

PROGRAM
MODUL KENYALANG CEMERLANG
TAHUN 2022

JABATAN PENDIDIKAN NEGERI SARAWAK

KIMIA 4541
KERTAS 1
SET 3

PENGENALAN

Program Semarak Kasih yang dilaksanakan pada tahun 2020 telah mendapat sambutan yang menggalakkan daripada warga pendidik dan murid, khasnya calon SPM 2020. Sehubungan dengan itu, pada tahun 2022 ini, Sektor Pembelajaran, Jabatan Pendidikan Negeri Sarawak mengadakan **Modul Kenyalang Cemerlang** untuk membantu guru dan calon SPM menghadapi peperiksaan SPM 2022.

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 2022 di semua sekolah menengah di negeri Sarawak.

OBJEKTIF PROGRAM

1. Memastikan calon SPM menguasai format baharu Peperiksaan SPM 2022.
2. Memastikan calon SPM mempunyai bahan pembelajaran yang berfokus ke arah peperiksaan SPM.
3. Meningkatkan pencapaian akademik calon SPM 2022.
4. Melonjakkan keputusan SPM 2022 Negeri Sarawak

SENARAI KANDUNGAN

Bil.	Perkara	Muka surat
1	Format Kertas Peperiksaan SPM Mulai Tahun 2021	3
2	Latihan - Praktis Kimia 4541/1: Set 3	4 – 22
3	Skema Jawapan/Pemarkahan	23
4	LAMPIRAN: Sampel Jadual Spesifikasi Ujian (JSU) untuk Praktis Kimia 4541/1: Set 3	24 – 26

SENARAI AHLI PANEL PEMBINA MODUL KENYALANG CEMERLANG

Bil.	Nama Guru	Sekolah	PPD
1.	Fransisca Lau Siew Hsia (Ketua)	SMK Methodist	SIBU
2.	Bella Mahony Sie	SMK Luar Bandar Sibu	SIBU
3.	Fun Ngik Ngon	SMK Bandar Sibu	SIBU
4.	Goh Leh Ling	SMK Sacred Heart	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
10.	Tie Woon Yen	SMK Bandar Bintulu	BINTULU
11.	Law Hui Nong	SMK Tinggi Sarikei	SARIKEI
12.	Victoria Petrus	SMK Tun Abdul Razak	SERIAN
13.	Chien Hui Siong	SMK Tinggi Sarikei	SARIKEI

PENYELARAS

Bil.	Nama Pegawai	Stesen Bertugas
1	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	• Subjektif Berstruktur • Subjektif Respons Terhad • Subjektif Respons Terbuka	Subjektif Berstruktur
3	Bilangan Soalan	40 soalan (40 markah) (Jawab semua soalan)	Bahagian A: • 8 soalan (60 Markah) (Jawab semua soalan) • Bahagian B: (20 Markah) • 2 soalan (Jawab 1 soalan) Bahagian C: (20 Markah) • 1 soalan	3 item (Jawab mengikut subjek yang didaftar)
4	Jumlah Markah	40 markah	100 markah	15 markah bagi setiap item
5	Konstruk	• Mengingat • Memahami • Mengaplikasi • Menganalisis	• Mengingat • Memahami • Mengaplikasi • Menganalisis • Menilai • Mencipta	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. Rajah 1 menunjukkan air embun yang terbentuk di atas daun pada waktu malam apabila suhu persekitaran jatuh.

Diagram 1 shows the dews formed on the leaves at night when the surrounding temperature drops.

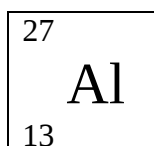


Rajah 1 / Diagram 1

Apakah nama perubahan antara keadaan jirim semasa pembentukan air embun?

What is the name of the conversion between states of matter during the formation of dew?

- | | |
|---|--|
| <p>A Pengendapan
<i>Deposition</i></p> <p>B Pembekuan
<i>Freezing</i></p> | <p>C Kondensasi
<i>Condensation</i></p> <p>D Pemejalwapan
<i>Sublimation</i></p> |
|---|--|
2. Rajah 2 menunjukkan perwakilan piawai bagi atom aluminium.
Diagram 2 shows the standard representation of aluminium atom.



Rajah 2 / Diagram 2

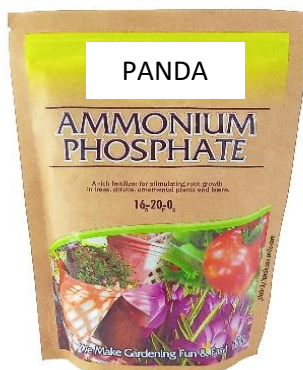
Apakah bilangan elektron valens bagi atom tersebut?

What is the number of valence electrons of the atom?

- | | |
|-------------------------------------|-------------------------------------|
| <p>A 1</p> <p>B 3</p> | <p>C 5</p> <p>D 7</p> |
|-------------------------------------|-------------------------------------|

3. Rajah 3 menunjukkan sejenis baja yang digunakan oleh Encik Tan untuk memberi nutrien kepada bunga-bunga.

Diagram 3 shows a type of fertiliser used by Mr. Tan to give nutrient to the flowers.



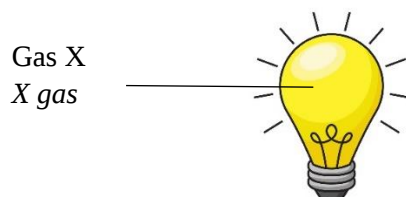
Rajah 3/ Diagram 3

Apakah formula kimia yang betul bagi bahan kimia yang terkandung dalam baja itu?

What is the correct chemical formula of the chemical substance in the fertiliser?

- | | | | |
|----------|------------------------------|----------|----------------------------------|
| A | NH_4PO_3 | C | $(\text{NH}_4)_2\text{PO}_4$ |
| B | $(\text{NH}_4)_3\text{PO}_4$ | D | $(\text{NH}_4)_3(\text{PO}_4)_2$ |
4. Bagaimana unsur-unsur disusun dalam Jadual Berkala Unsur?
- How are the elements arranged in the Periodic Table of Elements?*
- A** Mengikut penambahan nombor proton.
According to the increase in proton number.
- B** Mengikut penambahan jisim atom relatif.
According to the increase in relative atomic mass.
- C** Berdasarkan penambahan nombor nukleon.
Based on the increasing in nucleon number.
- D** Berdasarkan penambahan sifat logam.
Based on the increasing metallic properties.

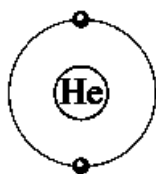
5. Rajah 4 menunjukkan satu mentol filamen tungsten yang menyala.
Diagram 4 shows a glowing tungsten filament bulb.



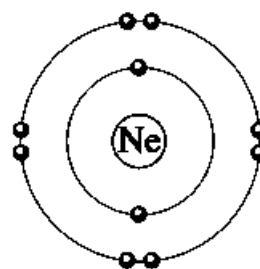
Rajah 4 / Diagram 4

Yang manakah antara berikut merupakan susunan elektron gas X?
Which of the following is the electron arrangement of gas X?

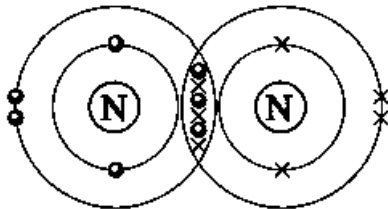
A



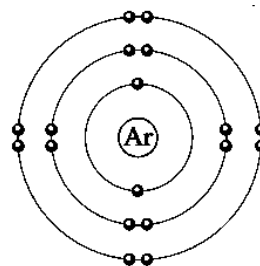
C



B



D



6. Yang manakah berikut dengan kehadirannya akan menunjukkan sifat-sifat asid?
Which of the following will show the acidic properties in its presence?

- A Ion hidrogen
Hydrogen ion
B Molekul hidrogen
Hydrogen molecules
C Atom hidrogen
Hydrogen atom

7. Rajah 5 menunjukkan perwakilan piawai untuk empat unsur.
Diagram 5 shows the standard representation for four elements.



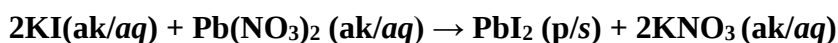
Rajah 5 / Diagram 5

Yang manakah unsur dapat membentuk daya tarikan elektrostatik antara lautan elektron dan ion bercas positif?

Which element can form electrostatic force between sea of electrons and positively charged ion?

- | | | | |
|----------|---|----------|---|
| A | P | C | R |
| B | Q | D | S |
8. Manakah garam-garam berikut tidak larut dalam air?
Which of the following salts are insoluble in water?
- | | | | |
|-----------|---|------------|--|
| I | Aluminium nitrat
<i>Aluminium nitrate</i> | III | Argentum klorida
<i>Silver chloride</i> |
| II | Plumbum(II) nitrat
<i>Lead(II) nitrate</i> | IV | Barium sulfat
<i>Barium sulphate</i> |
| A | I dan II
<i>I and II</i> | C | II dan IV
<i>II and IV</i> |
| B | I dan III
<i>I and III</i> | D | III dan IV
<i>III and IV</i> |

9. Persamaan kimia di bawah mewakili tindak balas antara larutan kalium iodida, KI dan larutan plumbum(II) nitrat, $\text{Pb}(\text{NO}_3)_2$.
The chemical equation below shows the reaction between potassium iodide solution, KI and lead(II) nitrate solution, $\text{Pb}(\text{NO}_3)_2$.



Manakah antara yang berikut merupakan suatu perubahan yang boleh diperhatikan dan diukur bagi menentukan kadar tindak balas?

Which of the following is an observable and measurable change that can be used to determine the rate of reaction?

- | | | | |
|----------|--|----------|--|
| A | Penambahan isipadu gas
<i>Increase in volume of gases</i> | C | Penambahan jisim hasil tindak balas
<i>Increase in the mass of products</i> |
| B | Pembentukan mendakan
<i>Formation of precipitate</i> | D | Pengurangan jisim bahan tindak balas
<i>Decrease in the mass of the reactants</i> |

10. Dalam pembinaan reaktor nuklear, seramik digunakan untuk membuat dinding bahagian dalamnya kerana
In the construction of a nuclear reactor, ceramics are used to make its inner walls because
- A** Seramik sangat lembut
Ceramics is very soft
- B** Seramik mudah dibentuk
Ceramic is malleable
- C** Seramik lengai terhadap bahan kimia
Ceramic is inert towards chemical
- D** Seramik tahan pada suhu yang tinggi
Ceramic can withstand high temperature
11. Manakah antara penukaran yang berikut merupakan suatu contoh bagi penurunan?
Which of the following conversion is an example of reduction?
- A** Fe^{2+} kepada Fe^{3+}
 Fe^{2+} to Fe^{3+}
- B** Mg kepada Mg^{2+}
 Mg to Mg^{2+}
- C** H_2S kepada S
 H_2S to S
- D** Cl_2 kepada Cl^-
 Cl_2 to Cl^-
12. Perlindungan logam korban ialah suatu cara untuk mencegah pengkaratan pada paip besi. Antara berikut yang manakah adalah logam korban?
Sacrificial protection is a method to prevent the rusting of iron pipe. Which of the following is a sacrificial metal?
- A** Plumbum
Lead
- B** Kuprum
Copper
- C** Zink
Zinc
- D** Argentum
Silver
13. Rajah 6 menunjukkan sejenis ubat X?
Diagram 6 shows a type of medicine X?



Rajah 6 / Diagram 6

Apakah jenis ubat X?
What is the type of medicine X?

- A** Analgesik
Analgesics
- B** Ubat psikotik
Psychotic drug
- C** Antibiotik
Antibiotic
- D** Kortikosteroid
Corticosteroids

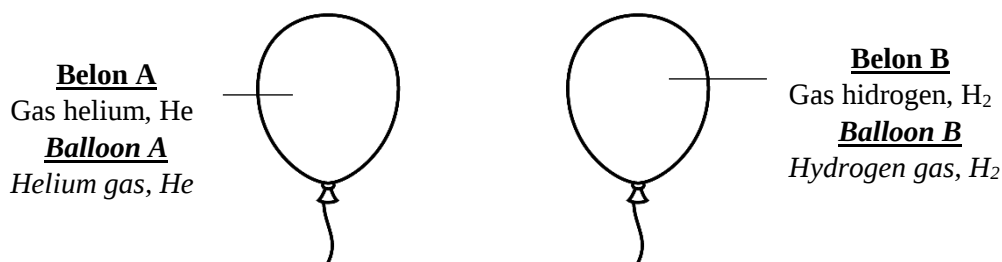
14. Dalam industri pembinaan, paip PVC lebih banyak digunakan berbanding dengan paip keluli. Antara yang berikut, yang manakah menyokong pernyataan itu?
In the construction industry, PVC pipes are preferred over steel pipes. Which of the following support the statement?
- A Paip PVC terbiodegradasi
PVC pipes are biodegradable
 - B Paip PVC tidak dioksidakan
PVC pipes are not oxidised
 - C Paip PVC lebih kuat dan tahan lama
PVC pipes are stronger and long lasting
 - D Paip PVC tidak menyebabkan pencemaran alam sekitar apabila dilupuskan.
PVC pipes do not cause pollution to environment when dispose.
15. Aplikasi nanoteknologi dalam industri pemakanan menghasilkan
Application of nanotechnology in food industry produce
- A Makanan yang lebih senang dihadam
Food that is easier to digest
 - B Makanan yang tahan segar dengan lebih lama
Food that can keep fresh longer
 - C Bahan tambahan makanan nanoskala
Nanoscale food additives
 - D Benih yang dapat berhasi banyak
Seed that can yield more
16. Klorin-35 dan klorin-37 adalah isotop untuk klorin.
Apakah persamaan antara klorin-35 dan klorin-37?
Chlorine-35 and chlorine 37 are the isotopes of chlorine.
What is the similarity between chlorine-35 and chlorine-37?
- | | |
|---|---|
| A Ketumpatan atom-atom.
<i>The density of the atoms.</i> | C Bilangan neutron.
<i>The number of neutrons.</i> |
| B Bilangan elektron.
<i>The number of electrons.</i> | D Jisim atom-atom.
<i>The mass of the atoms.</i> |

17. Rajah 7 menunjukkan dua biji belon A dan B yang masing masing diisi dengan 24 dm^3 gas helium, He dan gas hidrogen, H_2 .

[Pemalar Avogadro, N_A : $6.02 \times 10^{23} \text{ mol}^{-1}$, Isipadu molar = $24 \text{ dm}^3 \text{ mol}^{-1}$ pada keadaan bilik]

Diagram 7 shows two balloons A and B filled with 24 dm^3 of helium gas, He and hydrogen gas, H_2 respectively.

[Avogadro constant, N_A : $6.02 \times 10^{23} \text{ mol}^{-1}$, Molar volume of gas = $24 \text{ dm}^3 \text{ mol}^{-1}$ at room conditions]



Rajah 7 / Diagram 7

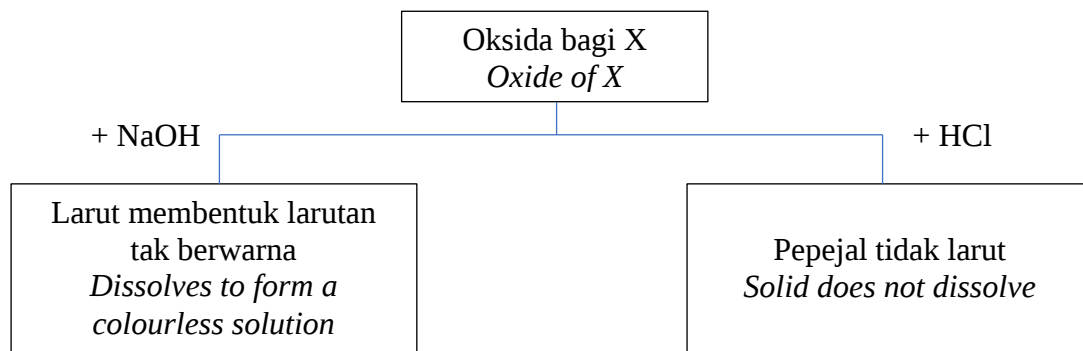
Antara pernyataan yang berikut, yang manakah benar?

Which of the following statements is true?

- A Belon A dan B masing-masing mengandungi 6.02×10^{23} atom.
Balloon A and B contains 6.02×10^{23} atom respectively.
 - B Belon A dan B masing-masing mengandungi 6.02×10^{23} molekul.
Balloon A and B contains 6.02×10^{23} molecules respectively.
 - C Belon A mengandungi bilangan atom yang sama dengan bilangan atom dalam 12 g karbon-12.
Balloon A contains the same number of atoms as in 12 g of carbon-12.
 - D Belon B mengandungi bilangan atom yang sama dengan bilangan atom dalam 12 g karbon-12.
Balloon B contains the same number of atoms as in 12 g of carbon-12.
18. Apakah maksud ikatan datif?
What is the meaning of dative bond?
- A Ikatan yang terbentuk yang melibatkan pemindahan elektron
A bond formed involving the transfer of electron
 - B Ikatan yang terbentuk apabila pasangan elektron yang dikongsi datang daripada satu atom sahaja
A bond formed when the electron pair that is shared comes from one atom only
 - C Ikatan yang terbentuk yang melibatkan perkongsian elektron antara atom bukan logam
A bond formed involving the sharing of electrons of non-metal atoms
 - D Ikatan yang terbentuk melibatkan daya tarikan elektrostatik antara lautan elektron dan ion logam bercas positif
A bond formed involving electrostatic attraction force between sea of electron and positively charged metal ion

19. Rajah 8 menunjukkan carta alir bagi tindak balas oksida suatu unsur dalam Kala 3 Jadual Berkala.

Diagram 8 shows a flow chart for a reaction of the oxide of an element in Period 3 of the Periodic Table.



Rajah 8 / Diagram 8

Apakah X?

What is X?

- A** Sulfur
Sulphur
B Natrium
Sodium

- C** Magnesium
Magnesium
D Aluminium
Aluminium

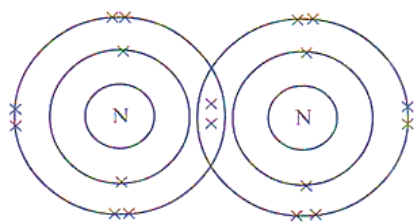
20. Manakah rajah menunjukkan susunan elektron untuk molekul nitrogen, N_2 ?

[Nombor proton: $N=7$]

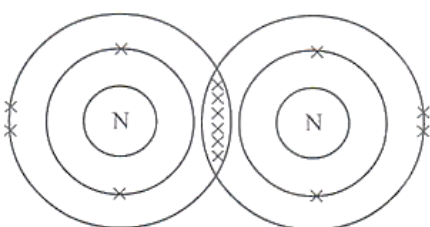
Which diagram shows the electron arrangement for a nitrogen molecule, N_2 ?

[Proton number: $N=7$]

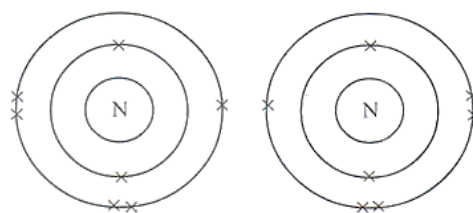
A



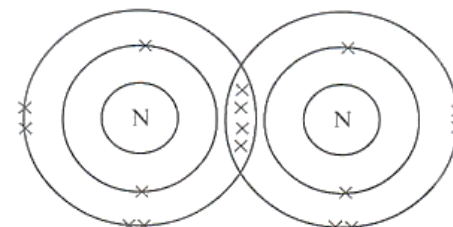
B



C



D



21. Seorang murid menyediakan garam X dengan mengikuti prosedur berikut.
A student prepares a salt X by following procedure.

Prosedur :**Procedure :**

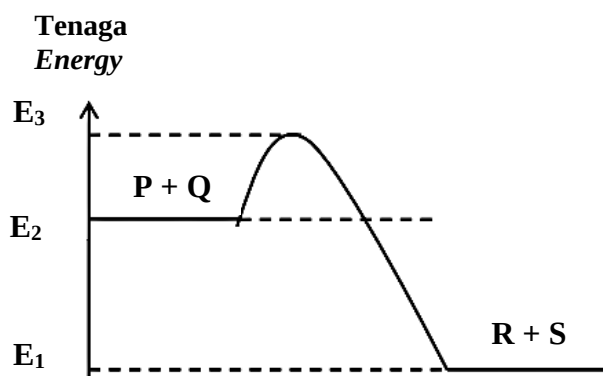
1. Larutan garam mengandungi kation Y^{2+} dituangkan ke dalam asid sulfurik cair. [Y tidak mewakili symbol sebenar unsur berkenaan]
Salt solution containing cation Y^{2+} is poured into dilute sulphuric acid. [Y do not represent the actual symbol of the element]
2. Turas campuran.
Filter the mixture.
3. Bilaskan hablur garam dengan air suling.
Rinse the crystals with distilled water.
4. Keringkan hablur garam dengan menekannya di antara dua keping kertas turas.
Dry the salt crystal by pressing them between two pieces of filter paper.

Apakah garam X?

What is salt X?

- | | |
|---|--|
| A Kuprum(II) sulfat, $CuSO_4$
Copper(II) sulphate, $CuSO_4$ | C Barium sulfat, $BaSO_4$
Barium sulphate, $BaSO_4$ |
| B Magnesium sulfat, $MgSO_4$
Magnesium sulphate, $MgSO_4$ | D Ferum(II) sulfat, $FeSO_4$
Iron(II) sulphate, $FeSO_4$ |

22. Rajah 9 menunjukkan profil tenaga bagi tindakbalas yang berikut:
Diagram 9 shows the energy profile for the following reaction:



Rajah 9 / Diagram 9

E_1 , E_2 dan E_3 , masing-masing mewakili aras-aras tenaga yang berbeza. Jika mungkin digunakan dalam tindakbalas ini, kadar tindakbalas akan bertambah kerana mungkin
 E_1 , E_2 and E_3 represent different levels of energy respectively. If catalyst is used in the reaction, the rate of reaction will increase because the catalyst

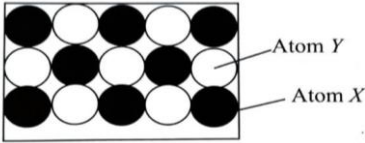
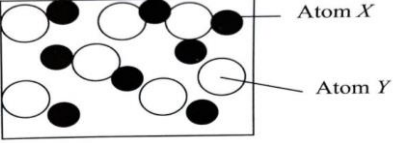
- | | |
|--|--|
| A meningkatkan E_1
increases E_1 | C meningkatkan E_2
increases E_2 |
| B decreases E_2
mengurangkan E_2 | D decreases E_3
mengurangkan E_3 |

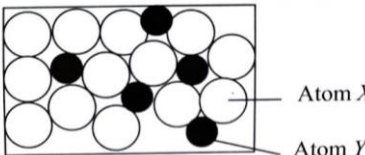
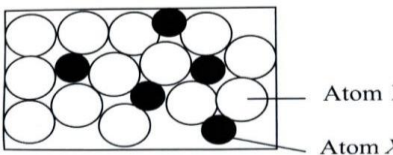
23. Rajah 10 menunjukkan perwakilan piawai bagi unsur X dan Y.
Diagram 10 shows the standard representation of elements X and Y.



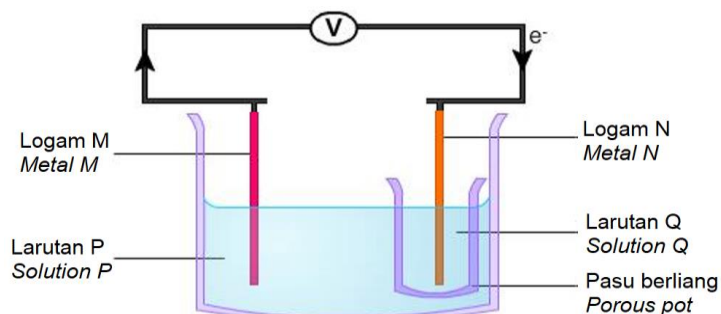
Rajah 10 / Diagram 10

Unsur X dan Y bergabung untuk membentuk suatu aloi.
Yang manakah berikut menunjukkan susunan atom yang betul dalam aloi?
Elements X and Y combine together to form an alloy.
Which of the following shows the correct arrangement of atoms in the alloy?

A  **C** 

B  **D** 

24. Rajah 11 di bawah menunjukkan sel kimia.
Diagram 11 below shows a voltaic cell.

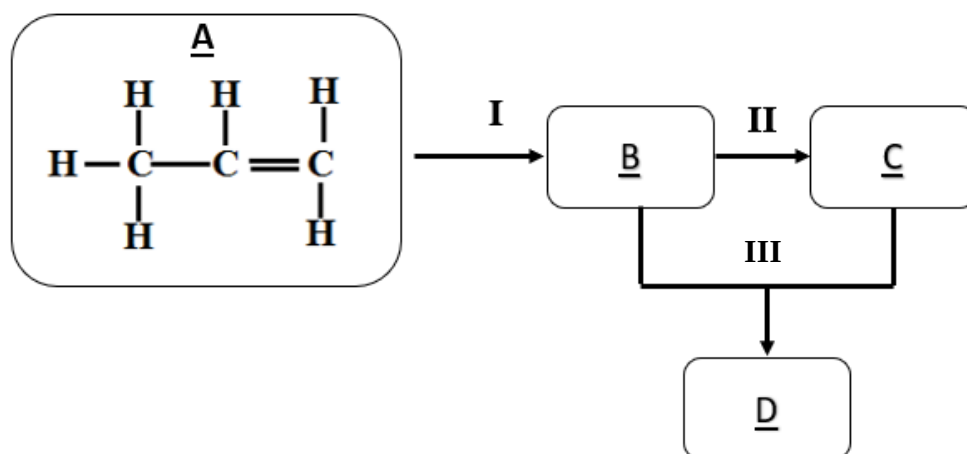


Rajah 11/ Diagram 11

Antara pasangan logam berikut, yang manakah akan menyebabkan elektron mengalir dari logam M ke logam N?
Which of the following metal pairs will result in the flow of electrons from metal M to metal N?

	Metal M <i>Logam M</i>	Metal N <i>Logam N</i>
A	Zink <i>Zinc</i>	Aluminium <i>Aluminium</i>
B	Kuprum <i>Copper</i>	Zink <i>Zinc</i>
C	Kuprum <i>Copper</i>	Argentum <i>Silver</i>
D	Plumbum <i>Lead</i>	Ferum <i>Iron</i>

25. Rajah 12 menunjukkan carta alir bagi penukaran molekul sebatian karbon A kepada D.
Diagram 12 shows the flow chart for the conversion of carbon compound A to D.



Rajah 12 / Diagram 12

Sebatian karbon D yang dihasilkan membebaskan bau wangi. Yang manakah antara berikut dipadankan dengan betul?

Carbon compound D releases sweet smell. Which of the followings are correctly matched?

	Tindak balas I <i>Reaction I</i>	Tindak balas II <i>Reaction II</i>	Tindak balas III <i>Reaction III</i>	Formula molekul D <i>Molecular formula of D</i>
A	Penghidratan <i>Hydration</i>	Pengoksidaan <i>Oxidation</i>	Pengesteran <i>Esterification</i>	$\text{C}_2\text{H}_5\text{COOC}_2\text{H}_5$
B	Penghidrogenan <i>Hydrogenation</i>	Penghidratan <i>Hydration</i>	Pengesteran <i>Esterification</i>	$\text{C}_2\text{H}_5\text{COOC}_2\text{H}_5$
C	Pengesteran <i>Esterification</i>	Pengoksidaan <i>Oxidation</i>	Penghidratan <i>Hydration</i>	$\text{C}_2\text{H}_5\text{COOC}_3\text{H}_7$
D	Penghidratan <i>Hydration</i>	Pengoksidaan <i>Oxidation</i>	Pengesteran <i>Esterification</i>	$\text{C}_2\text{H}_5\text{COOC}_3\text{H}_7$

26. Rajah 13 menunjukkan seorang penoreh getah menghadapi masalah untuk menggumpalkan lateks. Untuk menyelesaikan masalah itu, dia perlu menambahkan suatu bahan ke dalam lateks itu.

Diagram 13 shows a rubber tapper facing a problem to coagulate the latex. To solve the problem she has to add a substance into the latex.



Rajah 13 / Diagram 13

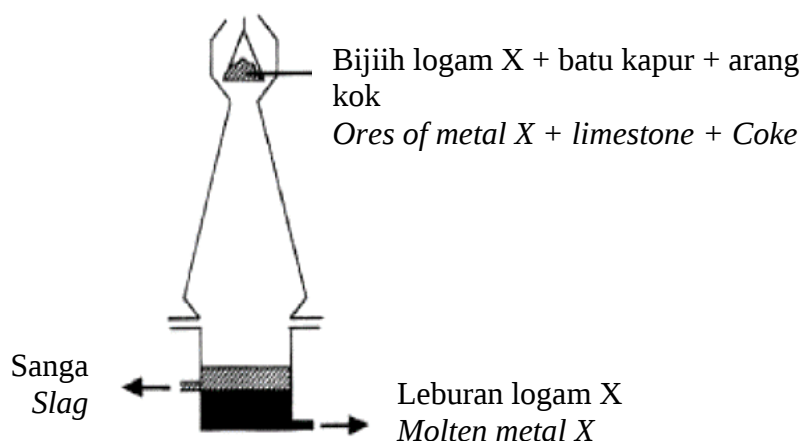
Apakah bahan dan penerangan yang betul untuk menyelesaikan masalah itu?

What is the correct substance and explanation to solve the problem?

	Bahan Substance	Explanation Penerangan
A	Air <i>Water</i>	Menjadikan lateks lebih cair dan senang dituang keluar daripada bekas kecil <i>To make the latex more dilute and easy to pour out from the little container</i>
B	Larutan natrium klorida <i>Sodium chloride solution</i>	Menjadikan pengawet untuk mengekalkan keadaan asal lateks <i>As a preservative to maintain the original state of the latex</i>
C	Methanoic acid <i>Asid metanoik</i>	Mengandungi ion H^+ yang meneutralkan cas negatif pada membran zarah getah <i>Contains H^+ ion that neutralises the negative charge on the membrane of the rubber particle</i>
D	Ammonia <i>Ammonia</i>	Mengandungi ion OH^- yang meneutralkan ion H^+ daripada asid laktik <i>Contains OH^- ion that neutralises the H^+ ion from the lactic acid</i>

27. Rajah 14 menunjukkan cara pengekstrakan logam X daripada bijihnya.

Diagram 14 shows the method to extract metal X from its ore.



Rajah 14 / Diagram 14

Apakah logam X?

What is metal X?

- | | |
|--|--|
| A Kalsium
<i>Calcium</i> | C Aluminium
<i>Aluminium</i> |
| B Magnesium
<i>Magnesium</i> | D Ferum
<i>Iron</i> |

28. Manakah antara berikut merupakan hidrokarbon?

Which of the following is a hydrocarbon?

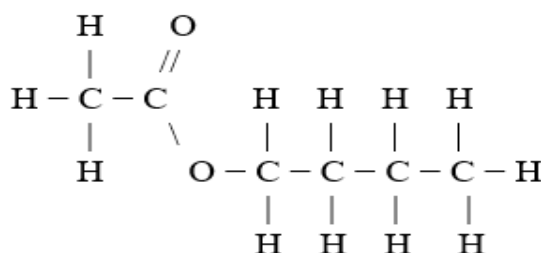
- | | | | |
|----------|---|----------|--|
| A | $\begin{array}{c} \text{Cl} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$ | C | $\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{C}\equiv\text{N} \\ \quad \\ \text{H} \quad \text{H} \end{array}$ |
| B | $\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{O}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$ | D | $\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$ |

29. Antara logam berikut, manakah yang memberikan peningkatan bacaan termometer yang paling kecil apabila ditambahkan ke dalam larutan kuprum(II) sulfat ?

Which of the following metals gives the smallest rise of thermometer reading when added into in copper(II) sulphate solution?

- | | |
|--|------------------------------------|
| A Magnesium
<i>Magnesium</i> | C Plumbum
<i>Lead</i> |
| B Zink
<i>Zinc</i> | D Argentum
<i>Silver</i> |

30. Rajah 15 menunjukkan suatu ester.
Diagram 15 shows an ester.

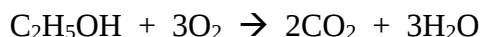


Rajah 15 /Diagram 15

Bahan tindak balas bagi ester tersebut adalah
The reactants of the ester are

- | | |
|--|---|
| I Etanol
<i>Ethanol</i> | III Asid etanoik
<i>Ethanoic acid</i> |
| II Butanol
<i>Butanol</i> | IV Asid butanoik
<i>Butanoic acid</i> |
| A I dan III
<i>I and III</i> | C II dan IV
<i>II and IV</i> |
| B II dan III
<i>II and III</i> | D I dan IV
<i>I and IV</i> |

31. Persamaan kimia di bawah mewakili pembakaran ethanol dalam gas oksigen berlebihan.
The chemical equation below shows the combustion of ethanol in excess oxygen gas.



Ketumpatan bagi ethanol ialah 0.789 g/ml. Apakah isipadu ethanol yang diperlukan untuk menghasilkan 10.0 g karbon dioksida dalam tindak balas berikut?

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

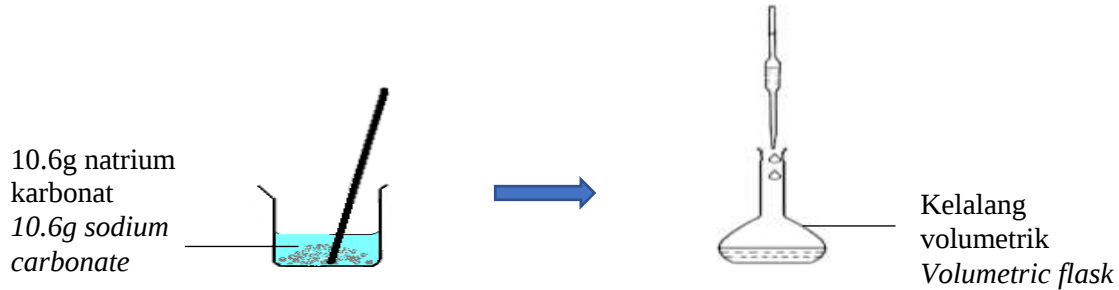
Density of ethanol is 0.789 g/ml. What is the volume of ethanol needed to produce 10.0 g of carbon dioxide in the following reaction?

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

- | | |
|---------------|----------------|
| A 6.63 | C 13.30 |
| B 9.32 | D 26.50 |

34. Rajah 17 menunjukkan penyediaan larutan piawai natrium karbonat, Na_2CO_3 dengan melarutkan 10.6 g natrium karbonat di dalam air suling dan menjadikan isi padu sehingga 100 cm^3 .

Diagram 17 shows the preparation of standard solution of sodium carbonate, Na_2CO_3 by dissolving 10.6 g of sodium carbonate in distilled water and making the volume up to 100 cm^3 .



Rajah 17 / Diagram 17

Berapakah isipadu larutan piawai yang disediakan perlu digunakan jika seorang pelajar ingin menyediakan 50 cm³ larutan natrium karbonat 0.5 mol dm⁻³?

[Jisim formula relatif : $\text{Na}_2\text{CO}_3 = 106$]

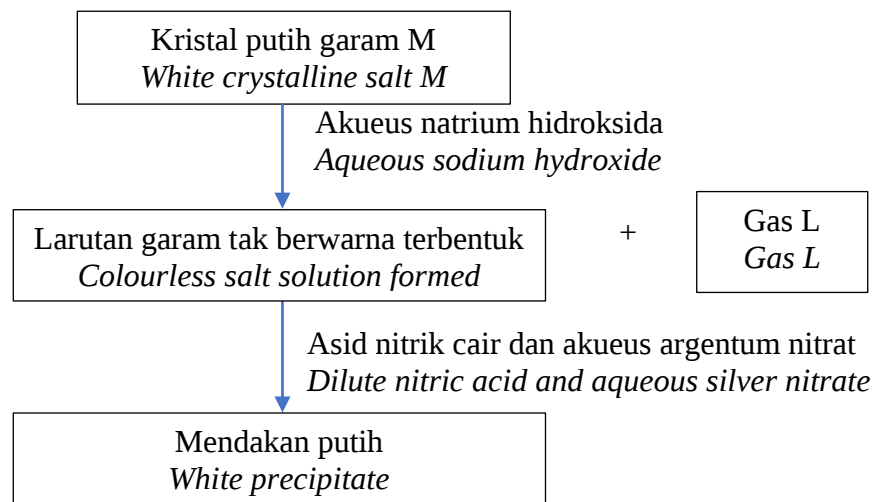
What is the volume of standard solution prepared that should be used if a student wants to prepare 50 cm^3 of 0.5 mol dm^{-3} sodium carbonate solution?

[Relative formula mass : $\text{Na}_2\text{CO}_3 = 106$]

- | | | | |
|----------|----------------------|----------|----------------------|
| A | 10.0 cm ³ | C | 25.0 cm ³ |
| B | 12.5 cm ³ | D | 50.0 cm ³ |

35. Rajah 18 menunjukkan satu skema tindak balas bagi garam M.

Diagram 18 shows a reaction scheme of salt M.

Rajah 18 / *Diagram 18*

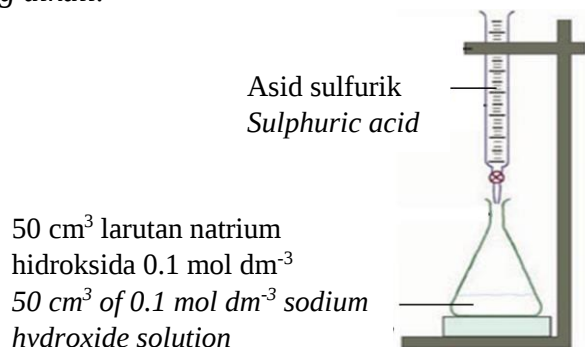
Gas L menukarkan kertas litmus basah merah kepada biru. Apakah M?

Gas L turns moist red litmus paper to blue. What is M?

- | | | | |
|----------|---|----------|--|
| A | Ammonium nitrat
<i>Ammonium nitrate</i> | C | Magnesium klorida
<i>Magnesium chloride</i> |
| B | Aluminium sulfat
<i>Aluminium sulphate</i> | D | Ammonium klorida
<i>Ammonium chloride</i> |

36. Rajah 19 menunjukkan susunan radas untuk tindak balas peneutralan antara asid kuat dan alkali kuat.

Diagram 19 shows the apparatus set-up for the neutralisation reaction between a strong acid and a strong alkali.



Rajah 19 / Diagram 19

50 cm³ asid sulfurik meneutralkan 50 cm³ larutan natrium hidroksida 0.1 mol dm⁻³.

Apakah kemolaran asid sulfurik?

50 cm³ of sulphuric acid neutralises 50 cm³ of 0.1 mol dm⁻³ sodium hydroxide solution.

What is the molarity of sulphuric acid?

A 0.05 mol dm⁻³

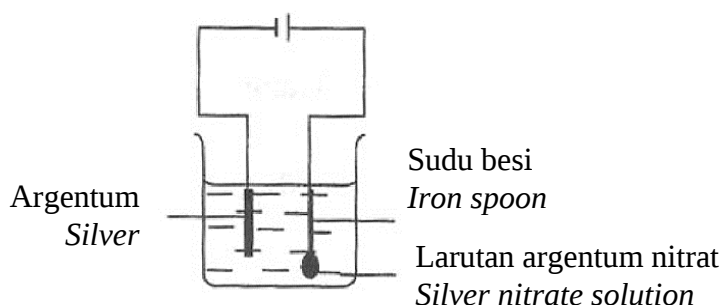
C 0.15 mol dm⁻³

B 0.10 mol dm⁻³

D 0.20 mol dm⁻³

37. Rajah 20 menunjukkan susunan radas untuk menyadur sudu besi dengan argentum.

Diagram 20 shows the setup of the apparatus to plate an iron spoon with silver.



Rajah 20 / Diagram 20

Selepas 1 jam, didapati tiada penyaduran berlaku pada sudu besi. Apakah yang perlu dilakukan?

After 1 hour, it was found that no plating on the iron spoon. What should be done?

A Saling tukar terminal pada sel

Interchange the terminals in the cell

B Menambahkan voltan sel

Increase the cell voltage

C Menggunakan larutan ferum(II) nitrat sebagai elektrolit

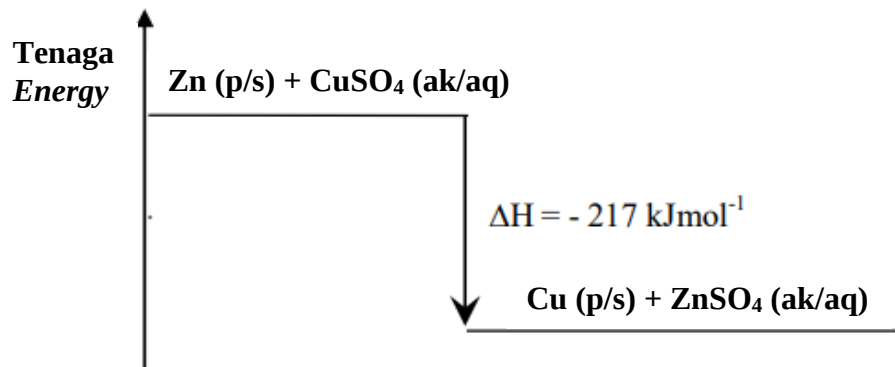
Use iron(II) nitrate as the electrolyte

D Menggosok sudu besi dengan kertas pasir

Rub the iron spoon with sand paper

38. Rajah 21 di bawah menunjukkan gambar rajah aras tenaga bagi tindak balas antara zink dan larutan kuprum(II) sulfat.

Diagram 21 below shows the energy level diagram for the reaction between zinc and copper(II) sulphate solution.



Rajah 21/ Diagram 21

Berapakah perubahan suhu jika 50 cm^3 larutan kuprum(II) sulfat 0.1 mol dm^{-3} ditindakbalaskan dengan zink berlebihan?

[Muatan haba tentu larutan = $4.2 \text{ Jg}^{-1} \text{ }^{\circ}\text{C}^{-1}$]

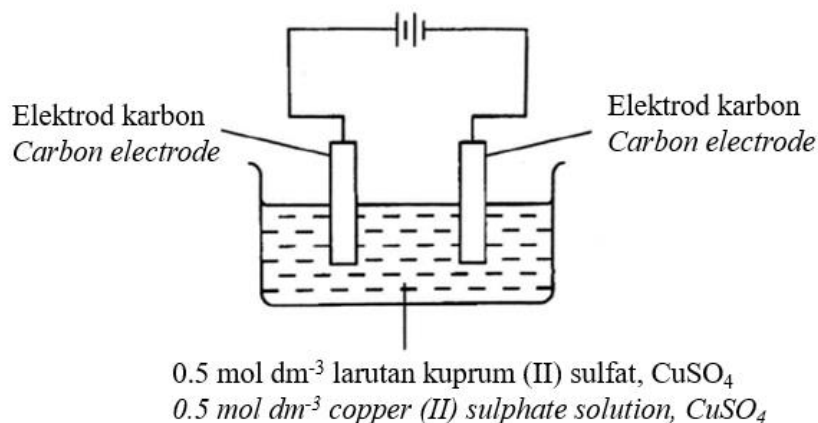
What is the change in temperature when 50 cm^3 of 0.1 mol dm^{-3} copper(II) sulphate solution is reacted with excess zinc?

[Specific heat capacity of solution = $4.2 \text{ Jg}^{-1} \text{ }^{\circ}\text{C}^{-1}$]

- A** $2.1 \text{ }^{\circ}\text{C}$
B $2.6 \text{ }^{\circ}\text{C}$

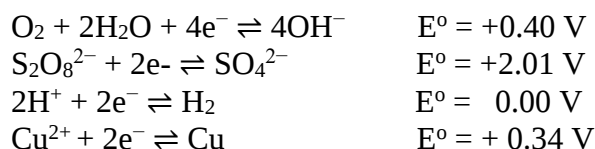
- C** $5.2 \text{ }^{\circ}\text{C}$
D $8.2 \text{ }^{\circ}\text{C}$

39. Rajah 22 menunjukkan elektrolisis larutan argentum nitrat, AgNO_3 0.5 mol dm^{-3} menggunakan elektrod karbon.
Diagram 22 shows the electrolysis of 0.5 mol dm^{-3} silver nitrate solution, AgNO_3 using carbon electrodes.



Rajah 22 / Diagram 22

Diberi keupayaan elektrod piawai sel setengah dan nilai keupayaan elektrod piawai, E°
Given the half cell standard electrode potential and standard electrode potential value, E°



Setengah persamaan manakah yang mewakili tindak balas di anod dan katod?
Which half equation represents the reaction at the anode and the cathode?

	Anod Anode	Katod Cathode
A	$\text{SO}_4^{2-} \rightarrow \text{S}_2\text{O}_8^{2-} + 2\text{e}^-$	$\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$
B	$4\text{OH}^- \rightarrow \text{O}_2 + 2\text{H}_2\text{O} + 4\text{e}^-$	$\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$
C	$4\text{OH}^- \rightarrow \text{O}_2 + 2\text{H}_2\text{O} + 4\text{e}^-$	$2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2$
D	$\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}^-$	$\text{Cu}^{2+} + 2\text{e}^- \rightleftharpoons \text{Cu}$

40. Mengapa gas ammonia, NH_3 menunjukkan sifat alkali dalam air?
Why ammonia gas, NH_3 able to show its alkaline properties in water?
- A** Gas yang kurang tumpat dengan 3 atom hidrogen per molekul.
Less dense gas with 3 hydrogen atoms per molecule.
 - B** Larut dalam air untuk membentuk ion ammonium dan ion hidroksida.
Dissolve in water to form ammonium ion and hydroxide ion.
 - C** Mempunyai pasangan elektron tunggal untuk membentuk ikatan datif dengan molekul air.
It has lone pair electrons to form dative bond with water molecules.
 - D** Merupakan sebatian kovalen yang boleh larut dalam air dan pelarut organik.
It is covalent compound that can dissolve in water and also organic solvents.

KERTAS PEPERIKSAAN TAMAT

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

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

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

Chapter	Sub-chapter	Remembering			Understanding			Applying			Analyzing			Total
		E	M	H	E	M	H	E	M	H	E	M	H	
1. Introduction to chemistry [F4]	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													
2. Matter and the Atomic Structure [F4]	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
3. The Mole Concept, Chemical Formula and Equation [F4]	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
4. The Periodic Table of Elements [F4]	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													
5. Chemical Bond [F4]	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	
6. Acid, Base and Salt [F4]	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
7. Rate of Reaction [F4]	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													
8.Manufactured Substances in Industry [F4]									29					1
	8.1 Alloy and its importance													
	8.2 Composition of glass and its uses					19								1
	8.3 Composition of ceramics and its uses													
9. Redox equilibrium [F5]	8.4 Composite materials and its importance													
	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
10. Carbon compound [F5]						11			28					2
	10.1 Types of carbon compound													
	10.2 Homologous series	8						30						2
	10.3 Chemical properties and interconversion of compounds between homologous series				14									1
11. Thermochemistry [F5]	10.4 Isomers and naming based on IUPAC nomenclature													
					12									1
	11.1 Heat change in reactions													
	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	
12. Polymer Chemistry [F5]	12.1 Polymer	9												1
	12.2 Natural rubber	33							26					2
	12.3 Synthetic rubber													
13. Consumer and Industrial Chemistry [F5]	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													
Total		10	1	0	5	4	1	3	9	0	3	3	1	40
Ratio of E:M:H														
Level of Difficulty		E : Easy M : Medium H : Hard												