **sat**u soalan

9. (a) A student carried out two sets of experiment to determine the factors that affect the rate of reaction between marble chips and hydrochloric acid. Time taken to collect carbon dioxide gas in each experiment is recorded in Table 9.

Seorang pelajar menjalankan dua set eksperimen untuk mengkaji faktor yang mempengaruhi kadar tindak balas antara ketulan marmar dan asid hidroklorik.

Masa yang diambil untuk mengumpul gas karbon dioksida dalam setiap eksperimen dicatatkan dalam Jadual 9.

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 2.0 mol dm ⁻³ hydrochloric acid + marble chips 40 cm ³ asid hidroklorik 2.0 mol dm ⁻³ + ketulan marmar	30	60
II	40 cm ³ of 2.0 mol dm ⁻³ hydrochloric acid + marble chips 40 cm ³ asid hidroklorik 2.0 mol dm ⁻³ + ketulan marmar	50	20

Table 9
Jadual 9

Based on the information in Table 9,

Berdasarkan maklumat dalam Jadual 9,

- (i) Write a chemical equation for the reaction and calculate the maximum volume of carbon dioxide gas released.

[Molar volume of gas at room conditions is 24 dm³ mol⁻¹]

Tulis persamaan kimia bagi tindak balas itu dan hitung isi padu maksimum gas karbon dioksida yang terbebas.

[Isi padu molar gas pada keadaan bilik ialah 24 dm³ mol⁻¹]

[5 marks]
[5 markah]

- (ii) By using the collision theory, compare the rate of reaction between Experiment I and Experiment II.

Dengan menggunakan teori perlanggaran, bandingkan kadar tindak balas antara Eksperimen I dan Eksperimen II.

[4 marks]

[4 markah]

(b)

The addition of vanadium(V) oxide in Harber Process speed up the reaction

Penambahan vanadium(V) oksida dalam Proses Harber mempercepatkan tindak balas

Using **one suitable catalyst**, describe an experiment to show how this factor affect the rate of reaction between zinc metal and a named acid.

Menggunakan satu mangkin yang sesuai, huraikan satu eksperimen untuk menunjukkan bagaimana faktor ini mempengaruhi kadar tindak balas antara logam zink dan satu asid yang dinamakan.

Apart from temperature and catalyst, state **one** other factor that will also affect the rate of reaction in this experiment

Selain daripada suhu dan mangkin, nyatakan satu faktor lain yang juga boleh mempengaruhi kadar tindak balas.

[11 marks]

[11 markah]

10. (a) Diagram 10 shows a conversation between two housewives.

Rajah 10 menunjukkan perbualan antara dua surirumah

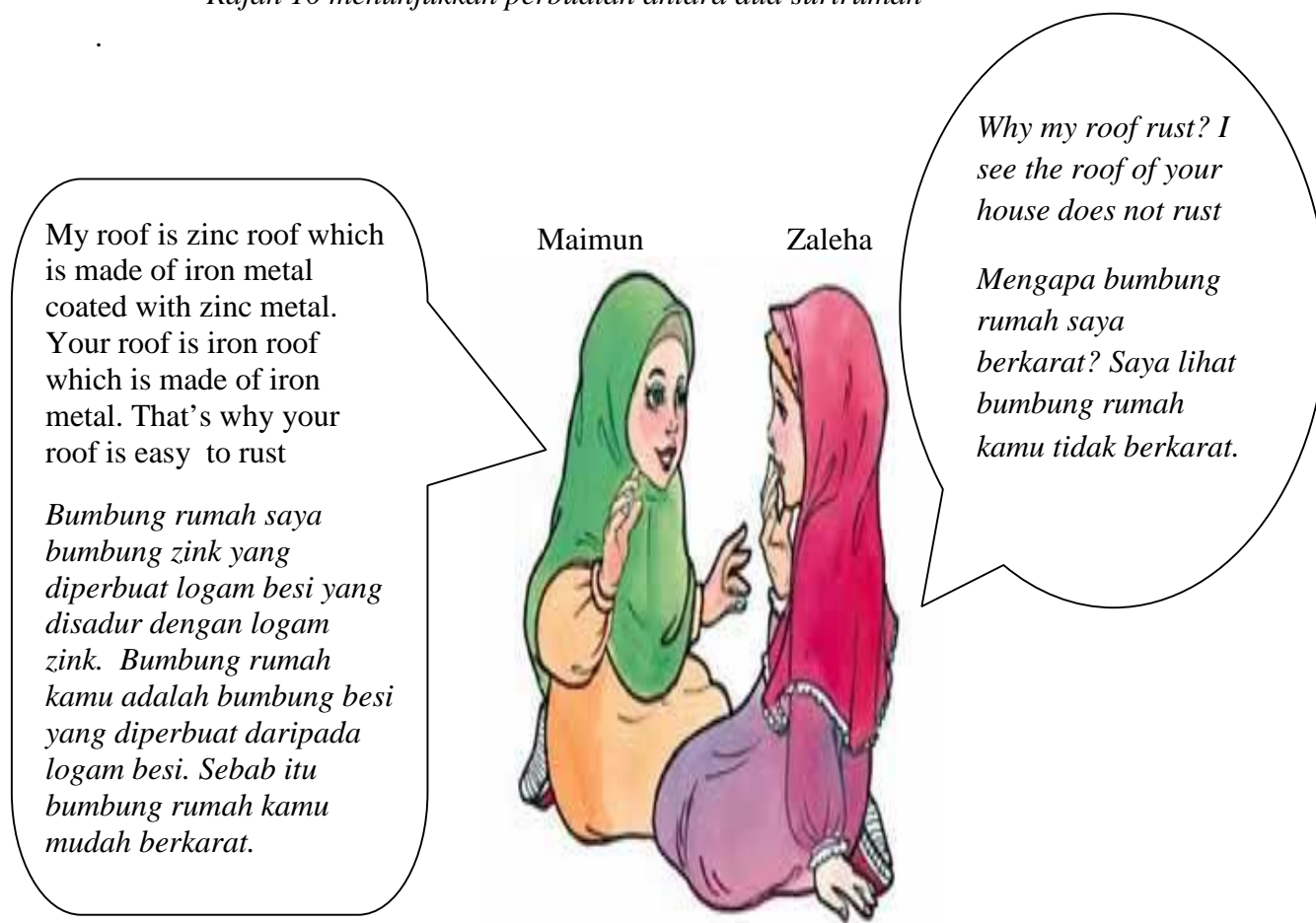


Diagram 10
Rajah 10

Based on the dialogue in Diagram 10, explain why the roof of Maimun's house does not rust.

Berdasarkan dialog dalam Rajah 10, terangkan mengapa atap rumah Maimun tidak berkarat.

[4 marks]

[4 markah]

(b)

Metal displacement is a redox reaction
Penyesaran logam adalah suatu tindak balas redoks

Based on the above statement, by using a suitable example of chemical equation, explain redox reaction in terms of change in oxidation number.

Berdasarkan pernyataan di atas, dengan menggunakan satu contoh persamaan kimia yang sesuai, terangkan tindak balas redoks dari segi nombor pengoksidaan.

[6marks]

[6 markah]

- (c) Table 10 shows a list of apparatus and materials.
Jadual 10 menunjukkan senarai alat radas dan bahan

Apparatus and Materials <i>Radas dan Bahan</i>	
<ul style="list-style-type: none"> • U-tube <i>Tiub U</i> • Carbon electrodes <i>Elektrod karbon</i> • Connecting wires <i>Wayar penyambung</i> • Galvanometer <i>Galvanometer</i> 	<ul style="list-style-type: none"> • Test tube <i>Tabung Uji</i> • <i>Iron(II) sulphate solution</i> <i>Larutan ferum(II) sulfat</i> • <i>Solution Y</i> <i>Larutan Y</i> • <i>Dilute sulfuric acid</i> <i>Asid Sulfurik cair</i>

Table 10
Jadual 10

Based on list of apparatus and materials in table 10, suggest a suitable solution for solution Y and describe an experiment to studied the redox reactions in terms of the transfer of electrons at a distance.

Berdasarkan senarai radas dan bahan yang diberi dalam jadual 10, cadangkan larutan yang sesuai bagi larutan Y dan huraikan satu eksperimen untuk mengkaji tindak balas redoks berdasarkan pemindahan elektron pada suatu jarak.

Your explanation should include the following:

Penerangan anda perlu mengandungi perkara-perkara berikut:

- A label diagram showing the apparatus set-up
Gambarajah berlabel yang menunjukkan susunan radas
- Procedure of the experiment
Prosedur eksperimen
- Observation at cathode
Pemerhatian di katod
- The direction of flow of electron
Arah pengaliran elektron

[10 marks]
 [10 markah]

END OF QUESTION PAPER
<https://cikguadura.wordpress.com/>
KERTAS SOALAN TAMAT

THE PERIODIC TABLE OF ELEMENTS

1 H Hydrogen 1		10 Ne Neon 20										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 Aluminium 27	14 Si Silicon 28	15 P Phosphorus 31	16 S Sulfur 32	17 Cl Chlorine 35	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 59	29 Cu Copper 64	30 Zn Zinc 65	31 Ga Gallium 70	32 Ge Germanium 73	33 As Arsenic 75	34 Se Selenium 79	35 Br Bromine 80	36 Kr Krypton 84
37 Rb Rubidium 86	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	47 Ag Silver 108	48 Cd Cadmium 112	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 133	56 Ba Barium 137	57 La Lanthanum 139	72 Hf Hafnium 179	73 Ta Tantalum 181	74 W Tungsten 184	75 Re Rhenium 186	76 Os Osmium 190	77 Ir Iridium 192	78 Pt Platinum 195	79 Au Gold 197	80 Hg Mercury 201	81 Tl Thallium 204	82 Pb Lead 207	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 Unq Unnilquadium 257	105 Unp Unnilpentium 260	106 Unh Unnilhexium 263	107 Uns Unnilseptium 262	108 Uno Unniloctium 265	109 Une Unnilennium 266	110 Uue Unnilium 265	111 Uuh Unnilium 263	112 Uub Unnilium 262	113 Uut Unnilium 262	114 Uuq Unnilium 262	115 Uup Unnilium 262	116 Uuq Unnilium 262	117 Uuh Unnilium 262	118 Uuo Unnilium 262

58 Ce Cerium 140	59 Pr Praseodymium 141	60 Nd Neodymium 144	61 Pm Promethium 147	62 Sm Samarium 150	63 Eu Europium 152	64 Gd Gadolinium 157	65 Tb Terbium 159	66 Dy Dysprosium 163	67 Hb Holmium 165	68 Er Erbium 167	69 Tm Thulium 169	70 Yb Ytterbium 173	71 Lu Lutetium 175
90 Th Thorium 232	91 Pa Protactinium 231	92 U Uranium 238	93 Np Neptunium 237	94 Pu Plutonium 244	95 Am Americium 243	96 Cm Curium 247	97 Bk Berkelium 247	98 Cf Californium 249	99 Es Einsteinium 254	100 Fm Fermium 253	101 Md Mendelevium 256	102 No Nobelium 254	103 Lr Lawrencium 257

10 Ne Neon 20	11 Na Sodium 23	12 Mg Magnesium 24	13 Al Aluminium 27	14 Si Silicon 28	15 P Phosphorus 31	16 S Sulfur 32	17 Cl Chlorine 35	18 Ar Argon 40
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10 Ne Neon 20	11 Na Sodium 23	12 Mg Magnesium 24	13 Al Aluminium 27	14 Si Silicon 28	15 P Phosphorus 31	16 S Sulfur 32	17 Cl Chlorine 35	18 Ar Argon 40
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10 Ne Neon 20	11 Na Sodium 23	12 Mg Magnesium 24	13 Al Aluminium 27	14 Si Silicon 28	15 P Phosphorus 31	16 S Sulfur 32	17 Cl Chlorine 35	18 Ar Argon 40
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INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

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. Tulis jawapan bagi Bahagian A dalam ruang yang disediakan dalam kertas soalan ini.
3. Answer **one** question from **Section B** and one question from **Section C**. Write your answers for **Section B** and **Section C** on the lined pages at the end of the question paper. Answer questions in **Section B** and **Section C** in detail. You may use questions, diagrams, tables, graphs and other suitable methods to explain your answer.
Jawab satu soalan daripada Bahagian B dan satu soalan dari Bahagian C. Tulis jawapan bagi Bahagian B dan Bahagian C pada helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Jawab soalan dalam Bahagian B dan Bahagian C dengan terperinci. Anda boleh menggunakan persamaan, 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 cancel any answer, neatly cross out the answer.
Sekiranya anda hendak menukar jawapan, batalkan dengan kemas jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.
6. The diagrams in the question 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 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 diprogram.
10. Hand in this question paper at the end of the examination
Serahkan kertas jawapan anda diakhir peperiksaan.

SULIT

NAMA :

TINGKATAN :

**MODUL KECEMERLANGAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2016**

SIJIL PELAJARAN MALAYSIA

4541/3

CHEMISTRY

Kertas 3

1½ jam

Satu jam tiga puluh minit

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

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tulis nombor kad pengenalan dan angka giliran anda pada petak yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau Bahasa Melayu.*
5. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

<i>Untuk Kegunaan Pemeriksa</i>		
Soalan	Markah Penuh	Markah Diperoleh
1	33	
2	17	
JUMLAH	50	

Kertas soalan ini mengandungi **10** halaman bercetak

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Kegunaan
pemeriksa
sahaja

1. Diagram 1.1 shows the apparatus set-up for an experiment to compare the hardness between bronze and pure copper. 1.0 kg weight is dropped at 1m height had hit the steel ball bearing on the block.
Rajah 1.1 menunjukkan susunan radas bagi eksperimen membandingkan kekerasan antara gangsa dan kuprum tulen. Pemberat 1.0 kg dilepaskan pada ketinggian 1m telah menghentak bebola keluli pada blok.

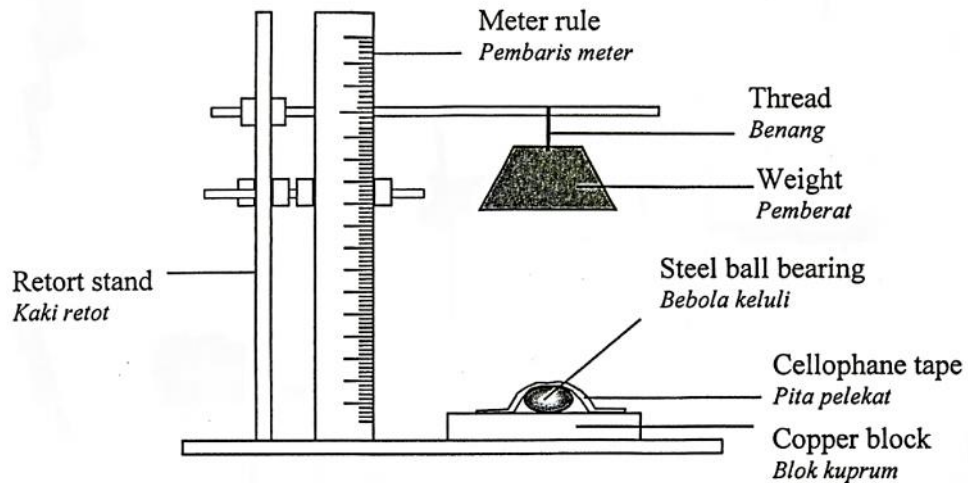


Diagram 1.1
Rajah 1.1

- Diagram 1.2 shows the dent formed on the block.
Rajah 1.2 menunjukkan lekuk yang terbentuk atas blok itu..

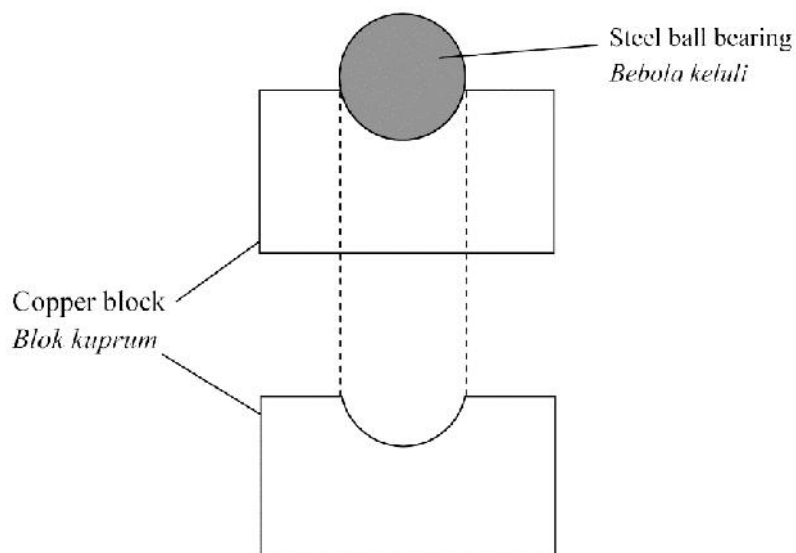


Diagram 1.2
Rajah 1.2

Diagram 1.3(a) shows the dent formed on copper block for experiments in Set I, Set II and Set III.

Rajah 1.3(a) menunjukkan lekuk yang terhasil di atas blok kuprum bagi eksperimen Set I, Set II dan Set III.

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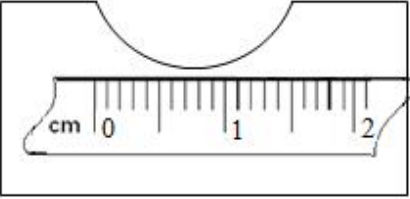
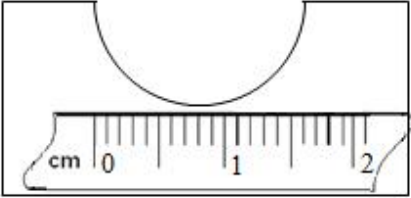
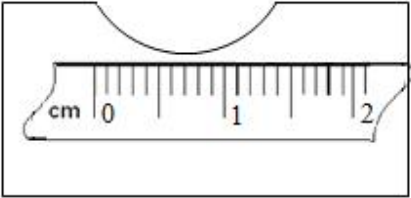
Experiment <i>Eksperimen</i>	Dent on copper block <i>Lekuk atas blok kuprum</i>
Set I	 <p>Diameter of dent :</p> <p><i>Diameter lekuk</i></p>
Set II	 <p>Diameter of dent :</p> <p><i>Diameter lekuk</i></p>
Set III	 <p>Diameter of dent :</p> <p><i>Diameter lekuk</i></p>

Diagram 1.3(a)
Rajah 1.3(a)

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Diagram 1.3(b) shows the dent formed on bronze block for experiments Set I, Set II and Set III.

Rajah 1.3(b) menunjukkan lekuk yang terhasil di atas blok gangsa bagi eksperimen Set I, Set II dan Set III.

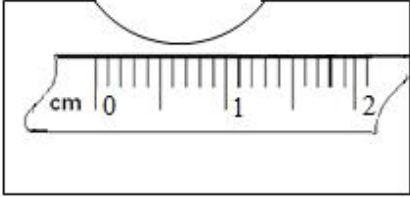
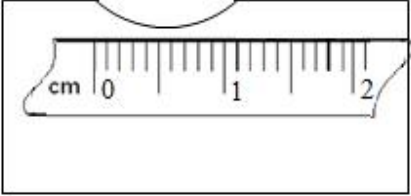
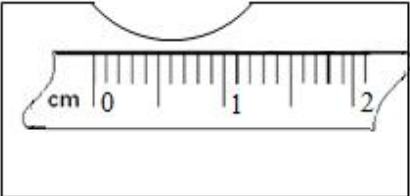
Experiment <i>Eksperimen</i>	Dent on bronze block <i>Lekuk atas blok gangsa</i>
Set I	 <p data-bbox="679 898 1102 958">Diameter of dent : <i>Diameter lekuk</i></p>
Set II	 <p data-bbox="679 1285 1102 1346">Diameter of dent : <i>Diameter lekuk</i></p>
Set III	 <p data-bbox="679 1659 1102 1720">Diameter of dent : <i>Diameter lekuk</i></p>

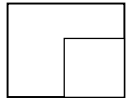
Diagram 1.3(b)
Rajah 1.3(b)

- (a) By using the ruler shown in the diagram, measure the diameter of dents and record the reading in Diagram 1.3(a) and 1.3(b).
 Dengan menggunakan pembaris yang ditunjukkan dalam rajah itu, ukur diameter lekuk dan rekodkan bacaan dalam Rajah 1.3(a) dan 1.3(b).

[3 marks]
 [3 markah]

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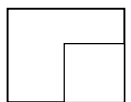
1(a)



- (b) Construct a table to record the diameters and the average diameters of dents on copper and bronze blocks.
 Bina satu jadual untuk merekod diameter lekuk dan purata diameter lekuk pada bongkah kuprum dan gangsa.

[3 marks]
 [3 markah]

1(b)

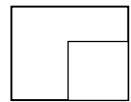


- (c) The average diameter of dents on bronze block is different from the copper block due to the arrangement of particles. Explain why.
 Purata diameter lekuk blok gangsa adalah berbeza dengan blok kuprum disebabkan oleh susunan zarah-zarah. Terangkan mengapa.

.....

[3 marks]
 [3 markah]

1(c)

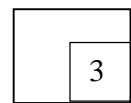


- (d) State all the variables for the experiment:
 Nyatakan semua pemboleh ubah bagi eksperimen itu:

- (i) The manipulated variable :
 Pemboleh ubah dimanipulasikan
- (ii) The responding variable :
 Pemboleh ubah bergerak balas
- (iii) The constant variable :
 Pemboleh ubah dimalarkan

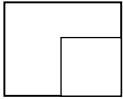
[3 marks]
 [3 markah]

1(d)



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1(e)

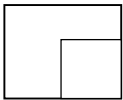


(e) State the hypothesis for this experiment.
Nyatakan hipotesis untuk eksperimen itu.

.....
.....

[3 marks]
[3 markah]

1(f)(i)



(f) (i) State one observation that can be obtained from the experiments other than diameter of the dent.
Nyatakan satu pemerhatian yang dapat diperolehi daripada eksperimen itu selain daripada diameter lekuk..

.....
.....

[3 marks]
[3 markah]

1(f)(ii)

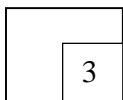


(ii) State the inference based on your answer in f(i).
Nyatakan inferens berdasarkan jawapan anda di f(i).

.....
.....

[3 marks]
[3 markah]

1(g)



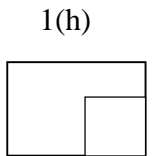
(g) State the operational definition for the hardness of block in this experiment.
Nyatakan definisi secara operasi bagi kekerasan blok dalam eksperimen ini..

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

[3 marks]
[3 markah]

- (h) Predict the diameter of the copper block if the experiment is repeated using 2.0 kg of weight and was dropped on the steel ball bearing at the same height.
Ramalkan diameter bagi blok kuprum jika eksperimen ini diulangi menggunakan pemberat 2.0kg dan dijatuhkan ke atas bebola keluli pada ketinggian yang sama.

.....
 [3 marks]
 [3 markah]



- (i) Diagram 1.4 shows a few materials.
Rajah 1.4 menunjukkan beberapa bahan.

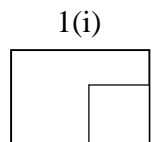
Duralumin	Tin	Chromium	Brass	Pewter	Iron
<i>Duralumin</i>	<i>Timah</i>	<i>Kromium</i>	<i>Loyang</i>	<i>Piuter</i>	<i>Besi</i>

Diagram 1.4
Rajah 1.4

Classify these materials into metals and alloys by completing the Table 1.
Kelaskan bahan-bahan itu kepada logam dan aloi dengan melengkapkan Jadual 1.

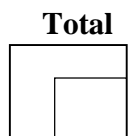
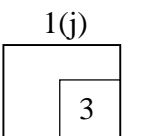
Metals <i>Logam</i>	Alloys <i>Aloi</i>

Table 1 [3 marks]
Jadual 1 [3 markah]



- (j) Iron spoon and steel spoon are put on wet cotton and left aside for 3 days and then until one week. What is the relationship between the observations obtain and time?
Sudu besi dan sudu keluli diletakkan di atas kapas lembap dan dibiarkan selama 3 hari dan seterusnya sehingga satu minggu. Apakah hubungan antara pemerhatian yang diperolehi dan masa?

.....
 [3 mark]
 [3 markah]



- 2 Maryam and Aiman had carried out an experiment to investigate the electrolysis of copper(II) sulphate solution using two different types of electrode. Diagram 2 shows the conversation between the chemistry teacher and both students about the observation at anode.

Maryam dan Aiman telah menjalankan eksperimen mengkaji elektrolisis larutan kuprum(II) sulfat menggunakan dua jenis elektrod yang berbeza. Rajah 2 menunjukkan perbualan antara guru kimia dan kedua-dua pelajar itu mengenai pemerhatian di anod.



Maryam.... What is the observation at anode for the experiment of electrolysis copper(II) sulphate solution using carbon electrodes?
Maryam... Apakah pemerhatian di anod bagi eksperimen elektrolisis larutan kuprum(II) sulfat menggunakan elektrod karbon?



I observed colourless gas bubbles released at anode, teacher
Saya memerhatikan gelembung gas tak berwarna dibebaskan di anod, cikgu



Aiman....what is the observation at anode for the experiment of electrolysis copper(II) sulphate solution using copper electrodes?
Aiman... Apakah pemerhatian di anod bagi eksperimen elektrolisis larutan kuprum(II) sulfat menggunakan elektrod kuprum?

Teacher, I don't see any gas bubbles but the copper anode become thinner
Cikgu, saya tak nampak sebarang gelembung gas tetapi anod kuprum semakin nipis



Based on the conversation, plan a laboratory experiment to study the effect of type of electrode on the formation of product at anode.

Your planning should include the following aspects:

Berdasarkan perbualan itu, rancangkan satu eksperimen makmal untuk mengkaji kesan jenis elektrod ke atas pembentukan hasil tindak balas di anod.

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 markah]

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END OF QUESTION PAPER
KERTAS SOALAN TAMAT

MAKLUMAT UNTUK CALON

1. *Jawab semua soalan.*
2. *Jawapan kepada Soalan 1 hendaklah ditulis dalam ruangan yang disediakan dalam kertas soalan.*
3. *Jawapan kepada Soalan 2 hendaklah ditulis pada helaian tambahan. Anda boleh menggunakan persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
4. *Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.*
5. *Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu.*
6. *Rajah yang mengiringi tidak dilukiskan mengikut skala kecuali dinyatakan.*
7. *Markah yang diperuntukkan bagi setiap soalan atau ceraihan soalan ditunjukkan di dalam kurungan.*
8. *Masa yang dicadangkan menjawab Soalan 1 ialah 45 minit dan Soalan 2 ialah 45 minit.*
9. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*
10. *Kertas soalan ini hendaklah diserahkan di akhir peperiksaan.*

Pemberian markah:

Markah	Penerangan
3	Cemerlang : Respons yang paling baik
2	Memuaskan: Respons yang sederhana
1	Lemah: Respons yang kurang tepat
0	Tiada respons <u>atau</u> respons salah

INFORMATION FOR CANDIDATES

1. *Answer all questions.*
2. *Write your answer for Question 1 in the spaces provided in the question paper.*
3. *Write your answers for Question 3 on the extra sheet. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.*
4. *Show your working, it may help you to get marks.*
5. *If you wish to cancel any answer, neatly cross out the answer.*
6. *The diagrams in the questions provided are not drawn to scale unless stated.*
7. *Marks allocated for each question or part question are shown in brackets.*
8. *The time suggested to answer Question 1 is 45 minutes and Question 2 is 45 minutes.*
9. *You may use a non-programmable scientific calculator.*
10. *This question paper must be handed in at the end of the examination.*

Marks awarded:

Mark	Description
3	Excellent: The best response provided
2	Satisfactory: An average response provided
1	Weak: An inaccurate response provided
0	No response <u>or</u> wrong response provided

SKEMA JAWAPAN PERCUBAAN KIMIA SPM 2016

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1	A
2	B
3	C
4	B
5	D
6	A
7	D
8	D
9	B
10	B
11	A
12	A
13	D
14	C
15	D
16	C
17	D
18	B
19	C
20	D
21	D
22	D
23	A
24	B
25	C

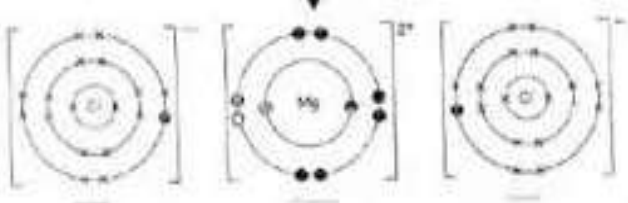
26	A
27	C
28	A
29	D
30	B
31	C
32	A
33	D
34	C
35	D
36	C
37	B
38	D
39	A
40	B
41	B
42	A
43	C
44	A
45	B
46	B
47	C
48	A
49	D
50	C

MARKING SCHEME CHEMISTRY PAPER 2

SECTION A

Question Number			Answer	Sub-Mark	Mark
1	(a)	(i)	Diffusion	1	1
		(ii)	1. Particles of fried chicken smell are tiny 2. move randomly in between air particles 3. from higher concentration to lower concentration region.	1 1 1	3
	(b)	(i)	<p>Temperatur e^oC Suhu /^oC</p> <p>melting point</p> <p>Time/s Masa/s</p>	1	1
		(ii)	<p>AB</p> <p>CD</p>	1+1	2
		(iii)	1. Heat energy absorbed is used 2. to overcome the forces of attraction between particles // to overcome the intermolecular forces.	1 1	2
TOTAL					9

Question Number		Answer	Sub-Mark	Mark
2	(a)	Chemical formula that shows the simplest whole number ratio of atoms of each element in a compound		1
	(b)	Solution X : Hydrochloric acid // [any suitable acid] Metal Y : Zinc // [any suitable metal]	1 1	2
	(c)	Dry the hydrogen gas		1
	(d)	(i) CuO		1
		(ii) $\text{CuO} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2\text{O}$		1
	(e)	Heating, cooling and weighing are repeated until a constant mass is obtained		1
	(f)	Cannot Aluminium is reactive than hydrogen // Aluminium is located above Hydrogen in the reactivity series.	1 1	2
TOTAL				9

Question Number		Answer	Sub-Mark	Mark
3	(a)	(i) Group 17 // Halogen	1	1
		(ii) <i>Na // Mg // Al</i> <i>Accept name.</i>	1	1
	(b)	(i) Al <i>Accept name.</i>	1	1
		(ii) Al_2O_3	1	1
	(c)	(i) MgCl_2	1	1
		(ii) Mg : one atom magnesium donate 2 electron to form magnesium ion / Mg^{2+} Cl : two atom chlorine receive 1 electron each to form chloride ion	1 1	2
		(iii) 1. Correct number of atom and had nucleus 2. Correct number of electron and charge 	1 1	2
		(iv) <ul style="list-style-type: none"> • High melting / boiling point// • Can conducts electricity in molten state or in aqueous solution// • Soluble in water 	1	1
TOTAL				10

Question Number			Answer	Sub-Mark	Mark
4	(a)	(i)	Ethanoic acid// Methanoic acid //Oxalic acid	1	1
		(ii)	1. Acid X is weak acid while hydrochloric acid is strong acid// The concentration of H ⁺ ions in ethanoic acid is lower// The concentration of H ⁺ ions in hydrochloric acid is higher 2. The higher the concentration of H ⁺ ion, the lower the pH value.	1	2
		(iii)	1. pH increases 2. The concentration of hydrogen ion is decreases	1 1	2
	(b)	(i)	A solution in which its concentration is accurately known.	1	1
		(ii)	Dilution	1	1
		(iii)	A volumetric flask measure volume more accurate than a beaker	1	1
		(iv)	2.0 mol dm ⁻³ x V ₁ = 1.0 mol dm ⁻³ x 100 cm ³ V ₁ = $\frac{1.0 \text{ mol dm}^{-3} \times 100 \text{ cm}^3}{2.0 \text{ mol dm}^{-3}}$ V ₁ = 50 cm ³	1 1	2
TOTAL					10

Question Number			Answer	Sub-Mark	Mark
5	(a)		Precipitate V : Lead (II) chloride / PbCl ₂ Solution A : Sodium nitrate / NaNO ₃	1 1	2
	(b)	(i)	Double decomposition	1	1
		(ii)	1. <i>Correct formulae of reactants and product</i> 2. <i>Balanced equation</i> Pb(NO ₃) ₂ + 2NaCl → PbCl ₂ + 2NaNO ₃	1 1	2
	(c)		n Pb(NO ₃) ₂ = $\frac{1.0 \times 50}{1000}$ / 0.05 mol mass PbCl ₂ = 0.05 x 242 = 12.1 g	1 1	2
	(d)		1. Pour diluted sulphuric acid, followed by iron (II) sulphate solution is added. 2. Slowly add concentrated sulphuric acid 3. Brown ring formed indicate NO ₃ ⁻ presence	1 1 1	3
	(e)		Same // 12.1 g	1	1
TOTAL					11

Question Number		Answer	Sub-Mark	Mark
6	(a)	Carbon dioxide	1	1
	(b)	(i) Hydroxyl group // -OH	1	1
		(ii) <div style="text-align: center;"> $\begin{array}{ccccccc} & \text{H} & & \text{H} & & \text{H} & \\ & & & & & & \\ \text{H} & - \text{C} & - & \text{C} & - & \text{C} & - \text{OH} \\ & & & & & & \\ & \text{H} & & \text{H} & & \text{H} & \end{array}$ <p>1-Propanol (<i>n</i>-propanol)</p> $\begin{array}{ccccccc} & \text{H} & & \text{OH} & & \text{H} & \\ & & & & & & \\ \text{H} & - \text{C} & - & \text{C} & - & \text{C} & - \text{H} \\ & & & & & & \\ & \text{H} & & \text{H} & & \text{H} & \end{array}$ <p>2-Propanol (isopropanol)</p> <p>*accept without name</p> </div>	1	2
	(c)	(i) Oxidation	1	1
		(ii) $\text{K}_2\text{Cr}_2\text{O}_7$ // KMnO_4 *accept name	1	1
	(d)	(i) Propene	1	1
		(ii) <ol style="list-style-type: none"> 1. Functional diagram 2. label 	1 1	2
	(e)	Ethanol and butanoic acid	1+1	2
TOTAL				11

SECTION B

Question Number			Answer	Sub-Mark	Mark										
7	(a)	(i)	<table border="1"> <thead> <tr> <th>Natural polymer</th> <th>Synthetic polymers</th> </tr> </thead> <tbody> <tr> <td>Rubber</td> <td>Polythene</td> </tr> <tr> <td>Starch</td> <td>PVC</td> </tr> </tbody> </table>	Natural polymer	Synthetic polymers	Rubber	Polythene	Starch	PVC	1+1 1+1	4				
		Natural polymer	Synthetic polymers												
Rubber	Polythene														
Starch	PVC														
		(ii)	$ \begin{array}{ccccccc} & \text{H} & & \text{H} & \text{H} & & \\ & & & & & & \\ \text{H} & - \text{C} = & \text{C} & - & \text{C} = & \text{C} & - \text{H} \\ & & & & & & \\ & & \text{H} & & & & \end{array} $ <p>isoprene // 2-methylbuta-1,3-diene</p>	1 1	2										
	(b)	(i)	<ol style="list-style-type: none"> 1. Bacteria from the air enter the latex 2. Bacteria will produce lactic acid / H⁺ ions which neutralize negatives charge of the protein membrane / rubber molecules 3. The rubber molecules will be collide with each other and cause protein membrane broken 4. Rubber polymer are released and lump together / coagulate 	1 1 1 1	4										
		(ii)	<ol style="list-style-type: none"> 1. Membrane protein of latex are negatively charge <table border="1"> <thead> <tr> <th>Ethanoic Acid</th> <th>Ammonia</th> </tr> </thead> <tbody> <tr> <td>Contains H⁺/ positive ions</td> <td>contains OH⁻ /negative ions</td> </tr> <tr> <td>H⁺ ions neutralized the negative charge on the protein membrane</td> <td>OH⁻ does not neutralize negative charge/ remain negative/ OH⁻ from alkali neutralise any acids that may be produced by bacteria</td> </tr> <tr> <td>The membrane/rubber particles collide with each other</td> <td>The rubber particle repel each other</td> </tr> <tr> <td>Membrane burst/break // Rubber coagulate</td> <td>Membrane does not burst/break// polymer does not coagulate</td> </tr> </tbody> </table>	Ethanoic Acid	Ammonia	Contains H ⁺ / positive ions	contains OH ⁻ /negative ions	H ⁺ ions neutralized the negative charge on the protein membrane	OH ⁻ does not neutralize negative charge/ remain negative/ OH ⁻ from alkali neutralise any acids that may be produced by bacteria	The membrane/rubber particles collide with each other	The rubber particle repel each other	Membrane burst/break // Rubber coagulate	Membrane does not burst/break// polymer does not coagulate	1 1 1 1	5
Ethanoic Acid	Ammonia														
Contains H ⁺ / positive ions	contains OH ⁻ /negative ions														
H ⁺ ions neutralized the negative charge on the protein membrane	OH ⁻ does not neutralize negative charge/ remain negative/ OH ⁻ from alkali neutralise any acids that may be produced by bacteria														
The membrane/rubber particles collide with each other	The rubber particle repel each other														
Membrane burst/break // Rubber coagulate	Membrane does not burst/break// polymer does not coagulate														
	(c)	(i)													

			Reaction X : Neutralisation Compound Z : Ammonium sulphate	1 1	2
		(ii)	1. Mol $\text{H}_2\text{SO}_4 = \text{MV} / 1000$ $= 2.0 \times 100 / 1000 = 0.2 \text{ mol}$ 2. Ratio between H_2SO_4 and compound Z/ $(\text{NH}_4)_2\text{SO}_4$ 1 mol : 1 mol 0.2 mol : 0.2 mol 3. Mass of compound Z = mol x molar mass $= 0.2 \times 132$ $= 26.4 \text{ g}$	1 1 1	3
TOTAL					20

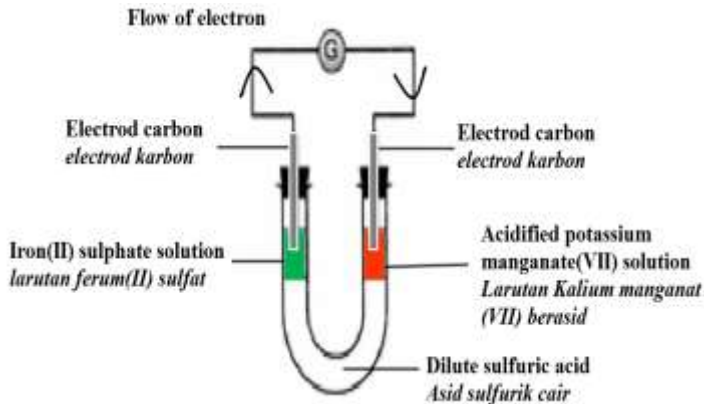
Question Number			Answer	Sub-Mark	Mark
8	(a)	(i)	Heat released when 1 mole of water is formed from the neutralisation between hydrochloric acid and sodium hydroxide solution// Heat released when 1 mol of water is formed from the neutralisation between ethanoic acid and sodium hydroxide solution.	1	1
		(ii)	$\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O} \quad \Delta\text{H} = -57.0 \text{ kJmol}^{-1}$ * balanced equation * ΔH	1 1	2
		(iii)	1. Hydrochloric acid in Experiment I is a strong acid which ionizes completely in water while ethanoic acid is a weak acid which ionises partially in water 2. Most of ethanoic acid exist as molecules. 3. Some of the heat releases in Experiment II is used to ionise the ethanoic acid molecules completely. 4. Therefore, Heat of neutralisation for Experiment I is higher than Experiment II	1 1 1 1	4
	(b)	(i)	To reduce heat loss to the surrounding// plastic is a good heat insulator	1	1

	(ii)	<p>No of mol = $\frac{50 \times 2}{1000} = 0.1$</p> <p>Temperature change, $\theta = 35.5 - 29.0 = 6.5^\circ \text{C}$</p> <p>Heat given out, $H = (50+50) \times 4.2 \times 6.5$ $= 2730 \text{ J}$</p> <p>Heat given out when 1 mol of water produced $= \frac{2730}{0.1} = 27300 \text{ J}$</p> <p>$\Delta H = 27.3 \text{ kJmol}^{-1}$</p>	1 1 1 1 1	5
	(iii)	<p>Unchanged.</p> <p>Nitric acid is also a strong acid hence the amount of heat given out will be the same.</p>	1 1	2
	(c)	<ul style="list-style-type: none"> - Reaction is exothermic// heat released to the surrounding - Temperature increases - Total energy of reactants is higher than the total energy of the products - When 1 mol of hydrochloric acid reacts with 1 mol of sodium hydroxide to produce 1 mol of sodium chloride and water, 57 kJ heat released - The heat released during bond formation is higher than heat absorbed during bond breaking. 	1 1 1 1 1	5
		TOTAL		20

SECTION C

Question Number			Answer	Sub-Mark	Mark
9	(a)	(i)	<p>1. <i>Correct formulae of reactants and product</i></p> <p>2. <i>Balanced equation</i></p> $2\text{HCl} + \text{CaCO}_3 \longrightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$ <p>3. $n = \frac{2.0 \times 40}{1000} / 0.08 \text{ mol}$</p> <p>4. mole ratio 2 mol HCl produce 1 mol CO₂ 0.08 mol HCl produce 0.04 mol CO₂</p> <p>5. volume = 0.04 x 24 dm³ = 0.96 dm³</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	5
		(ii)	<p>1. Rate of reaction in Experiment II is higher than Experiment I</p> <p>2. The kinetic energy of particles in Experiment II is higher</p> <p>3. Frequency of collision between H⁺ and CaCO₃ in Experiment II is higher</p> <p>4. Frequency of effective collision in Experiment II is higher</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	4
	(b)		<p>Copper (II) sulphate solution</p> <p>Procedure :</p> <p>1. [25-50] cm³ of [0.1-1.0] moldm⁻³ of hydrochloric acid is measured and poured into the conical flask</p> <p>2. About 5.0 g of zinc granules is weigh</p> <p>3. A burette is filled with water and inverted into a basin containing water</p> <p>4. The granulated zinc is added into the conical flask</p> <p>5. 5cm³ of 0.5 moldm⁻³ copper (II) sulphate solution is added into the conical flask</p> <p>6. Immediately the conical flask is closed and connect it using delivery tube to the burette</p> <p>7. The stopwatch is started</p> <p>8. The conical flask is shaken steadily</p> <p>9. Record volume of hydrogen gas produced every 30sec interval for 5 minutes</p> <p>Concentration // size of reactant</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	11
			TOTAL		20

Question Number		Answer	Sub-Mark	Mark
10	(a)	1. Zinc is more electropositive than iron. 2. Zinc oxidise/ zinc release electron to form Zn^{2+} 3. Fe^{2+} does not present so the roof of Maimun's house does not rust 4. Zinc is the sacrificial metal	1 1 1 1	4
	(b)	Suitable example: Zinc and Copper(II) nitrate solution *any suitable answer 1. Oxidation number of zinc increases from 0 to +2 2. Zinc undergoes oxidation 3. Oxidation number of copper decreases from +2 to 0 4. Copper undergoes reduction	1+1 1 1 1 1	6

(c)	<p>Solution Y =acidified potassium manganate(VII) solution *any suitable answer</p> <p>A label diagram :</p> <ol style="list-style-type: none"> 1. Functional diagram 2. label  <p>Flow of electron</p> <p>Electrod carbon <i>electrod karbon</i></p> <p>Electrod carbon <i>electrod karbon</i></p> <p>Iron(II) sulphate solution <i>larutan ferum(II) sulfat</i></p> <p>Acidified potassium manganate(VII) solution <i>Larutan Kalium manganat (VII) berasid</i></p> <p>Dilute sulfuric acid <i>Asid sulfurik cair</i></p> <p>Explanation:</p> <ol style="list-style-type: none"> 1. Dilute sulphuric acid is poured into a U-tube 2. Using a dropper, iron(II) sulphate solution is added at one side 3. Acidified potassium manganate(VII) solution is added at another side 4. Carbon electrodes are placed in each side of the U-tube and connected to galvanometer to completed the external circuit 5. Any change that can be observed after a few minutes are recorded. <p>Observation at cathode: the purple colour of acidified potassium manganate(VII) solution is decolorised / change to colourless *based on solution Y</p> <p>The direction of flow or electron : *Refer to diagram above</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>10</p> <p>20</p>
TOTAL			20

MARKING SCHEME CHEMISTRY PAPER 3 TRIAL PAHANG 2016<https://cikguadura.wordpress.com/>

Question	Rubric	Score
1(a)	Able to measure all the diameter of dents in 1 decimal point accurately with correct unit <u>Sample answer:</u> Copper: 1.5 cm, 1.6 cm, 1.4 cm Bronze: 1.3 cm, 1.1 cm, 1.2 cm	3
	Able to measure all the diameter of dents in 1 decimal point without unit // 2 decimal point with unit // at least 4 diameter of dents correctly with unit	2
	Able to state at least 3 diameter of dents correctly without unit	1
	No response or wrong response	0

Question	Rubric	Score																						
1(b)	Able to construct the table to record the diameters and average of dents on copper and bronze block with correct: 1. titles and units 2. Reading <u>Sample answer:</u> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th rowspan="2">Type of blocks</th> <th colspan="3">Diameter of dents(cm)</th> <th rowspan="2">Average diameter of dents (cm)</th> </tr> <tr> <th>I</th> <th>II</th> <th>III</th> </tr> </thead> <tbody> <tr> <td>Copper</td> <td>1.5</td> <td>1.6</td> <td>1.4</td> <td>1.5</td> </tr> <tr> <td>Bronze</td> <td>1.3</td> <td>1.1</td> <td>1.2</td> <td>1.2</td> </tr> </tbody> </table>	Type of blocks	Diameter of dents(cm)			Average diameter of dents (cm)	I	II	III	Copper	1.5	1.6	1.4	1.5	Bronze	1.3	1.1	1.2	1.2					
	Type of blocks		Diameter of dents(cm)				Average diameter of dents (cm)																	
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Able to construct a less accurate table that contain the following: 1. Title without unit 2. reading <table border="1" style="margin-left: 20px;"> <thead> <tr> <th rowspan="2">Type of blocks</th> <th colspan="3">Diameter of dents</th> <th rowspan="2">Average diameter of dents</th> </tr> <tr> <th>I</th> <th>II</th> <th>III</th> </tr> </thead> <tbody> <tr> <td>Copper</td> <td>1.5</td> <td>1.6</td> <td>1.4</td> <td>1.5</td> </tr> <tr> <td>Bronze</td> <td>1.3</td> <td>1.1</td> <td>1.2</td> <td>1.2</td> </tr> </tbody> </table>	Type of blocks	Diameter of dents			Average diameter of dents	I	II	III	Copper	1.5	1.6	1.4	1.5	Bronze	1.3	1.1	1.2	1.2	2					
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Bronze	1.3	1.1	1.2	1.2																				
Able to construct at least 1 title OR reading <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Type of blocks</th> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>Copper</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> OR <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>I</th> <th>II</th> <th>III</th> </tr> </thead> <tbody> <tr> <td>Copper</td> <td>1.5</td> <td></td> <td></td> </tr> </tbody> </table>	Type of blocks					Copper											I	II	III	Copper	1.5			1
Type of blocks																								
Copper																								
	I	II	III																					
Copper	1.5																							
No response or wrong response		0																						

Question	Rubric	Score								
1(c)	<p>Able to explain the arrangement of particles in the materials correctly [must have comparison]</p> <p><u>Sample answer:</u></p> <table border="1"> <thead> <tr> <th>Copper</th> <th>Bronze</th> </tr> </thead> <tbody> <tr> <td>1. Atomic size of copper atom are same</td> <td>1. Atomic size of tin/foreign atoms and copper are different</td> </tr> <tr> <td>2. Atoms are in closely pack in orderly manner</td> <td>2. The presence of tin/foreign atoms in bronze disrupts the orderly arrangement of copper atoms</td> </tr> <tr> <td>3. Layer of atom easily sliding when force is applied</td> <td>3. layers of atoms more difficult to slide when force is applied</td> </tr> </tbody> </table>	Copper	Bronze	1. Atomic size of copper atom are same	1. Atomic size of tin/foreign atoms and copper are different	2. Atoms are in closely pack in orderly manner	2. The presence of tin/foreign atoms in bronze disrupts the orderly arrangement of copper atoms	3. Layer of atom easily sliding when force is applied	3. layers of atoms more difficult to slide when force is applied	3
Copper	Bronze									
1. Atomic size of copper atom are same	1. Atomic size of tin/foreign atoms and copper are different									
2. Atoms are in closely pack in orderly manner	2. The presence of tin/foreign atoms in bronze disrupts the orderly arrangement of copper atoms									
3. Layer of atom easily sliding when force is applied	3. layers of atoms more difficult to slide when force is applied									
	Able to compare 2 points correctly// able to state 3 points on copper/bronze without comparing	2								
	Able to compare 1point correctly// able to state any 2 points correctly	1								
	No response or wrong response	0								

Question	Rubric	Score
1(d)	<p>Able to state all the variables</p> <p><u>Sample answer:</u></p> <p>Manipulated variable : Type of materials / blocks // Copper and bronze</p> <p>Responding variable : Size / diameter of dents // hardness of metals/alloy/blocks</p> <p>Fixed variable : Size / diameter of steel ball bearing // height of the weight // mass of the weight</p>	3
	Able to state two variables correctly	2
	Able to state one variable correctly	1
	No response or wrong response	0

Question	Rubric	Score
1(e)	<p>Able to state the hypothesis correctly</p> <p><u>Sample answer:</u></p> <p>Bronze block has smaller size / diameter of dents than copper block // Bronze is harder than copper // Copper is less harder than bronze</p>	3
	<p>Able to state the hypothesis less correctly</p> <p>If the metal block is hard, the diameter of the dent is smaller // The diameter of the dent is bigger when the copper block is used // the diameter of the dent is smaller when the bronze block is used</p>	2
	<p>Able to state idea of hypothesis</p> <p>Different block produces different diameter of the dent</p>	1
	No response or wrong response	0

Question	Rubric	Score
1(f)(i)	Able to state the observation correctly <u>Sample answer:</u> Depth of the dent formed on copper block is deeper // Depth of the dent formed on bronze block is shallower // Size of dent on copper block is bigger than bronze	3
	Able to state less correctly <u>Sample answer :</u> Dent formed on copper is deep // Dent formed on bronze shallow // Size of dent on copper block is big // size of dent on bronze is small	2
	Able to state the idea of inference <u>Sample answer :</u> Depth of dent formed is different // size of dent is different	1
	No response or wrong response	0

Question	Rubric	Score
1(f)(ii)	Able to state the inference correctly based on answer in (f)(i) <u>Sample answer:</u> 1. Copper is less hard than bronze // arrangement of copper atom are same size, closely pack and orderly manner //layer of atom easily slide when force is applied 2. Bronze is harder than copper // stanum/foreign atoms distrupts the orderly manner of the copper atoms in the bronze.// layer of atom not easily slide when force is applied [Any one]	3
	Able to state the inference less correctly <u>Sample answer :</u> The bronze is harder//the hardness of bronze is higher //copper is less harder	2
	Able to state the idea of inference Bronze is hard// Copper is soft //the hardness of the blocks is different	1
	No response or wrong response	0

Question	Rubric	Score
1(g)	Able to state the operational definition correctly <i>1. What work is done</i> <i>2. Observation</i> <u>Sample answer:</u> when 1 kg weight is dropped to hit steel ball bearing on the block, the diameter of dent produced smaller // when 1 kg weight is dropped to hit steel ball bearing on the block, the size of dent produced bigger	3
	Able to state the operational definition less correctly <u>Sample answer:</u> The dent produced when a weight is dropped on the block // A smaller dent is formed on the bronze block	2
	Able to state idea of operational definition The harder block has a smaller dent.	1
	No response or wrong response	0

Question	Rubric	Score
1(h)	Able to predict the diameter correctly <u>Sample answer:</u> Diameter/size of copper dent increase / bigger / [more than 1.6 cm]	3
	Able to state the answer less correctly Diameter / size of copper dent large / big	2
	Able to state any idea of prediction Diameter / size of dent change	1
	No response or wrong response	0

Question	Rubric	Score							
1(i)	Able to classify all substances correctly <u>Sample answer:</u> <i># if reverse score 1</i>	3							
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Alloy</th> <th>Pure metal</th> </tr> </thead> <tbody> <tr> <td>Duralumin</td> <td>Tin</td> </tr> <tr> <td>Brass</td> <td>Iron</td> </tr> <tr> <td>Pewter</td> <td>Chromium</td> </tr> </tbody> </table>		Alloy	Pure metal	Duralumin	Tin	Brass	Iron	Pewter
	Alloy	Pure metal							
	Duralumin	Tin							
Brass	Iron								
Pewter	Chromium								
Able to classify at least 4 substances correctly	2								
Able to classify at least 2 substances correctly// reverse	1								
No response or wrong response	0								

Question	Rubric	Score
1(j)	Able to state the answer correctly <u>Sample answer:</u> The longer the time, the rust formed on iron spoon increase while steel spoon remain unchanged // More iron corrode / rust as the longer the time while steel iron does not rust / remain unchanged	3
	Able to state the answer less correctly Iron spoon will corrode/rust while steel spoon does not rust /remain unchange	2
	Able to state any idea Iron corrode / rust // steel iron does not corrode / rust / remain unchanged	1
	No response or wrong response	0

Question	Rubric	Score
2(a)	Able to give the statement of problem correctly. <u>Sample answer:</u> Does the type of electrodes /anode affect the type of products formed during the electrolysis?	3
	Able to give the statement of problem. The type of electrodes / anode affect the type of products formed // To investigate the effect of type of electrode on the formation of product	2
	Able to give an idea. The products formed are different	1
	No response or wrong response	0

Question	Rubric	Score
2(b)	Able to state all variables correctly. <u>Sample answer:</u> Manipulated variable: type of electrodes / anode // carbon electrode, copper electrode. Responding variable: products formed at the anode. Fixed variable: electrolyte/ copper(II) sulphate solution	3
	Able to state any two variables correctly.	2
	Able to staet any one variable correctly.	1
	No response or wrong response	0

Question	Rubric	Score
2(c)	Able to state the hypothesis correctly. <u>Sample answer:</u> When carbon electrode is used the oxygen gas is released, when copper electrode is used the Cu^{2+} ion formed // When carbon electrode is used gas bubble is released, when copper electrode is used the copper thinner // When copper electrodes are used instead of carbon electrodes, the type of product formed at anode is different.	3
	Able to state the hypothesis. When carbon electrode is used gas bubble is released // When copper electrode is used the copper thinner // Different electrode / anode will produce different product.	2
	Able to give an idea Different electrode/ anode affect the product.	1
	No response or wrong response	0

Question	Rubric	Score
2(d)	Able to list completely the materials and apparatus. <u>Sample answer:</u> Materials: 1. Copper(II) sulphate, CuSO_4 solution Apparatus: 2. Batteries 3. Connecting wire 4. Carbon electrodes 5. Copper electrodes 6. Electrolytic cell / beaker	3
	Able to list the materials and apparatus incompletely Materials: 1. Copper(II) sulphate, CuSO_4 solution Apparatus: 2. Batteries 3. Carbon electrodes 4. Copper electrodes 5. Electrolytic cell / beaker	2
	Able to give an idea. Materials: 1. Electrolyte Apparatus: 2. Batteries 3. Carbon electrodes / Copper electrodes 4. Container	1
	No response or wrong response	0

Question	Rubric	Score
2(e)	Able to state all the steps correctly. <u>Sample answer:</u> 1. Pour the copper(II) sulphate solution into the beaker 2. Connect carbon electrodes to batteries 3. Dip the carbon electrodes into copper(II) sulphate solution 4. Record the observation. 5. Repeat the experiment using copper electrodes to replace carbon electrodes.	3
	Able to state steps 1, 3, 4, 5.	2
	Able to state steps 1, 3.	1
	No response or wrong response	0

Question	Rubric	Score						
2(f)	Able to tabulate the data with the following aspects 1. Correct titles 2. List of electrodes <u>Sample answer</u> <table border="1" data-bbox="373 1099 1238 1216"> <tr> <td>Type of electrodes</td> <td>Observation at anode</td> </tr> <tr> <td>Carbon</td> <td></td> </tr> <tr> <td>Copper</td> <td></td> </tr> </table>	Type of electrodes	Observation at anode	Carbon		Copper		2
	Type of electrodes	Observation at anode						
	Carbon							
Copper								
Able to tabulate the data but incomplete <u>Sample answer</u> <table border="1" data-bbox="373 1352 1238 1429"> <tr> <td></td> <td>Observation at anode</td> </tr> <tr> <td>Carbon/copper</td> <td></td> </tr> </table>		Observation at anode	Carbon/copper		1			
	Observation at anode							
Carbon/copper								
No response or wrong response		0						

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

END OF MARKING SCHEME