



KEMENTERIAN PENDIDIKAN MALAYSIA  
JABATAN PENDIDIKAN NEGERI SARAWAK

# **PROGRAM SEMARAK KASIH SPM 2.0 JPN SARAWAK TAHUN 2021**

## **KIMIA**

### **KERTAS 1**

### **SET 3**

**PROGRAM  
SEMARAK KASIH SPM 2.0  
TAHUN 2021**

**JABATAN PENDIDIKAN NEGERI SARAWAK**

**KIMIA  
(4541/1)**

**PRAKTIS KERTAS 1  
SET 3**

## Pengenalan

Program Semarak Kasih yang dilaksanakan pada tahun 2020 telah mendapat sambutan yang menggalakkan daripada warga pendidik dan murid, khususnya calon SPM 2020. Sehubungan dengan itu, pada tahun 2021 ini, Sektor Pembelajaran, Jabatan Pendidikan Negeri Sarawak mengadakan **Program Semarak Kasih SPM 2.0** untuk membantu guru dan calon SPM menghadapi peperiksaan SPM 2021.

Modul yang dihasilkan disertakan dengan sampel Jadual Spesifikasi Ujian (JSU) dan sampel item/soalan mengikut format baharu peperiksaan SPM mulai 2021 untuk dijadikan bahan panduan dan rujukan guru-guru dan juga sebagai bahan latihan/ulangkaji kepada calon-calon SPM 2021 di semua sekolah menengah di negeri Sarawak.

### OBJEKTIF PROGRAM

1. Memastikan calon SPM menguasai format baharu Peperiksaan SPM 2021.
2. Memastikan calon SPM mempunyai bahan pembelajaran yang berfokus ke arah peperiksaan SPM.
3. Meningkatkan pencapaian akademik calon SPM 2021.
4. Melonjakkan keputusan SPM 2021 Negeri Sarawak

## Senarai Kandungan

Bil.	Perkara	Muka surat
1	Format Kertas Peperiksaan SPM Mulai Tahun 2021	2
2	Latihan - <b>Praktis Kimia 4541/1: Set 3</b>	3 – 20
3	Skema Jawapan/Pemarkahan	21
4	LAMPIRAN: Sampel Jadual Spesifikasi Ujian (JSU) untuk Praktis Kimia 4541/1: Set 1	22 – 23

## Senarai Ahli Panel Pembina Modul Semarak Kasih SPM 2.0

Bil.	Nama Guru	Sekolah	PPD
1.	Francisca Lau Siew Hsia	SMK Methodist	Sibu
2.	Belle Mahony Sie	SMK Luar Bandar Sibu	Sibu
3.	Fun Ngiik Ngon	SMK Bandar Sibu	Sibu
4.	Goh Leh Ling	SMK Sacred Heat	Sibu
5.	Hii Sian Kiong	SMK Sibu Jaya	Sibu
6.	Ling Mee Ling	SMK St. Elizabeth	Sibu
7.	Ling Teck Ping	SMK Tung Hua	Sibu
8.	Wong Kee Ping	SMK Bukit Assek	Sibu
9.	Yap Liew Yiing	SMK Tiong Hin	Sibu

## Penyelaras

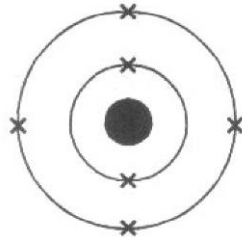
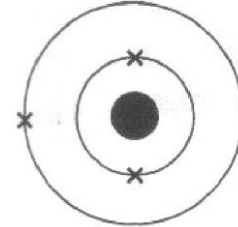
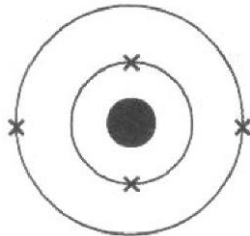
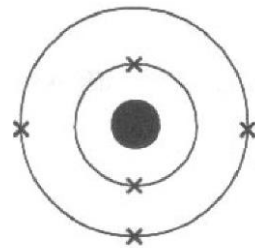
Bil.	Nama Pegawai	Stesen Bertugas
1	Evelin anak Medong	Unit Sains dan Matematik, JPN Sarawak
2	Haslina Binti Marzoki	Unit Sains dan Matematik, JPN Sarawak

**FORMAT INSTRUMEN PEPERIKSAAN SPM MULAI TAHUN 2021  
BAGI MATA PELAJARAN KIMIA (KOD: 4541)**

BIL	PERKARA	KERTAS 1 (4541/1)	KERTAS 2 (4541/2)	KERTAS 3 (4541/3)
1	Jenis Instrumen	Ujian Bertulis		Ujian Amali
2	Jenis Item	Objektif Aneka Pilihan	<ul style="list-style-type: none"> <li>• Subjektif Berstruktur</li> <li>• Subjektif Respons Terhad</li> <li>• Subjektif Respons Terbuka</li> </ul>	Subjektif Berstruktur
3	Bilangan Soalan	40 soalan (40 markah) (Jawab <b>semua</b> soalan)	<b>Bahagian A:</b> <ul style="list-style-type: none"> <li>• 8 soalan (60 Markah) (Jawab <b>semua</b> soalan)</li> <li>• <b>Bahagian B:</b> (20 Markah)</li> <li>• 2 soalan (Jawab 1 soalan)</li> </ul> <b>Bahagian C:</b> (20 Markah) <ul style="list-style-type: none"> <li>• 1 soalan</li> </ul>	3 item (Jawab mengikut subjek yang didaftar)
4	Jumlah Markah	<b>40 markah</b>	<b>100 markah</b>	<b>15 markah bagi setiap item</b>
5	Konstruk	<ul style="list-style-type: none"> <li>• Mengingat</li> <li>• Memahami</li> <li>• Mengaplikasi</li> <li>• Menganalisis</li> </ul>	<ul style="list-style-type: none"> <li>• Mengingat</li> <li>• Memahami</li> <li>• Mengaplikasi</li> <li>• Menganalisis</li> <li>• Menilai</li> <li>• Mencipta</li> </ul>	Kemahiran proses sains
6	Tempoh Ujian	1 jam 15 minit	2 jam 30 minit	40 minit + 5 minit setiap item (5 minit: sesi merancang) (40 minit: masa menjawab soalan)
7	Cakupan Konteks	Standard kandungan dan standard pembelajaran dalam Dokumen Standard Kurikulum dan Pentaksiran (DSKP) KSSM (Tingkatan 4 dan 5)		
8	Aras Kesukaran	Rendah : Sederhana : Tinggi 5 : 3 : 2		
9	Kaedah Penskoran	Dikotomus	Analitikal	
10	Alat Tambahan	Kalkulator saintifik		

**PRAKTIS KIMIA 4541/1****SET 3**

1. Antara susunan elektron berikut, yang manakah mempunyai dua elektron valens?  
Which of the following electron arrangements has two valence electrons?

**A****C****B****D**

2. Rajah 1 menunjukkan empat unsur dalam Kumpulan 1 Jadual Berkala Unsur.  
Diagram 1 shows four elements in Group 1 of the Periodic Table of elements.

Li
Na
K
Rb

Rajah 1 / Diagram 1

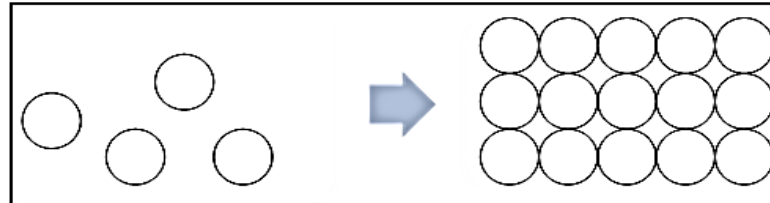
- Antara berikut, yang manakah benar tentang unsur-unsur ini?  
Which of the following is true about the elements?

- A** Unsur-unsur ini keras dan bersinar  
*The elements are hard and shiny*
- B** Unsur-unsur ini membentuk sebatian oksida berasid  
*The elements formed acidic oxides compounds*
- C** Unsur-unsur ini menjadi lebih reaktif apabila menurun ke kumpulan tersebut  
*The elements become more reactive going down the group*
- D** Takat lebur unsur-unsur ini meningkat apabila menurun ke kumpulan tersebut  
*The melting points of the elements increase going down the group*

3. Antara proses berikut yang manakah merupakan tindak balas redoks?  
*Which of the following process is a redox reaction?*

- |   |   |
|---|---|
| <b>A</b> Penghalogenan<br><i>Halogenation</i> | <b>C</b> Penyesaran<br><i>Displacement</i>  |
| <b>B</b> Peneutralan<br><i>Neutralisation</i> | <b>D</b> Pemendakan<br><i>Precipitation</i> |

4. Rajah 2 menunjukkan susunan zarah bagi suatu bahan.  
*Diagram 2 shows the arrangement of particles of a substance.*



Rajah 2 / *Diagram 2*

Apakah proses yang telah berlaku?  
*What is the process that has occurred?*

- |  |   |
|--|---|
| <b>A</b> Kondensasi<br><i>Condensation</i> | <b>C</b> Pemejalwapan<br><i>Sublimation</i> |
| <b>B</b> Pembekuan<br><i>Freezing</i>      | <b>D</b> Pengendapan<br><i>Deposition</i>   |

5. Antara yang berikut, yang manakah betul tentang elektrolit?  
*Which of the following is correct about an electrolyte*
- A** Unsur yang mengalirkan arus elektrik dalam keadaan leburan  
*Element that conducts electricity in molten state*
- B** Wujud sebagai cecair pada suhu bilik  
*Exists as liquid at room temperature*
- C** Mengkonduksikan arus elektrik dalam keadaan pepejal  
*Conduct electricity in solid state*
- D** Sebatian yang mengalirkan arus elektrik dalam keadaan leburan dan larutan akueus  
*Compounds that conduct electricity in molten state or aqueous solution*
6. Antara berikut, bahan manakah adalah asid monoprotik?  
*Which of the following substances is a monoprotic acid?*

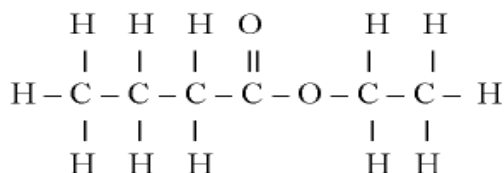
- |   |  |
|---|--|
| <b>A</b> Asid propanoik, $C_2H_5COOH$<br><i>Propanoic acid, <math>C_2H_5COOH</math></i> | <b>C</b> Asid sulfurik, $H_2SO_4$<br><i>Sulphuric acid, <math>H_2SO_4</math></i> |
| <b>B</b> Asid fosforik, $H_3PO_4$<br><i>Phosphoric acid, <math>H_3PO_4</math></i>       | <b>D</b> Asid karbonik, $H_2CO_3$<br><i>Carbonic acid, <math>H_2CO_3</math></i>  |

7. Antara berikut yang manakah padanan yang betul bagi kadar tindak balas rendah dan kadar tindak balas tinggi?

*Which of the following is the correct match of a low rate of reaction and a high rate of reaction?*

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

8. Rajah 3 menunjukkan formula struktur suatu sebatian karbon.  
*Diagram 3 shows the structural formula of a carbon compound.*



Rajah 3/ Diagram 3

Antara berikut, yang manakah padanan yang betul bagi siri homolog dan kumpulan berfungsinya?

*Which of the following is correct match of the homologous series and its functional group?*

	<b>Siri homolog</b> <i>Homologous series</i>	<b>Kumpulan berfungsi</b> <i>Functional group</i>
<b>A</b>	Asid karboksilik <i>Carboxylic acid</i>	Kumpulan karboksilat <i>Carboxylate group</i>
<b>B</b>	Ester <i>Esters</i>	Kumpulan karboksilat <i>Carboxylate group</i>
<b>C</b>	Alcohol <i>Alcohol</i>	Kumpulan hidroksil <i>Hydroxyl group</i>
<b>D</b>	Alkena <i>Alkene</i>	Kumpulan karboksil <i>Carboxyl group</i>

9. Antara berikut, yang manakah mengalami pemolimeran kondensasi?  
*Which of the following undergoes condensation polymerization?*

**A** Polietena  
*Polyethene*

**B** Polivinil klorida  
*Polyvinil chloride*

**C** Polistirena  
*Polystyrene*

**D** Terilena  
*Terylene*

10. Rajah 4 menunjukkan terapi sinar untuk rawatan kanser. Sinar gamma yang digunakan untuk membunuh sel kanser dihasilkan oleh suatu isotop.

*Diagram 4 shows radio therapy for the treatment of cancer. The gamma radiation used to destroy cancer cells is generated by an isotope.*



Rajah 4 / *Diagram 4*

Apakah nama isotop tersebut?

*What is the name of the isotope?*

**A** Iodin-131  
*Iodine-131*

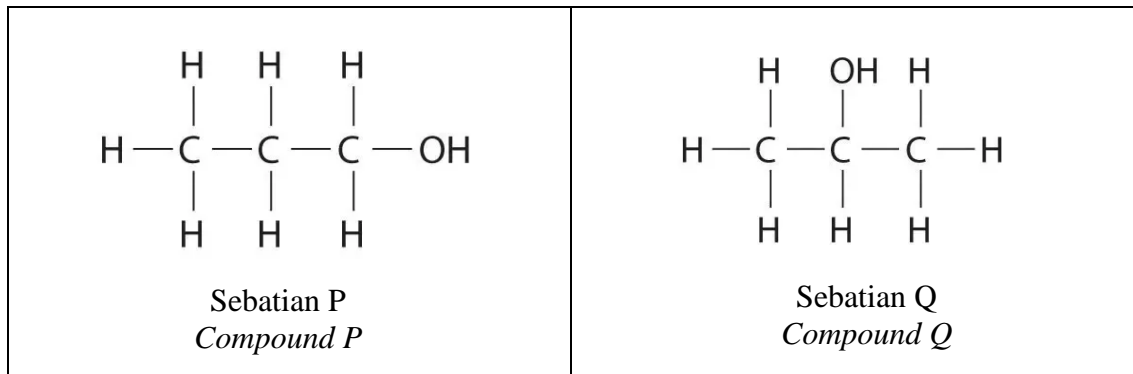
**B** Kobalt-60  
*Cobalt-60*

**C** Natrium-24  
*Sodium-24*

**D** Karbon-12  
*Carbon-12*



- 11 Rajah 5 menunjukkan dua isomer bagi propanol.  
Diagram 5 shows two isomers of propanol



Rajah 5 / Diagram 5

Apakah perbezaan antara sebatian P dan Q?

What are the differences between compounds P and Q?

- |   |   |
|---|---|
| <p><b>I</b> Sifat fizik<br/><i>Physical properties</i></p> <p><b>II</b> Formula struktur<br/><i>Structural formula</i></p> <p><b>III</b> Sifat kimia<br/><i>Chemical properties</i></p> <p><b>IV</b> Formula molekul<br/><i>Molecular formula</i></p> | <p><b>C</b> I dan IV<br/><i>I and IV</i></p> <p><b>D</b> III dan IV<br/><i>III and IV</i></p> |
| <p><b>A</b> I dan II<br/><i>I and II</i></p> <p><b>B</b> II dan III<br/><i>II and III</i></p>   | <p><b>C</b> I dan IV<br/><i>I and IV</i></p> <p><b>D</b> III dan IV<br/><i>III and IV</i></p> |

- 12 Antara berikut, yang manakah menyerap haba dari persekitaran?  
Which of the following absorbs heat from the surroundings?

- A** Tambahkan asid kepada alkali  
*Adding acid to alkali*
- B** Tambahkan asid pekat ke dalam air  
*Adding concentrated acid to water*
- C** Larutkan pepejal ammonium klorida di dalam air  
*Dissolving solid ammonium chloride in water*
- D** Larutkan kuprum(II) sulfat kontang di dalam air  
*Dissolving anhydrous copper(II) sulphate in water*

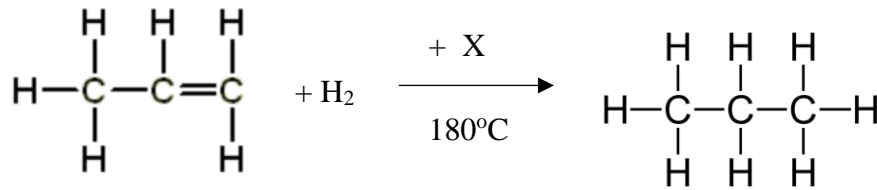
13. Seorang murid tertumpah kuah kari di atas pakaian sekolahnya. Bahan tambah P yang terdapat dalam detergen membantu menyingkirkan kesan kari tersebut. Apakah bahan tambah P?

*A child spilled curry gravy on his school uniform. The presence of additive P in detergent can make remove the curry stain. What is the additive P?*

- |  |   |
|--|---|
| <b>A</b> Protease<br><i>Protease</i>                 | <b>C</b> Natrium silikat<br><i>Sodium silicate</i>      |
| <b>B</b> Natrium karbonat<br><i>Sodium carbonate</i> | <b>D</b> Pewarna pendafflour<br><i>Fluorescent dyes</i> |

14. Persamaan berikut mewakili tindak balas suatu bahan.

*The following equation represents a reaction of a substance.*

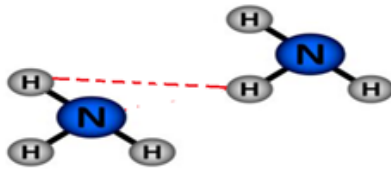


Apakah X?

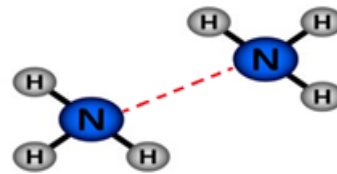
*What is X?*

- |                                 |   |
|---------------------------------|---|
| <b>A</b> Iron<br><i>Ferum</i>   | <b>C</b> Asid fosforik<br><i>Phosphoric acid</i>          |
| <b>B</b> Nikel<br><i>Nickel</i> | <b>D</b> Vanadium (V) oksida<br><i>Vanadium (V) oxide</i> |
15. Antara berikut, yang manakah menunjukkan ikatan hidrogen yang betul di antara molekul ammonia?
- Which of the followings show the correct hydrogen bonding between ammonia molecules?*

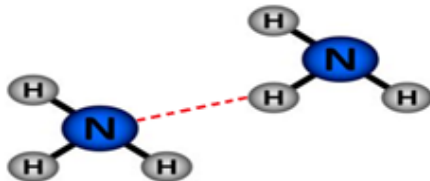
**A**



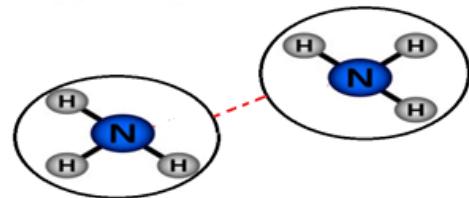
**C**



**B**



**D**



16. Rajah 6 menunjukkan susunan radas bagi penyediaan garam.  
*Diagram 6 shows the apparatus set-up for the preparation of salt.*

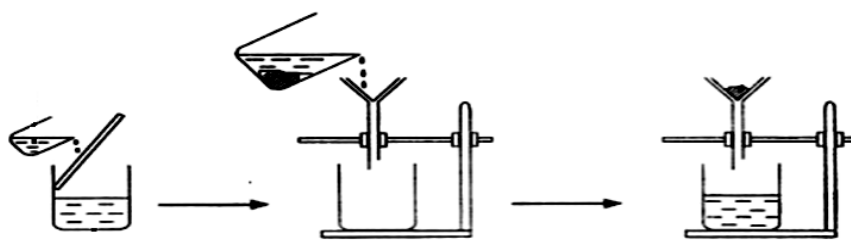
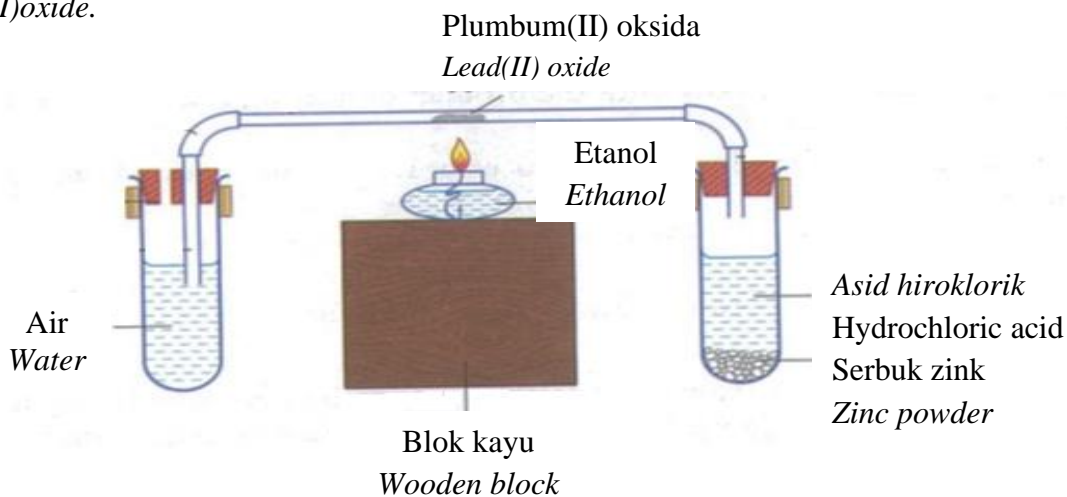


Diagram 6 / Rajah 6

Garam manakah yang disediakan melalui kaedah ini?  
*Which salt is prepared through this method?*

- |          |                   |          |                                   |
|----------|-------------------|----------|-----------------------------------|
| <b>A</b> | BaSO <sub>4</sub> | <b>C</b> | Pb(NO <sub>3</sub> ) <sub>2</sub> |
| <b>B</b> | CuCl <sub>2</sub> | <b>D</b> | Na <sub>2</sub> CO <sub>3</sub>   |
17. Rajah 7 menunjukkan susunan radas untuk menentukan formula empirik bagi plumbum(II) oksida.  
*Diagram 7 shows the set-up of apparatus to determine the empirical formula of lead(II) oxide.*



Rajah 7 / Diagram 7

Pernyataan manakah yang menerangkan mengapa kaedah ini **tidak** sesuai untuk menentukan formula empirik magnesium oksida?  
*Which statement explains why the method is **not** suitable to determine the empirical formula of magnesium oxide?*

- A** Magnesium meletup apabila dipanaskan  
*Magnesium explodes when it is heated*
- B** Magnesium lebih reaktif daripada hidrogen  
*Magnesium is more reactive than hydrogen*
- C** Magnesium lebih reaktif berbanding plumbum  
*Magnesium is more reactive when compared to lead.*
- D** Magnesium terbakar dengan sangat cergas dalam gas oksigen  
*Magnesium burns vigorously in oxygen gas*

18. Jadual 1 menunjukkan nilai pH bagi dua larutan dengan kepekatan yang sama.  
*Table 1 shows the pH values of two solutions with the same concentration.*

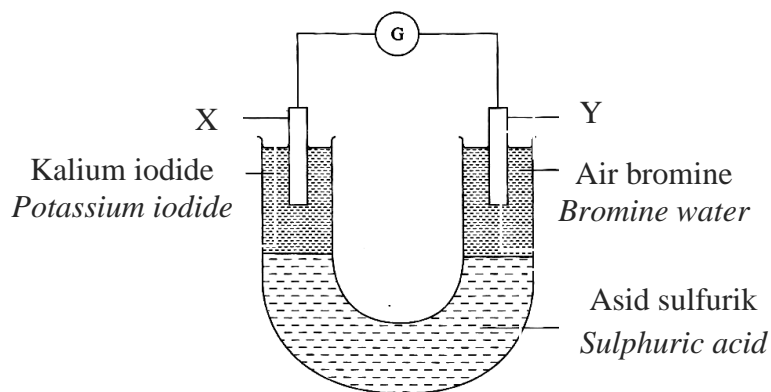
Larutan <i>Solution</i>	pH
Q	13
R	9

Jadual 1 / *Table 1*

Pernyataan manakah yang menerangkan perbezaan antara nilai pH itu?  
*Which statement explains the differences in the pH values?*

- A** Q mengion separa manakala R mengion lengkap  
*Q ionises partially while R ionises completely*
- B** Kepekatan ion hidroksida dalam Q adalah lebih rendah daripada R  
*The concentration of hydroxide ion in Q is lower than R*
- C** Bilangan mol ion hidroksida dalam Q adalah kurang daripada R  
*The number of moles of hydroxide ion in Q is less than R*
- D** Darjah pengionan Q adalah lebih tinggi daripada R dalam air  
*The degree of ionisation of Q is higher than R in water*
19. Silikon dioksida ialah komponen utama kaca. Apakah jenis kaca yang terbentuk apabila kalsium karbonat dipanaskan dengan silikon dioksida?  
*Silicon dioxide is a major component of glass. What type of glass is formed when calcium carbonate is heated with silicon dioxide?*
- A** Kaca silika terlakur  
*Fused glass*
- B** Kaca bososilikat  
*Borosilicate glass*
- C** Kaca plumbum  
*Lead crystal glass*
- D** Kaca soda kapur  
*Soda-lime glass*
20. Osteoporosis ialah penyakit tulang yang berlaku apabila tubuh kehilangan kepadatan tulang. Makanan tambahan kalsium bersaiz nano dipercayai dapat diserap dengan lebih baik untuk mengatasi masalah kesihatan ini. Antara berikut, penerangan yang manakah paling betul menjelaskan pernyataan tersebut?  
*Osteoporosis is a bone disease that occurs when the body loses too much bone density. Nano-sized calcium supplement is believed to be absorbed better in order to overcome this health problem. Which of the following explanations best clarifies the statement?*
- A** Kadar penyerapan ion kalsium ke dalam aliran darah lebih tinggi.  
*Rate of absorption of calcium ions into the bloodstream is higher.*
- B** Ion kalsium yang lebih kecil membenarkan penyerapan yang lebih baik melalui usus kecil.  
*Smaller calcium ion allows better diffusions through small intestine.*
- C** Ion kalsium dipecahkan kepada komponen yang lebih kecil sebelum diserap ke dalam usus kecil.  
*Calcium ions are broken into smaller components before they are absorbed into the intestine.*
- D** Kalsium bersaiz nano melekat pada tulang dengan lebih baik.  
*Nano-sized calcium attaches better in the bone.*

21. Berapakah nilai pH larutan barium hidroksida,  $\text{Ba(OH)}_2$   $0.02 \text{ mol dm}^{-3}$ ?  
*What is the pH value of  $0.02 \text{ mol dm}^{-3}$  of barium hydroxide solution,  $\text{Ba(OH)}_2$ ?*
- A 1.4    C 12.3  
B 1.7    D 12.6
22. Unsur Y terletak dalam kumpulan yang sama dengan bromin dalam Jadual Berkala Unsur.  
Antara yang berikut, yang manakah betul tentang Y?  
*Element Y is located in the same group as bromine in the Periodic Table of Elements.  
Which of the following is correct about Y?*
- A Menbetuk ion  $\text{Y}^-$   
*Form  $\text{Y}^-$  ion*
- B Membentuk oksida bes  
*Forms basic oxide*
- C Wujud sebagai monoatom  
*Exists as monoatomic*
- D Bertindak balas dengan natrium untuk membentuk pepejal hitam  
*Reacts with sodium to form black solid.*
23. Rajah 8 menunjukkan susunan radas untuk mengkaji tindak balas pemindahan elektron dalam suatu jarak.  
*Diagram 8 shows the apparatus set-up to study the transfer reaction of electron at a distance.*

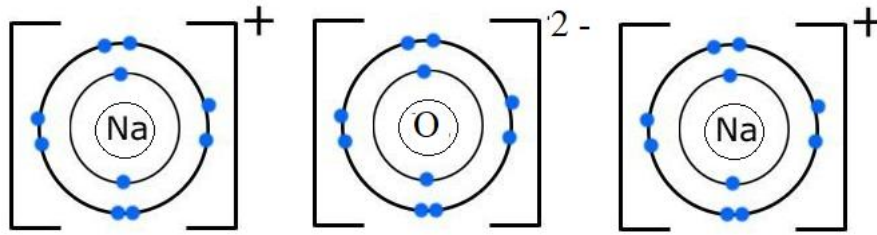


Rajah 8/ Diagram 8

Antara yang berikut, yang manakah berlaku di X dan Y?  
*Which of the following occur at X and Y?*

<b>A</b>	Nombor pengoksidaan iodin berubah dari 0 ke -1 <i>Oxidation number of iodine changes from 0 to -1</i>	Nombor pengoksidaan bromin berubah dari -1 ke 0 <i>Oxidation number of bromine changes from -1 to 0</i>
<b>B</b>	Larutan perang menjadi tidak berwarna <i>Brown solution turns colourless</i>	Tiada perubahan warna <i>No change in colour</i>
<b>C</b>	Ion iodida dioksidakan <i>Iodide ion is oxidised</i>	Bromin diturunkan <i>Bromine is reduced</i>
<b>D</b>	Jisim X bertambah <i>Mass of X increases</i>	Jisim Y berkurang <i>Mass of Y decreases</i>

24. Rajah 9 menunjukkan susunan elektron bagi suatu sebatian.  
*Diagram 9 shows the electron arrangement of a compound.*

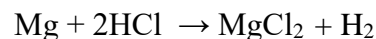


Rajah 9 / Diagram 9

Antara pernyataan berikut, yang manakah benar tentang sebatian ini?  
*Which of the following statements is true about the compound?*

- A** Sebatian ini adalah sebatian kovalen  
*It is a covalent compound*
- B** Sebatian itu terbentuk melalui ikatan ion  
*The compound is formed by ionic bond*
- C** Sebatian ini mempunyai takat lebur yang rendah  
*The compound has low melting point*
- D** Sebatian ini terbentuk melalui perkongsian elektron  
*The compound is formed by electron sharing*
25. 2.40 g magnesium bertindak balas dengan 100 cm<sup>3</sup> asid hidroklorik 1.0 mol dm<sup>-3</sup> menghasilkan magnesium klorida dan gas hidrogen.  
*2.40 g magnesium reacts with 100cm<sup>3</sup> of 1.0 moldm<sup>-3</sup> hydrochloric acid to produce magnesium chloride and hydrogen gas.*

Persamaan kimia untuk tindak balas ini adalah seperti berikut:  
*The chemical equation for the reaction is as follows:*



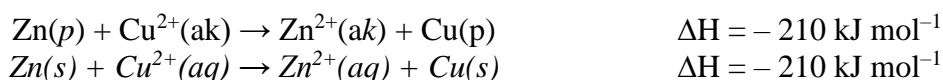
Apakah jisim maksimum magnesium klorida yang dihasilkan?  
*What is the maximum mass of magnesium chloride formed?*

[Jisim atom relatif : Mg=24; Cl=35.5]

[Relative atomic mass of Mg=24; Cl=35.5]

- A** 1.20 g                                  **C** 4.75g  
**B** 2.40 g                                  **D** 9.50g

26. Apakah yang berlaku apabila getah asli divulcankakan?  
*What happen when natural rubber is vulcanised?*
- A** Takat lebur getah berkurang  
*The melting point of rubber decreases*
- B** Getah ter vulkan lebih rintangan terhadap haba  
*Vulcanised rubber is more resistant to heat*
- C** Getah ter vulkan kurang rintangan terhadap pengoksidaan  
*Vulcanised rubber is less resistant to oxidation*
- D** Molekul getah menggelongsor lebih mudah antara satu sama lain  
*Rubber molecules slide more easily over each other*
27. Persamaan termokimia bagi tindak balas penyesaran kuprum oleh zink adalah seperti berikut:  
*The thermochemical equation for the displacement of copper by zinc is given as below:*



Dalam suatu eksperimen, serbuk zink berlebihan ditambah ke dalam larutan kuprum(II) sulfat  $0.5 \text{ mol dm}^{-3}$ . Didapati  $10\,500 \text{ J}$  haba terhasil. Berapakah isi padu larutan kuprum(II) sulfat yang digunakan?

*In an experiment, excess zinc powder is added into  $0.5 \text{ mol dm}^{-3}$  of copper(II) sulphate solution. Given  $10\,500 \text{ J}$  of heat is produced. What is the volume of copper(II) sulphate solution used?*

- A**  $200 \text{ cm}^3$                                       **C**  $50 \text{ cm}^3$   
**B**  $100 \text{ cm}^3$                                       **D**  $10 \text{ cm}^3$
28. Rajah 10 menunjukkan formula struktur bagi suatu hidrokarbon.  
*Diagram 10 shows the structural formula of a hydrocarbon.*

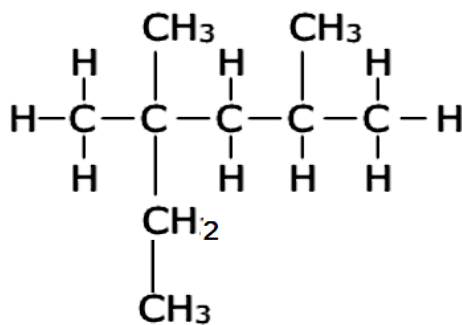


Diagram 10 / Rajah 10

Apakah nama bagi hidrokarbon itu dengan menggunakan tatanama IUPAC?  
*What is the name for the hydrocarbon by using IUPAC nomenclature?*

- A** 2, 3, 4 - trimetilpentana  
*2, 3, 4 - trimethylpentane*
- B** 2 - etil - 2, 4 - dimetilpentana  
*2 - ethyl - 2, 4 - dimethylpentane*
- C** 2, 4 - dimetil - 4 - etilpentana  
*2, 4 - dimethyl - 4 - ethylpentane*
- D** 2, 4, 4 - trimetilheksana  
*2, 4, 4 - trimethylhexane*

29. Rajah 11 menunjukkan sebuah termos besi nirkarat.

*Diagram 11 shows a stainless steel thermos.*



Rajah 11 / Diagram 11

Besi nirkarat ialah aloi besi. Oleh itu, termos besi nirkarat tidak mudah berkarat kerana kehadiran atom kromium di dalam aloi

*Stainless steel is an alloy of iron. Therefore, stainless steel thermos does not rust easily because the presence of chromium atoms in alloy*

- A** mengisi penuh ruang kosong di antara atom-atom dan menjadikannya lebih mampat.  
*fills up the empty spaces between the atoms and makes it denser.*
- B** mengelakkan lapisan atom dalam aloi menggelongsor di antara satu sama lain.  
*prevents the layers of atoms in the alloy from sliding over one another.*
- C** berfungsi sebagai logam pengorbanan and mengelakkan pengaratan besi.  
*serves as a sacrificial metal and prevents the corrosion of iron.*
- D** membentuk lapisan pelindung oksida pada permukaan aloi.  
*forms a protective oxide layer on the surface of the alloy.*
30. Rajah 12 menunjukkan sejenis bunga yang berbau harum.  
*Diagram 12 shows a flower that has a pleasant fragrance.*



Rajah12 / Diagram 12

Apakah nama bahan yang memberikan haruman itu?

*What is the name of the substance that gives the pleasant fragrance?*

- |   |  |
|---|--|
| <b>A</b> Asid etanoik<br><i>Ethanoic acid</i>     | <b>C</b> Geranil etanoat<br><i>Geranyl ethanoate</i> |
| <b>B</b> Etana-1,2-diol<br><i>Ethane-1,2-diol</i> | <b>D</b> Etanol<br><i>Ethanol</i>                    |



31. Jadual 2 menunjukkan jumlah isipadu gas karbon dioksida yang terkumpul pada sela masa tertentu dalam suatu tindak balas antara kalsium karbonat dengan asid hidroklorik.  
 Table 2 shows the total volume of carbon dioxide gas collected at various time interval in a reaction of calcium carbonate with hydrochloric acid.

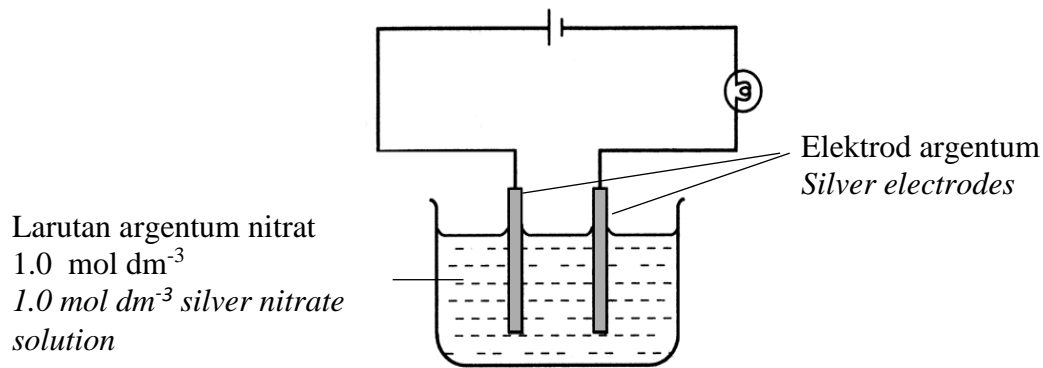
<b>Masa/s Time/ s</b>	0	30	60	90	120	150	180	210
<b>Isipadu gas / cm<sup>3</sup> Volume of gas/ cm<sup>3</sup></b>	0.00	4.20	7.70	10.90	13.70	15.20	16.00	16.00

Jadua 2/ Table 2

Berapakah kadar tindak balas purata dalam minit kedua?

*What is the average rate of reaction in the second minute?*

- A 0.128 cm<sup>3</sup> s<sup>-1</sup>                                      C 0.114 cm<sup>3</sup> s<sup>-1</sup>  
 B 0.100 cm<sup>3</sup> s<sup>-1</sup>                                      D 0.088 cm<sup>3</sup> s<sup>-1</sup>
- 32 Rajah 13 menunjukkan elektrolisis larutan argentum nitrat 1.0 mol dm<sup>-3</sup> menggunakan elektrod argentum.  
 Antara persamaan setengah berikut yang manakah mewakili tindak balas di anod dan katod?  
 Diagram 13 shows the electrolysis of 1.0 mol dm<sup>-3</sup> silver nitrate solution using silver electrodes.  
 Which of the following half equations represent reactions at the anode and cathode?



Rajah 13 / Diagram 13



	<b>Anod</b> <i>Anode</i>	<b>Katod</b> <i>Cathode</i>
<b>A</b>	$\text{Ag} \rightarrow \text{Ag}^+ + \text{e}$	$\text{Ag}^+ + \text{e} \rightarrow \text{Ag}$
<b>B</b>	$\text{Ag} \rightarrow \text{Ag}^+ + \text{e}$	$2\text{H}^+ + 2\text{e} \rightarrow \text{H}_2$
<b>C</b>	$4\text{OH}^- \rightarrow 2\text{H}_2\text{O} + \text{O}_2 + 4\text{e}$	$\text{Ag}^+ + \text{e} \rightarrow \text{Ag}$
<b>D</b>	$4\text{OH}^- \rightarrow 2\text{H}_2\text{O} + \text{O}_2 + 4\text{e}$	$2\text{H}^+ + 2\text{e} \rightarrow \text{H}_2$

33. Seorang penoreh getah mendapati lateks teragumpal selepas beberapa jam. Bahan apakah yang seharusnya ditambahkan kepada lateks untuk mencegah lateks daripada teragumpal?  
*A rubber tapper finds that latex coagulates after several hours. What substance should be added into the latex to prevent it from coagulating?*

- A** Larutan natrium klorida  
*sodium chloride solution*
- B** Larutan ammonia  
*ammonia solution*
- C** Asid etanoik  
*Ethanoic acid*
- D** Asid nitrik  
*Nitric acid*

34. Gambarajah 14 menunjukkan keputusan satu eksperimen untuk mengkaji kesan logam lain ke atas pengurangan besi. Kedua-dua paku besi dililitkan dengan logam yang berlainan dan direndam dalam larutan agar-agar yang mengandungi kalium heksasianoferat (III) dan fenolftalein

*Diagram 14 shows the results of an experiment to investigate the effect of other metals on the rusting of iron. The iron nails are coiled with two different metals and dipped into jelly solution containing potassium hexacyanoferrate (III) and phenolphthalein.*

<b>Tabung uji</b> <i>Test tube</i>	<b>Prosedur</b> <i>Procedure</i>	<b>Pemerhatian selepas 3 hari</b> <i>Observation after 3 days</i>
p	 <p>Paku besi dililitkan dengan logam X <i>Iron nail coiled with metal X</i></p>	<p>Tompok merah jambu <i>Pink spot</i></p>
Q	 <p>Paku besi dililitkan dengan logam Y <i>Iron nail coiled of metal Y</i></p>	<p>Tompok biru <i>blue spot</i></p>

Rajah 14 / *Diagram 14*

Berdasarkan keputusan di atas, susun besi, X dan Y mengikut turutan menaik keelektropositifannya.

*Based on the above result, arrange iron, X and Y in ascending order of electropositivity.*

- A** X, iron, Y
- B** Y, iron, X
- C** Iron, X, Y
- D** Iron, Y, X

35. Satu siri ujian telah dijalankan ke atas larutan garam X. Jadual 3 menunjukkan keputusan ujian tersebut  
*A series of tests were carried out on a solution of salt X. Table 3 shows the results of the tests.*

<b>Ujian Test</b>	<b>Pemerhatian Observation</b>
Tambahkan larutan plumbum(II) nitrat <i>Add lead(II) nitrate solution.</i>	Mendakan putih, larut dalam air apabila dipanaskan. <i>White precipitate dissolves in water when heated.</i>
Tambahkan asid sulfurik cair. <i>Add dilute sulphuric acid.</i>	Tiada perubahan. <i>No change.</i>
Tambahkan larutan natrium hidroksida sehingga berlebihan. <i>Add sodium hydroxide solution until in excess.</i>	Mendakan putih terbentuk. Ia tidak larut dalam larutan natrium hidroksida berlebihan. <i>White precipitate is formed. It is insoluble in excess sodium hydroxide solution.</i>
Tambahkan larutan akueus ammonia sehingga berlebihan. <i>Add ammonia solution until in excess.</i>	Mendakan putih terbentuk. Ia tidak larut dalam larutan akueus ammonia berlebihan. <i>White precipitate is formed. It is insoluble in excess ammonia solution.</i>

Jadual 3 / Table 3

Berdasarkan keputusan eksperimen, garam X ialah  
*Based on the results of the experiment, salt X is*

- |   |   |
|---|---|
| <b>A</b> Zinc klorida<br><i>Zinc chloride</i>         | <b>C</b> Aluminium sulfat<br><i>Aluminium sulphate</i>  |
| <b>B</b> Kalsium karbonat<br><i>Calcium carbonate</i> | <b>D</b> Magnesium klorida<br><i>Magnesium chloride</i> |

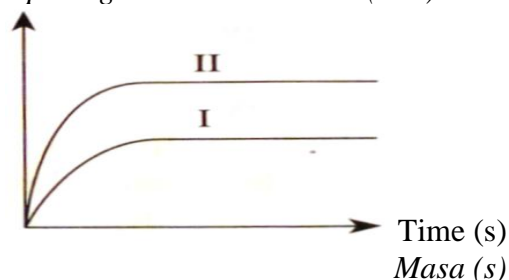
36. Jadual 4 menunjukkan keadaan tindak balas bagi dua set eksperimen.  
 Table 4 shows the reacting conditions of two sets of experiment.

Set Set	Keadaan tindak balas Reacting conditions
I	Marmar berlebihan + 25 cm <sup>3</sup> asid nitrik 0.1 mol dm <sup>-3</sup> pada suhu bilik <i>Excess marble chips + 25 cm<sup>3</sup> of 0.1 mol dm<sup>-3</sup> nitric acid at room temperature</i>
II	Marmar berlebihan + 50 cm <sup>3</sup> asid nitrik 0.05 mol dm <sup>-3</sup> pada suhu bilik <i>Excess marble chips + 50 cm<sup>3</sup> of 0.05 mol dm<sup>-3</sup> nitric acid at room temperature</i>

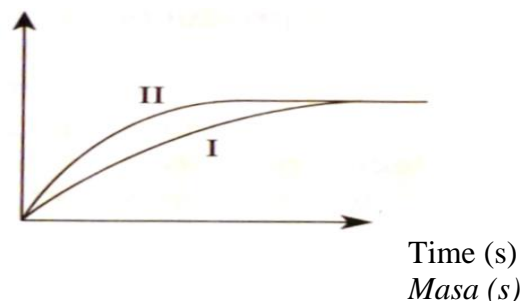
Jadual 4 / Table 4

Antara graf berikut yang manakah menunjukkan isipadu gas karbon dioksida yang terbebas melawan masa bagi kedua-dua eksperimen?  
 Which of the following graph shows the volume carbon dioxide gas liberated against time for both experiment?

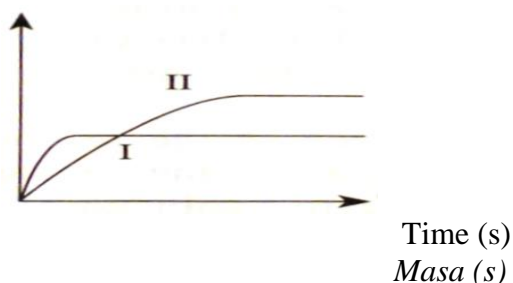
- A Volume of carbon dioxide gas (cm<sup>3</sup>)  
 Isipadu gas karbon dioksida (cm<sup>3</sup>)



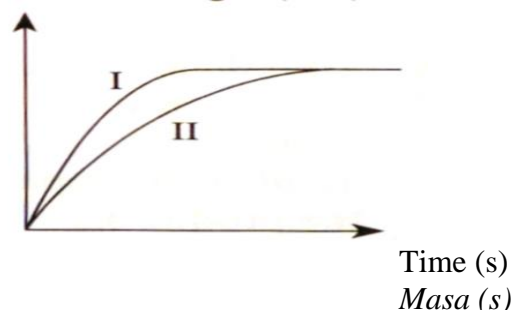
- C Volume of carbon dioxide gas (cm<sup>3</sup>)  
 Isipadu gas karbon dioksida (cm<sup>3</sup>)



- B Volume of carbon dioxide gas (cm<sup>3</sup>)  
 Isipadu gas karbondioksida (cm<sup>3</sup>)



- D Volume of carbon dioxide gas (cm<sup>3</sup>)  
 Isipadu gas karbondioksida (cm<sup>3</sup>)



37. Jadual 5 menunjukkan nilai keupayaan elektrod piawai setengah sel bagi beberapa logam.  
*Table 5 shows the standard electrode potential values of half-cells of some metals.*

$\text{Cu}^{2+}(\text{aq}) + 2\text{e}^{-} \rightleftharpoons \text{Cu}(\text{s})$ $\text{Cu}^{2+}(\text{ak}) + 2\text{e}^{-} \rightleftharpoons \text{Cu}(\text{p})$	$E^{\circ} = +0.34\text{V}$
$\text{Zn}^{2+}(\text{aq}) + 2\text{e}^{-} \rightleftharpoons \text{Zn}(\text{s})$ $\text{Zn}^{2+}(\text{ak}) + 2\text{e}^{-} \rightleftharpoons \text{Zn}(\text{p})$	$E^{\circ} = -0.76\text{V}$
$\text{Ag}^{+}(\text{aq}) + \text{e}^{-} \rightleftharpoons \text{Ag}(\text{s})$ $\text{Ag}^{+}(\text{ak}) + \text{e}^{-} \rightleftharpoons \text{Ag}(\text{p})$	$E^{\circ} = +0.80\text{V}$
$\text{Mg}^{2+}(\text{aq}) + 2\text{e}^{-} \rightleftharpoons \text{Mg}(\text{s})$ $\text{Mg}^{2+}(\text{ak}) + 2\text{e}^{-} \rightleftharpoons \text{Mg}(\text{p})$	$E^{\circ} = -2.38\text{V}$

Jadual 5 / Table 5

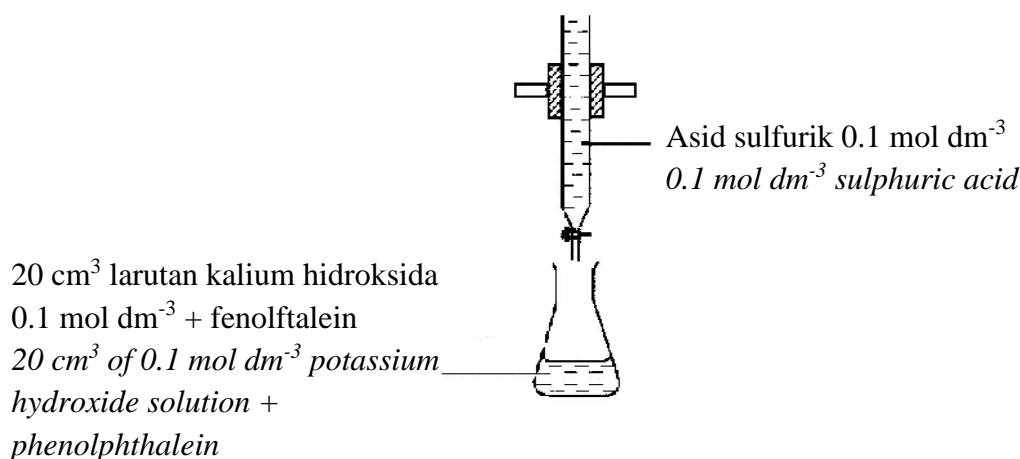
Berdasarkan kepada sel notasi yang berikut, tentukan sel voltan yang menghasilkan bacaan voltan yang paling besar.

*Based on the following cell notation, determine the voltaic cell that will produce the highest voltage reading.*

- |   |   |
|---|---|
| <b>A</b> $\text{Ag}(\text{s})   \text{Ag}^{+}(\text{aq})    \text{Mg}^{2+}(\text{aq})   \text{Mg}(\text{s})$<br>$\text{Ag}(\text{p})   \text{Ag}^{+}(\text{ak})    \text{Mg}^{2+}(\text{ak})   \text{Mg}(\text{p})$   | <b>C</b> $\text{Mg}(\text{s})   \text{Mg}^{2+}(\text{aq})    \text{Zn}^{2+}(\text{aq})   \text{Zn}(\text{s})$<br>$\text{Mg}(\text{p})   \text{Mg}^{2+}(\text{ak})    \text{Zn}^{2+}(\text{ak})   \text{Zn}(\text{p})$ |
| <b>B</b> $\text{Zn}(\text{s})   \text{Zn}^{2+}(\text{aq})    \text{Cu}^{2+}(\text{aq})   \text{Cu}(\text{s})$<br>$\text{Zn}(\text{p})   \text{Zn}^{2+}(\text{ak})    \text{Cu}^{2+}(\text{ak})   \text{Cu}(\text{p})$ | <b>D</b> $\text{Cu}(\text{s})   \text{Cu}^{2+}(\text{aq})    \text{Mg}^{2+}(\text{aq})   \text{Mg}(\text{s})$<br>$\text{Cu}(\text{p})   \text{Cu}^{2+}(\text{ak})    \text{Mg}^{2+}(\text{ak})   \text{Mg}(\text{p})$ |

38. Rajah 15 menunjukkan susunan radas bagi pentitratan larutan natrium hidroksida dengan asid sulfurik.

*Diagram 15 shows set up apparatus for titration of potassium hydroxide with sulphuric acid.*



Rajah 15 / Diagram 15

Berapakah jumlah isipadu campuran di dalam kelalang kon pada takat akhir pentitratan dalam Rajah 15?

*What is total volume of the mixed solution in the conical flask at the end point of titration in Diagram 15?*

- |                            |                            |
|----------------------------|----------------------------|
| <b>A</b> $10 \text{ cm}^3$ | <b>C</b> $30 \text{ cm}^3$ |
| <b>B</b> $20 \text{ cm}^3$ | <b>D</b> $40 \text{ cm}^3$ |

39. Jadual 6 menunjukkan nombor proton bagi W, X, Y dan Z. X dan Z bertindak balas untuk menghasilkan sebatian A manakala W dan Y bertindak balas untuk menghasilkan sebatian B.

*Table 6 shows the proton number for elements W, X, Y and Z. X and Z react to form compound A while W and Y react to form compound B.*

<b>Unsur Element</b>	<b>Nombor proton Proton number</b>
<b>W</b>	8
<b>X</b>	11
<b>Y</b>	15
<b>Z</b>	17

Jadual 6 / Table 6

Antara pernyataan berikut, yang manakah **benar** tentang sebatian A dan sebatian B?  
*Which of the following statement is **true** about the compound A and B?*

- I Sebatian A mudah meruap manakala sebatian B tidak meruap.  
*Compound A is volatile while compound B is non-volatile.*
- II Sebatian A boleh mengkonduksikan elektrik dalam keadaan leburan manakala sebatian B tidak boleh mengkonduksikan elektrik.  
*Compound A can conduct electricity in molten state while compound B cannot.*
- III Sebatian A ialah cecair manakala sebatian B ialah pepejal pada suhu bilik.  
*Compound A is a liquid while compound B is a solid at room condition.*
- IV Sebatian A mempunyai takat lebur yang lebih tinggi daripada sebatian B.  
*Compound A has higher melting point than compound B*

**A** I dan II sahaja  
*I and II only*

**C** II dan IV sahaja  
*II and IV only*

**B** II dan III sahaja  
*II and III only*

**D** I dan IV sahaja  
*I and IV only*

40. Haba pembakaran propanol,  $C_3H_7OH$  ialah  $-2016 \text{ kJ mol}^{-1}$ . Apabila 0.3 g propanol terbakar lengkap dalam oksigen, haba yang dibebaskan digunakan untuk memanaskan  $250 \text{ cm}^3$  air. Berapakah kenaikan suhu untuk air?

[Muatan haba tentu air =  $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$ , Jisim molar propanol =  $60 \text{ g mol}^{-1}$ ]

*The heat of combustion for propanol,  $C_3H_7OH$  is  $-2016 \text{ kJ mol}^{-1}$ . When 0.3 g of propanol is completely burnt, the heat given out is used to heat  $250 \text{ cm}^3$  of water. What is the rise in temperature for the water?*

[Specific heat capacity of water =  $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$ . Molar mass of propanol =  $60 \text{ g mol}^{-1}$ ]

**A**  $2.4 \text{ }^\circ\text{C}$   
**B**  $9.6 \text{ }^\circ\text{C}$

**C**  $4.8 \text{ }^\circ\text{C}$   
**D**  $19.2 \text{ }^\circ\text{C}$

**SKEMA JAWAPAN  
PRAKTIS KIMIA 4541/1  
SET 3**

Jawapan Kertas 1  
*Answers Paper 1*

1	B	11	A	21	D	31	B
2	C	12	C	22	A	32	A
3	C	13	A	23	C	33	B
4	D	14	B	24	B	34	B
5	D	15	B	25	C	35	D
6	A	16	A	26	B	36	D
7	D	17	B	27	B	37	A
8	B	18	D	28	D	38	C
9	D	19	D	29	D	39	C
10	B	20	B	30	C	40	B

**LAMPIRAN**

(Untuk rujukan guru)

**SAMPEL JADUAL SPESIFIKASI UJIAN (JSU)  
PRAKTIS KIMIA 4541/1: SET 3**

Chapter	Sub-chapter	Remembering			Understanding			Applying			Analyzing			Total
		E	M	H	E	M	H	E	M	H	E	M	H	
<b>1. Introduction to chemistry [F4]</b>	1.1 Development in chemistry field and its importance in daily life													
	1.2 Scientific investigation in chemistry													
	1.3 Usage, management and handling of apparatus and materials													
<b>2. Matter and the Atomic Structure [F4]</b>	2.1 Basic concepts of matter	4												1
	2.2 The development of the atomic model													
	2.3 Atomic structure	1												1
	2.4 Isotopes and its uses	10												1
<b>3. The Mole Concept, Chemical Formula and Equation [F4]</b>	3.1 Relative atomic mass and relative molecular mass													
	3.2 Mole concept													
	3.3 Chemical formula					17								1
	3.4 Chemical equation							25						1
<b>4. The Periodic Table of Elements [F4]</b>	4.1 The development of The Periodic Table of Elements													
	4.2 The arrangement in The Periodic Table of Elements													
	4.3 Elements in Group 18													
	4.4 Elements in Group 1		2											1
	4.5 Elements in Group 17							22						1
	4.6 Elements in Period 3													
	4.7 Transition elements													
<b>5. Chemical Bond [F4]</b>	5.1 Basics of compound formation													
	5.2 Ionic bond							24						1
	5.3 Covalent bond													
	5.4 Hydrogen bond				15									1
	5.5 Dative bond													
	5.6 Metallic bond													
	5.7 Properties of ionic and covalent compounds										39			1



Chapter	Sub-chapter	Knowledge			Understanding			Application			Analysis			Total	
		E	M	H	E	M	H	E	M	H	E	M	H		
<b>6. Acid, Base and Salt [F4]</b>	6.1 The role of water in showing acidic and alkaline properties	6												1	
	6.2 pH value								21					1	
	6.3 Strength of acids and alkalis					18								1	
	6.4 Chemical properties of acids and alkalis														
	6.5 Concentration of aqueous solution														
	6.6 Standard solution														
	6.7 Neutralisation											38		1	
	6.8 Salts, crystals and their uses in daily life														
	6.9 Preparation of salts					16									1
	6.10 Effect of heat on salts														
	6.11 Qualitative analysis												35		1
<b>7. Rate of Reaction [F4]</b>	7.1 Determining rate of reaction	7							31			36		3	
	7.2 Factors affecting rate of reaction														
	7.3 Application of factors that affect the rate of reaction in daily life														
	7.4 Collision theory														
<b>8. Manufactured Substances in Industry [F4]</b>	8.1 Alloy and its importance									29				1	
	8.2 Composition of glass and its uses					19								1	
	8.3 Composition of ceramics and its uses														
	8.4 Composite materials and its importance														
<b>9. Redox equilibrium [F5]</b>	9.1 Oxidation and reduction	3							23					2	
	9.2 Standard electrode potential											37		1	
	9.3 Voltaic cell	5												1	
	9.4 Electrolytic cell								32					1	
	9.5 Extraction of metal from its ore														
	9.6 Rusting											34		1	
<b>10. Carbon compound [F5]</b>	10.1 Types of carbon compound					11			28					2	
	10.2 Homologous series	8						30						2	
	10.3 Chemical properties and interconversion of compounds between homologous series					14								1	
	10.4 Isomers and naming based on IUPAC nomenclature														
<b>11. Thermochemistry [F5]</b>	11.1 Heat change in reactions					12								1	
	11.2 Heat of reaction								27			40		2	
	11.3 Application of endothermic and exothermic reactions in daily life														

Chapter	Sub-chapter	Knowledge			Understanding			Application			Analysis			Total
		E	M	H	E	M	H	E	M	H	E	M	H	
<b>12. Polymer Chemistry [F5]</b>	12.1 Polymer	9												1
	12.2 Natural rubber	33							26					2
	12.3 Synthetic rubber													
<b>13. Consumer and Industrial Chemistry [F5]</b>	13.1 Oils and fats													
	13.2 Cleaning agents					13								1
	13.3 Food additives													
	13.4 Medicines and cosmetics													
	13.5 Application of nanotechnology in industry						20							1
	13.6 Application of green technology in industrial waste management													
<b>Total</b>		<b>10</b>	<b>1</b>	<b>0</b>	<b>5</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>9</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>40</b>

Ratio of E:M:H

Level of Difficulty E : Easy M : Medium H : Hard