MODUL KENYALANG CEMERLANG
SPM
TAHUN 2022

JABATAN PENDIDIKAN NEGERI SARAWAK

KIMIA 4541
KERTAS 1
SET 1

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 2021 ini, Sektor Pembelajaran, Jabatan Pendidikan Negeri Sarawak mengadakan **Modul Kenyalang Cemerlang** 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 - **Praktis Kimia 4541/1: Set 1**	3 – 20
3	Skema Jawapan/Pemarkahan	22
4	LAMPIRAN: Sampel Jadual Spesifikasi Ujian (JSU) untuk Praktis Kimia 4541/1: Set 1	23 - 24

SENARAI AHLI PANEL PEMBINA MODUL KENYALANG CEMERLANG

Bil.	Nama Guru	Sekolah	PPD
1.	Franscisca Lau Siew Hsia (Ketua)	SMK Methodist	SIBU
2.	Bella Mahony Sie	SMK Luar Bandar Sibu	SIBU
3.	Fun Ngiik 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 1

1. Antara bahan berikut, yang manakah boleh dibuang ke dalam sinki makmal?
Which of the following substance can be thrown into the laboratory sink?

A Etanol
Ethanol
B Asid hidroklorik pekat
Concentrated hydrochloric acid
C Hidrogen peroksida pekat
Concentrated hydrogen peroxide
D Merkuri
Mercury

2. Pernyataan manakah yang menerangkan perubahan sifat unsur merentasi Kala 3 di dalam Jadual Berkala Unsur?
Which statement explains the change in property of the elements across Period 3 in the Periodic Table of Elements?

A Saiz atom bertambah
Atomic size increases
B Sifat logam bertambah
Metallic property increases
C Keelektronegatifan bertambah
Electronegativity increases
D Bilangan petala berisi elektron bertambah
The number of shells occupied with electrons increases

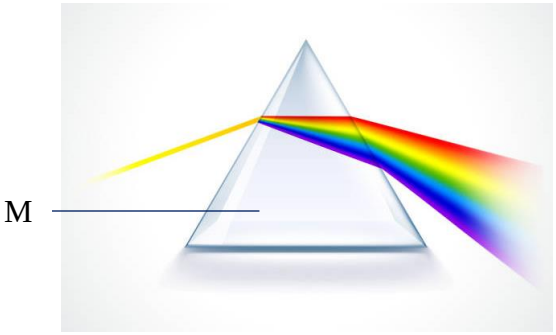
3. Set manakah bagi definisi pengoksidaan dari segi oksigen, hidrogen dan elektron adalah betul?
Which set of definition of oxidation in terms of oxygen, hydrogen and electron is correct?

	Oksigen ***Oxygen***	**Hidrogen** ***Hydrogen***	**Elektron** ***Electrons***
A	Menerima *Gain*	Kehilangan *Loss*	Kehilangan *Loss*
B	Menerima *Gain*	Kehilangan *Loss*	Menerima *Gain*
C	Kehilangan *Loss*	Menerima *Gain*	Menerima *Gain*
D	Kehilangan *Loss*	Menerima *Gain*	Kehilangan *Loss*

4. Bahan yang manakah tidak mengalami proses pengendapan?
Which substance does not undergo deposition process?

A NH_4Cl
B $MgCl_2$
C CO_2
D I_2

5. Rajah 1 menunjukkan sebuah prisma.
Diagram 1 shows a prism.



Rajah 1 / *Diagram 1*

Apakah bahan M?
What is substance M?

A Kaca borosilikat
Borosilicate glass
B Kaca silika terlakur
Fused glass
C Kaca soda kapur
Soda lime glass
D Kaca plumbum
Lead crystal glass

6. Antara berikut yang manakah adalah asid kuat?
*Which of the following is a strong acid***?**

A Asid formik
Formic acid
B Asid etanoik
Ethanoic acid
C Asid karbonik
Carbonic acid
D Asid nitrik
Nitric acid

7. Apakah maksud kadar tindak balas?
What is the meaning of the rate of reaction?

A Peningkatan kuantiti bahan tindak balas
Increase in quantity of reactant
B Pengurangan kuantiti bahan tindak balas
Decrease in quantity of reactant
C Peningkatan kuantiti hasil tindak balas per unit masa
Increase in quantity of product per unit time
D Pengurangan kuantiti hasil tindak balas per unit masa
Decrease in quantity of product per unit time

8. Rajah 2 menunjukkan asetilena, C_2H_2 yang digunakan untuk mengimpal atau memotong bahan yang memerlukan suhu tinggi 3500 °C. Antara berikut yang manakah siri homolog dan kumpulan berfungsi bagi asetilena adalah betul?
Diagram 2 shows the acetylene, C_2H_2 which is used to weld or cut materials that require high temperatures of 3500 ℃. Which of the following is the homologous series and functional group of acetylene?

Rajah 2 / *Diagram 2*

	Siri homolog ***Homologous series***	**Kumpulan berfungsi** ***Functional group***
A	Alkana *Alkane*	C – C
B	Alkena *Alkene*	C = C
C	Alkuna Alkyne	C ≡ C
D	Alkohol *Alcohol*	– OH

9. Antara berikut yang manakah merupakan polimer?
Which of the following is a polymer?

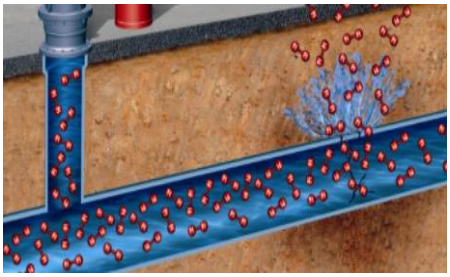
A Glukosa
Glucose

B Getah asli
Natural rubber

C Asid amino
Amino acid

D Minyak sawit
Palm oil

10. Rajah 3 menunjukkan kebocoran paip bawah tanah.
Diagram 3 shows the leakage of underground pipe.



Rajah 3 / Diagram 3

Antara yang berikut, yang manakah digunakan untuk mengesan kebocoran paip bawah tanah?
Which of the following is used to detect the leakages of underground pipe?

A Karbon-14
Carbon-14

B Natrium-24
Sodium-24

C Kobalt – 60
Cobalt – 60

D Fosforus – 32
Phosphorus – 32

11. Antara pernyataan berikut, yang manakah menerangkan ikatan logam dengan betul?
Which of the following statement explains metallic bond correctly?

I Daya tarikan elektrostatik antara lautan elektron dan ion logam bercas positif
Electrostatic attraction force between sea of electrons and positively charged metal ions

II Daya tarikan elektrostatik antara ion positif dan ion negatif dalam logam
Electrostatic attraction force between positive ions and negative ions in metals

III Elektron membawa cas dan bergerak bebas
Electrons carry charges and move freely

IV Elektron tersusun rapat di dalam kekisi
Electrons are arranged tightly within the lattice

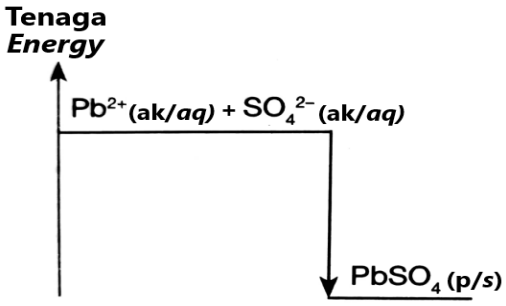
A I dan II
I and II

B I dan III
I and III

C II dan III
II and III

D III dan IV
II and IV

12. Rajah 4 menunjukkan satu gambar rajah aras tenaga.
Diagram 4 shows an energy level diagram.



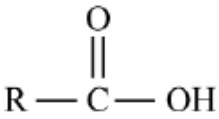
Rajah 4 / *Diagram 4*

Apakah kesimpulan yang dapat dibuat daripada Rajah 4?
What conclusion can be made from Diagram 4?

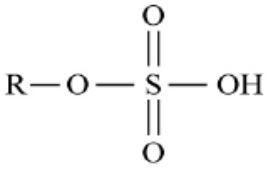
A Suhu persekitaran meningkat
The temperature of the surroundings increases
B Ion SO_4^{2-} mengandungi lebih tenaga daripada ion Pb^{2+}
SO_4^{2-} ions contains more energy than Pb^{2+} ions
C Haba diperlukan untuk memulakan tindak balas
Heat is needed to initiate the reaction
D Bahan tindak balas mengandungi kurang tenaga daripada hasil tindak balas
The reactant contains less energy than the products

13. Antara berikut yang manakah formula struktur bagi detergen?
Which of the following is the structural formula of detergent?

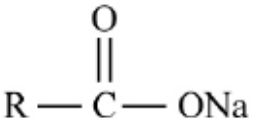
A



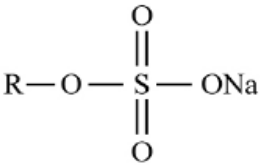
C



B

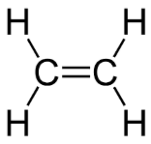


D

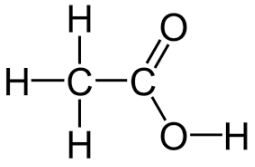


14. Antara berikut, yang manakah merupakan sebatian karbon yang larut dalam air?
Which of the following is a carbon compound that is soluble in water?

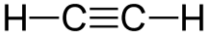
A



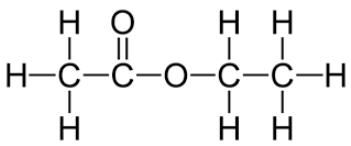
C



B



D



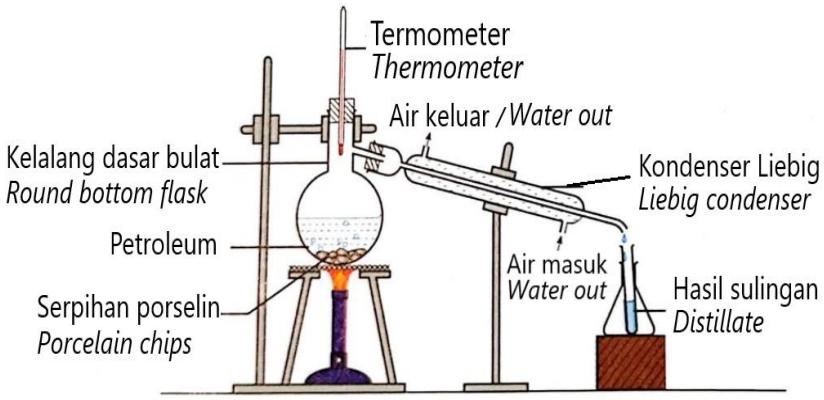
15. Pernyataan yang manakah menerangkan mengapa kereaktifan unsur Kumpulan 1 meningkat apabila menuruni kumpulan itu?
Which statement explains why the reactivity of Group 1 elements increases when going down the group?

A Takat lebur bagi unsur menurun
The melting points of the elements decreases
B Bilangan proton bertambah
The number of protons increases
C Elektron valens semakin jauh dari nukleus
The valence electron get further away from the nucleus
D Daya tarikan antara nukleus and elektron valens semakin kuat
The attractive force between nucleus and valence electron become stronger

16. Antara tindak balas berikut, yang manakah menerangkan garam yang paling tepat?
Which of the following best explains salt?

A Garam ialah sebatian ion yang terhasil apabila ion hidroksida daripada bes digantikan oleh ion logam atau ion ammonium
Salt is an ionic compound produced when hydroxide ion from a base is replaced with metal or ammonium ion
B Garam ialah sebatian kovalen yang terhasil apabila ion hidroksida daripada bes digantikan oleh ion logam atau ion ammonium
Salt is a covalent compound produced when hydroxide ion from a base is replaced with metal or ammonium ion
C Garam ialah sebatian ion yang terhasil apabila ion hidrogen daripada asid digantikan oleh ion logam atau ion ammonium
Salt is an ionic compound produced when hydrogen ion from an acid is replaced with metal or ammonium ion
D Garam ialah sebatian kovalen yang terhasil apabila ion hidrogen daripada asid digantikan oleh ion logam atau ion ammonium
Salt is a covalent compound produced when hydrogen ion from an acid is replaced with metal or ammonium ion

17. Rajah 5 menunjukkan susunan radas bagi proses penyulingan berperingkat petroleum.
Diagram 5 shows the apparatus set-up of petroleum fractional distillation process.



Rajah 5 / *Diagram 5*

Pernyataan manakah adalah tidak benar tentang proses ini?
Which statements is not true about the process?

A Pecahan hidrokarbon dalam petroleum dapat diasingkan berdasarkan takat didih yang berbeza
The hydrocarbon fractions in petroleum can be separated based on the different boiling point

B Pecahan hidrokarbon dengan takat didih yang rendah meruap lebih awal daripada pecahan dengan takat didih yang tinggi
The hydrocarbon fractions with lower boiling points are vaporized earlier than the fractions with higher boiling points

C Warna dan kelikatan hasil sulingan bertambah dengan peningkatan takat didih pecahan hidrokarbon
The colour and viscosity of the distillate increase with the increase in boiling point of the hydrocarbon fractions

D Warna hasil sulingan yang semakin gelap menunjukkan molekul pecahan hidrokarbon yang bersaiz kecil terbentuk
The darker colour of distillate shows the smaller molecular size of the hydrocarbon fraction is produced

18. Jadual 1menunjukkan kepekatan dan nilai pH bagi asid hidroklorik dan asid etanoik.
Table 1 shows the concentration and pH value of hydrochloric acid and ethanoic acid.

Asid *Acid*	Nilai pH *pH value*
Asid hidroklorik 0.1 mol dm^{-3} *0.1 mol dm^{-3} hydrochloric acid*	2
Asid etanoik 0.1 mol dm^{-3} *0.1 mol dm^{-3} ethanoic acid*	5

Jadual 1 / *Table 1*

Pernyataan yang manakah menjelaskan mengapa nilai pH asid etanoik lebih tinggi daripada asid hidroklorik dengan paling tepat?
Which statement explain the best why the pH value of ethanoic acid is higher than hydrochloric acid?

A Asid etanoik merupakan asid lemah
Ethanoic acid is a weak acid

B Asid etanoik merupakan asid monoprotik
Ethanoic acid is a monoprotic acid

C Asid etanoik mengion secara sepenuhnya dalam air
Ethanoic acid ionises completely in water

D Kepekatan ion hidrogen asid etanoik lebih rendah daripada asid hidroklorik
The concentration of hydrogen ion of ethanoic acid is lower than hydrochloric acid

19. Getah asli adalah lembut dan kurang tahan kepada haba dan pengoksidaan. Seorang murid mencelup sekeping getah asli ke dalam bikar yang mengandungi pelarut organik dan sebatian X selama beberapa minit. Kepingan getah itu kemudian dikeluarkan dan dikeringkan. Didapati bahawa kepingan getah itu menjadi lebih kenyal dan lebih tahan haba dan pengoksidaan. Apakah sebatian X?
Natural rubber is soft and less resistant to oxidation and heat. A student dipped a natural rubber sheet in a beaker containing an organic solvent and compound X for a few minutes. The rubber sheet is then removed and dried. It is found that the rubber sheet becomes more elastic and more heat and oxidation resistant. What is compound X?

A Asid ethanoik
Ethanoic acid
B Ammonia
Ammonia
C Sikloheksana
Cyclohexane
D Disulfur diklorida
Disulphur dichloride

20. Antara berikut, ubat manakah yang boleh melegakan sakit kepala?
Which of the following medicines can relieve a headache?

I Aspirin
Aspirin
II Penisilin
Penicillin
III Parasetamol
Paracetamol
IV Antihistamin
Antihistamines

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

21. Antara tindak balas berikut, yang manakah menghasilkan garam tak terlarutkan?
Which of the following reaction produces insoluble salt?

A Natrium hidroksida dan asid sulfuric
Sodium hydroxide and sulphuric acid
B Logam magnesium dan asid hidroklorik
Magnesium metal and hydrochloric acid
C Natrium klorida dan plumbum(II) sulfat
Sodium chloride and lead(II) sulphate
D Argentum nitrat dan kalium klorida
Silver nitrate and potassium chloride

22. Jadual 2 menunjukkan nombor proton bagi unsur-unsur X dan Y.
Table 2 shows the proton numbers of elements X and Y.

Unsur ***Element***	**Nombor proton** ***Proton number***
X	9
Y	17

Jadual 2 / Table 2

Unsur X adalah lebih reaktif daripada unsur Y. Pernyataan manakah yang menerangkan sifat kereaktifan ini?
Element X is more reactive than element Y. Which statements explains this reactivity property?

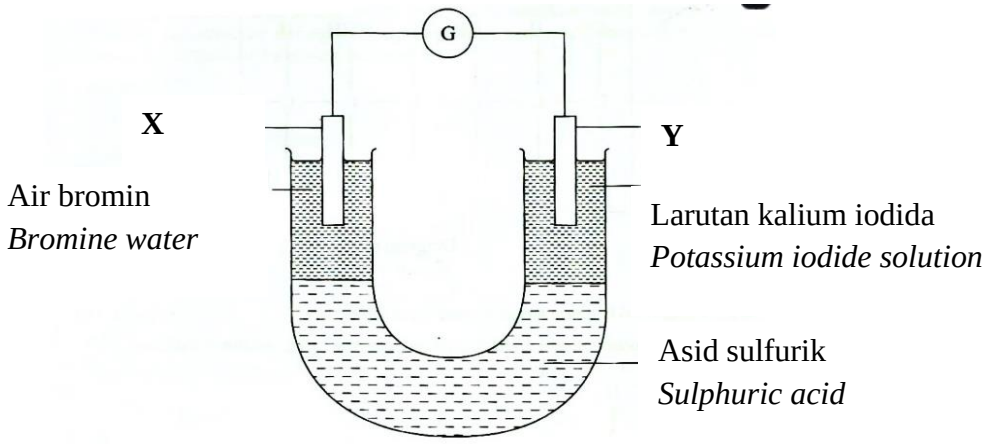
A Unsur X kurang tumpat daripada unsur Y
Element X is less dense than element Y

B Jisim atom bagi unsur X lebih kecil daripada unsur Y
Atomic mass of element X is smaller than element Y

C Unsur X mempunyai takat didih yang lebih rendah daripada unsur Y
Element X has lower boiling point than element Y

D Keupayaan atom X menarik satu elektron ke dalam petala valensnya lebih mudah daripada atom Y
The tendency of atom X to attract one electron to its valence shell is more easily than atom Y

23. Rajah 6 menunjukkan susunan radas untuk mengkaji tindak halas pemindahan elektron dalam suatu jarak.
Diagram 6 shows the apparatus set-up to study the reaction of the transfer electron at a distance.

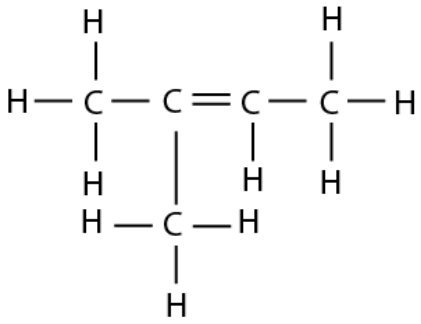
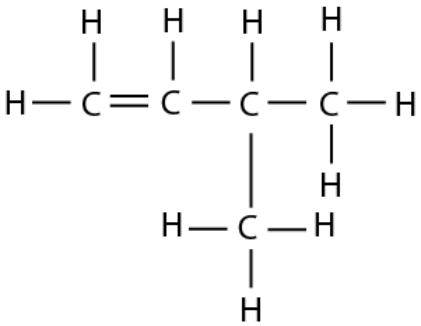


Rajah 6 / *Diagram 6*

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

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

24. Rajah 7 menunjukkan formula struktur bagi dua isomer, M dan N.
Diagram 7 shows the structural formulae of two isomers, M and N.

	
M	N

Rajah 7/ *Diagram 7*

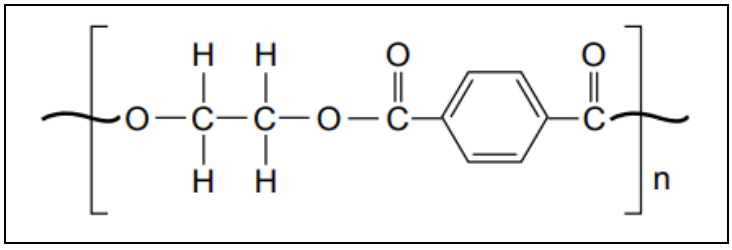
Antara pasangan berikut, yang manakah mempunyai nama isomer yang betul?
Which of the following pairs has the correct name of the isomers?

	M	N
A	2-methylbut-2-ene	2-methylbut-1-ene
B	2-methylbut-2-ene	3-methylbut-1-ene
C	3-methylbut-3-ene	2-methylbut-3-ene
D	3-methylbut-3-ene	3-methylbut-1-ene

25. Penguraian kuprum(II) nitrate menghasilkan kuprum(II) oksida, gas nitrogen dioksida dan gas oksigen. Antara berikut, yang manakah persamaan kimia seimbang bagi tindak balas berikut?
The decomposition of copper(II) nitrate produces copper(II) oxide, nitrogen dioxide gas and oxygen gas. Which of the following is the balanced chemical equation for the reaction?

A $2Cu(NO_3)_2 \rightarrow Cu_2O + 2NO_2 + O$
B $Cu(NO_3)_2 \rightarrow CuO + 2NO + O_3$
C $2Cu(NO_3)_2 \rightarrow 2CuO_2 + 4NO_2 + O_2$
D $2Cu(NO_3)_2 \rightarrow 2\ CuO + 4NO_2 + O_2$

26. Rajah 8 menunjukkan formula struktur bagi polimer P
Diagram 8 shows the structural formula P.



Rajah 8 / *Diagram 8*

Antara yang berikut, yang manakah benar tentang polimer P?
Which of the following is true about polymer P?

I Polimer P dihasilkan melalui tindak balas pempolimeran kondensasi
Polymer P is produced through condensation polymerisation reaction

II Monomer bagi polimer P terdiri daripada siri homolog berbeza
Monomer of polymer P consists of different homologous series

III Polivinil klorida dihasilkan daripada tindak balas yang sama dengan polimer P
Polyvinyl chloride is produced through the same type of reaction as polymer P

IV Kumpulan berfungsi monomer bagi polimer P adalah ikatan ganda dua antara atom karbon
The functional group of the monomer of polymer P is double bond between carbon atoms

A I dan II
I and II

B I dan III
I and III

C II dan III
II and III

D II dan IV
II and IV

27. Persamaan termokimia berikut menunjukkan tindak balas penyesaran.
The following thermochemical equation shows a displacement reaction.

$$Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu \qquad \Delta H = -210 \text{ kJ mol}^{-1}$$

Berdasarkan persamaan itu, pernyataan manakah yang betul?
Based on the equation, which statement is correct?

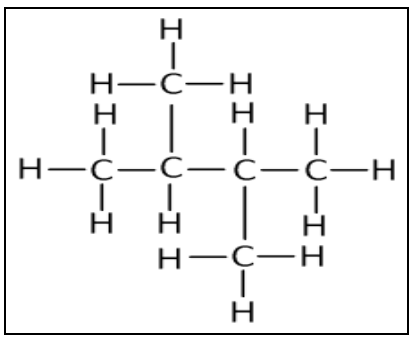
A Kuprum lebih elektropositif daripada zink
Copper is more reactive than zinc

B Tindak balas menyerap haba daripada persekitaran
The reaction absorb heat from the surroundings

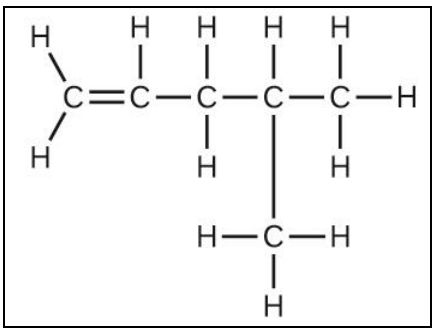
C Suhu campuran meningkat
The temperature of the mixture increases

D Tenaga pengaktifan ialah 210 kJ mol^{-1}
The activation energy is -210 kJ mol^{-1}

28. Rajah 9 menunjukkan formula struktur bagi sebatian X dan sebatian Y.
Diagram 9 shows the structural formulae of compound X and compound Y.



X



Y

Rajah 9 / *Diagram 9*

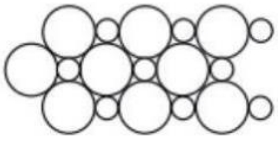
Antara berikut, yang manakah sifat yang betul bagi sebatian X dan sebatian Y?
Which of the following are the correct properties for compound X and compound Y?

	X	**Y**
A	Larut dalam asid cair *Soluble in dilute acid*	Larut dalam air *Soluble in water*
B	Menghasilkan lebih banyak jelaga apabila ia terbakar *Produces more soot when it burns*	Menghasilkan kurang jelaga apabila ia terbakar *Produces less soot when it burns*
C	Bertindak balas dengan bromin *Reacts with bromine*	Tidak bertindak balas dengan bromin *Does not react with bromine*
D	Tidak bertindak balas dengan kalium manganat(VII) berasid *Does not react with acidified potassium manganate(VII)*	Bertindak balas dengan kalium manganat(VII) berasid *Reacts with acidified potassium manganate (VII)*

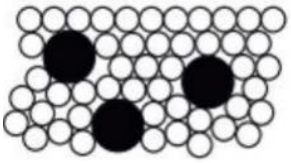
29. Rajah 10 menunjukkan cenderamata yang berkilat dan tidak mudah berkarat. Antara berikut, yang manakah menunjukkan susunan zarah dalam bahan yang membuat cenderamata ini?
Diagram 10 shows a souvenir which looks shiny and does not rust easily. Which of the following shows the arrangement of particles in substance that make this souvenir?

Rajah 10 / *Diagram 10*

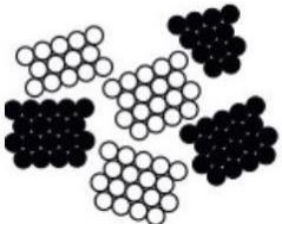
A



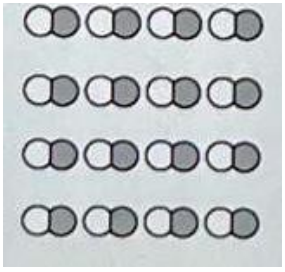
C



B



D



30. Jadual 3 menunjukkan kekonduksian elektrik bagi bahan X, Y dan Z.
Table 3 shows the electrical conductivities of substance X, Y and Z.

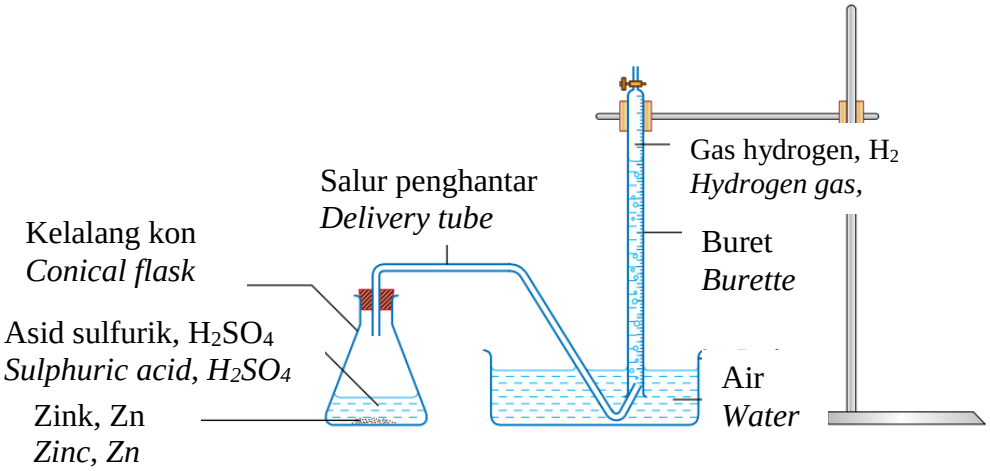
Bahan *Substance*	Kekonduksiaan elektrik dalam *Electrical conductivity in*	
	Keadaan pepejal *Solid state*	Keadaan leburan *Molten state*
X	√	√
Y	x	x
Z	x	√

Jadual 3 / Table 3

Bahan untuk X, Y dan Z adalah
The substance for X, Y and Z are

	X	Y	Z
A	Natrium klorida *Sodium chloride*	Zink *Zinc*	Naftalena *Naphthalene*
B	Natrium klorida *Sodium chloride*	Naftalena *Naphthalene*	Zink *Zinc*
C	Zink *Zinc*	Natrium klorida *Sodium chloride*	Naftalena *Naphthalene*
D	Zink *Zinc*	Naftalena *Naphthalene*	Natrium klorida *Sodium chloride*

31. Rajah 11 menunjukkan tindak balas antara zink, Zn dan asid sulfurik, H_2SO_4 bagi menentukan kadar tindak balas.
Diagram 11 shows the reaction between zinc, Zn and sulphuric acid, H_2SO_4 to determine the rate of reaction.



Rajah 11 / *Diagram 11*

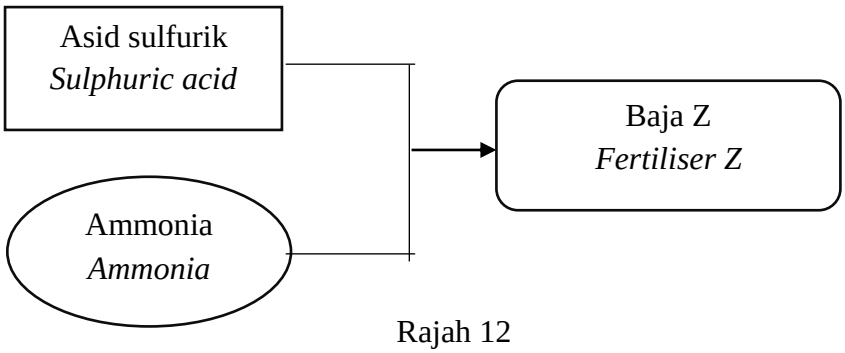
Antara yang berikut, perubahan yang manakah paling sesuai diukur bagi menentukan kadar tindak balas?
Which of the following changes is most suitable to measure to determine the rate of reaction?

A Pengurangan jisim zink terhadap masa
Decreased of zinc mass over time
B Pembentukan mendakan terhadap masa
Formation of precipitate over time
C Penambahan isipadu gas hidrogen yang terbebas terhadap masa
Increased volume of hydrogen gas released over time
D Perubahan nilai pH yang berlaku bagi hasil tindak balas terhadap masa
Changes in pH values of product of reaction over time

32. Hidrokarbon X mengandungi 93.75% karbon dan 6.25% hidrogen berdasarkan jisimnya. Jisim molekul relatif X ialah 128. Apakah formula molekul bagi hidrokarbon tersebut?
[Jisim atom relatif: C, 12; H, 1]
Hydrocarbon X contains 93.75% of carbon and 6.25% of hydrogen according to its mass. The relative molecular mass of X is 128. What is the molecular formula of the hydrocarbon?
[Relative atomic mass: C, 12; H, 1]

A CH_2
B C_3H_2
C C_5H_4
D $C_{10}H_8$

33. Rajah 12 menunjukkan penyediaan baja Z secara industri daripada hasil tindak balas antara asid sulfurik dengan ammonia.
Diagram 12 shows an industrial preparation of fertilizer Z from the product of reaction between sulphuric acid and ammonia.



Rajah 12
Diagram 12

Hitungkan peratus nitrogen mengikuti jisim dalam baja Z.
Calculate the percentage of nitrogen by mass in fertiliser Z.
[Jisim atom relatif : H=1; C=12; N=14; O=16; S=32]
[Relative atomic mass : H=1; C=12; N=14; O=16; S=32]

A 6.67%
B 12.28%
C 12.39%
D 21.21%

34. Unsur X terdiri daripada dua isotop, ^{11}X dan ^{Z}X. Kelimpahan semula jadi ^{11}X ialah 80% dan ^{Z}X ialah 20%. Diberi jisim atom relatif bagi unsur X ialah 10.8, hitung nilai Z.
Element X consists of two isotopes, ^{11}X and ^{Z}X. The natural abundance of ^{11}X is 80% and ^{Z}X is 20%, calculate the value of Z.

A 10
B 11
C 12
D 13

35. Jadual 4 menunjukkan pemerhatian bagi tiga ujian kimia bagi larutan T.
Table 4 shows the observation for three chemical tests on solution T.

	Test	**Observation**
I	Tambah larutan natrium hidroksida sehingga berlebihan *Add sodium hydroxide solution until in excess*	Mendakan putih terbentuk dan tidak larut dalam larutan natrium hidroksida berlebihan *White precipitate formed and insoluble in excess sodium hydroxide solution*
II	Tambah larutan ammonia sehingga berlebihan *Add ammonia solution until in excess*	Mendakan putih terbentuk dan tidak larut dalam larutan natrium hidroksida berlebihan *White precipitate formed and insoluble in excess sodium hydroxide solution*
III	Tambah asid nitrik dan larutan barium nitrate *Add nitric acid and barium nitrate solution*	White precipitate is formed *Mendakan putih terbentuk*

Jadual 4 / *Table 4*

Apakah T?
What is T?

A Aluminium sulfat
Aluminium sulphate

B Magnesium sulfat
Magnenium sulphate

C Kalsium klorida
Calcium chloride

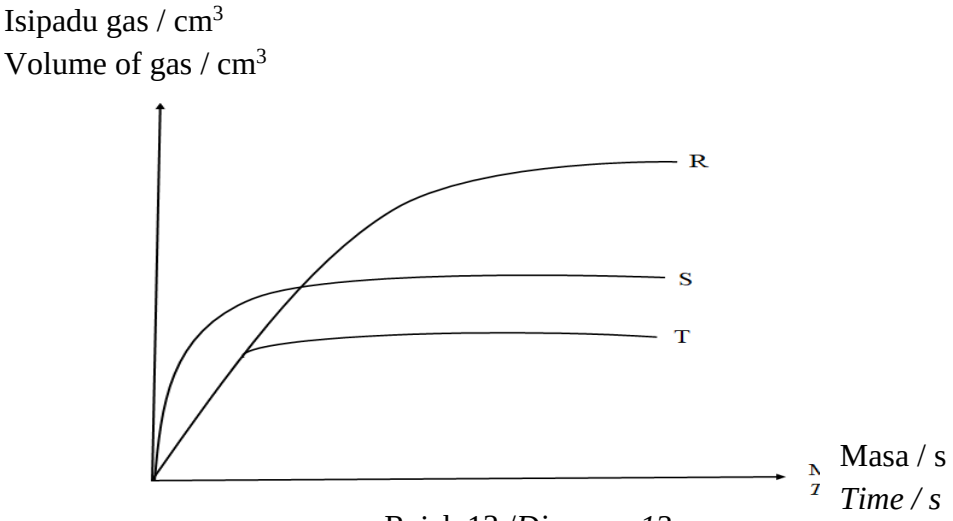
D Zink klorida
Zinc chloride

36. Jadual 5 menunjukkan tiga eksperimen yang dijalankan untuk menyiasat tindak balas antara serbuk magnesium berlebihan dengan asid.
Table 5 shows three experiments conducted to investigate the reaction between excess magnesium powder and acid.

Set ***Set***	**Keadaan bahan tindak balas** ***Conditions of reactants***
I	Serbuk magnesium + 50 cm^3 asid hidroklorik 0.5 mol dm^{-3} *Magnesium powder + 50 cm^3 of 0.5 mol dm^{-3} hydrochloric acid*
II	Serbuk magnesium + 15 cm^3 asid hidroklorik 2.0 mol dm^{-3} *Magnesium powder + 15 cm^3 of 2.0 mol dm^{-3} hydrochloric acid*
III	Serbuk magnesium + 50 cm^3 asid sulfurik 0.5 mol dm^{-3} *Magnesium powder + 50 cm^3 of 0.5 mol dm^{-3} sulphuric acid*

Jadual 5 / *Table 5*

Rajah 13 menunjukkan graf isipadu gas hidrogen melawan masa bagi eksperimen-eksperimen di atas.
Diagram 13 shows the graph of volume of hydrogen gas against time for the above experiments.

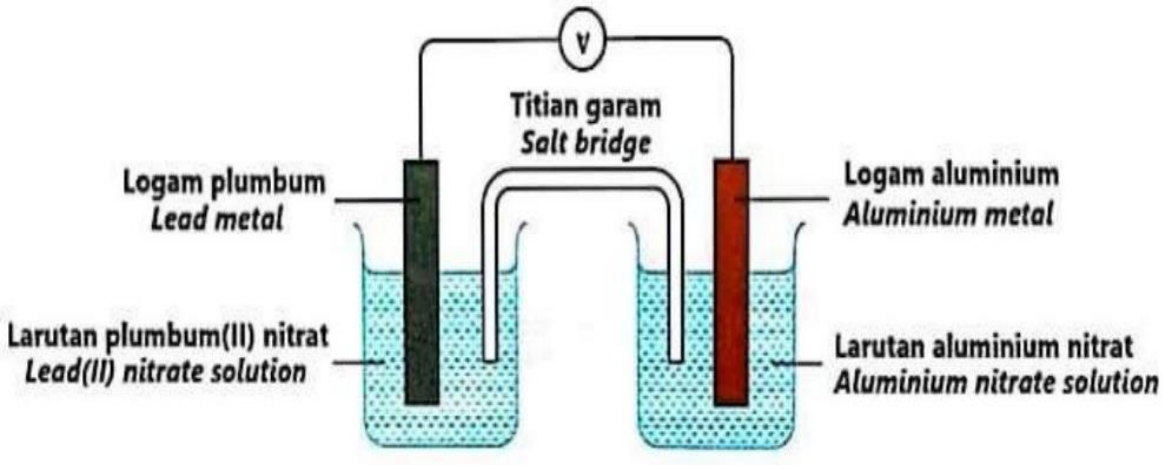


Rajah 13 /*Diagram 13*

Antara yang berikut, yang manakah mewakili keputusan eksperimen yang betul?
Which of the following represents the correct results of the experiments?

	I	**II**	**III**
A	T	S	R
B	R	S	T
C	T	R	S
D	S	T	R

37. Rajah 14 menunjukkan susunan radas bagi satu sel kimia.
Diagram 14 shows the apparatus set-up of a chemical cell.



Rajah 14 / Diagram 14

Apakah notasi sel bagi sel ini?
What is the cell notation for this cell?

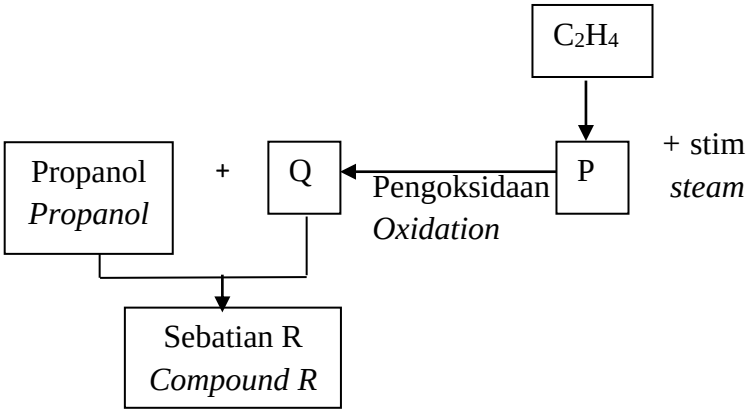
A Pb (p/*s*) | Pb^{2+} (ak/ *aq*) ‖ Al^{3+} (ak/ *aq*) | Al (p/*s*)

B Al (p/*s*) | Al^{3+} (ak/ *aq*) ‖ Pb^{2+} (ak/ *aq*) | Pb (p/*s*)

C Al^{3+} (ak/ *aq*) | Al (p/*s*) ‖ Pb (p/*s*) | Pb^{2+} (ak/ *aq*)

D Pb^{2+} (ak/ *aq*) | Pb (p/*s*) ‖ Al (p/*s*) | Al^{3+} (ak/ *aq*)

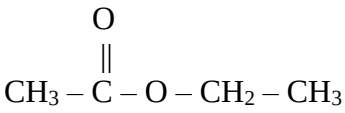
38. Rajah 15 menunjukkan proses penghasilan sebatian R.
Diagram 15 shows the process of producing compound R.



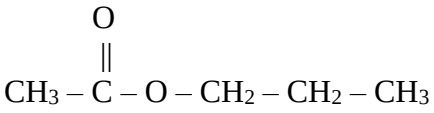
Rajah 15/ *Diagram 15*

Antara berikut, yang manakah formula struktur bagi sebatian R?
Which of the following is the structural formula for compound R?

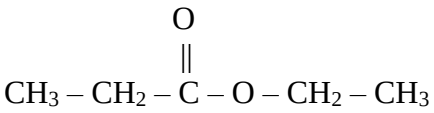
A



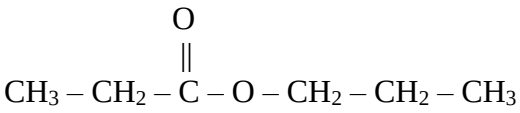
B



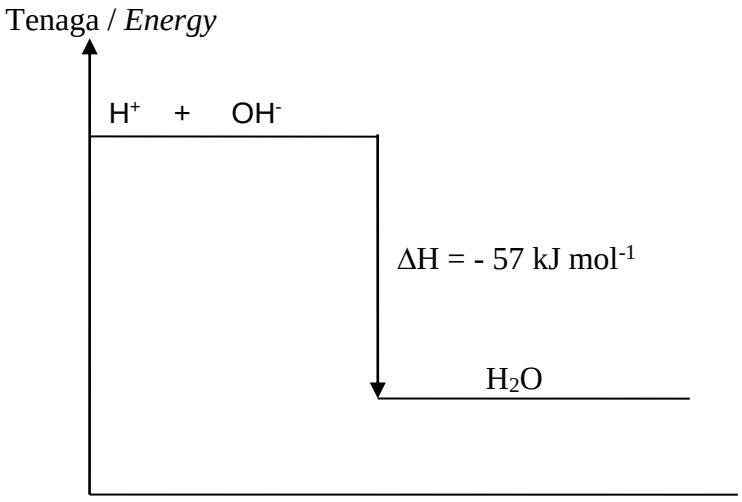
C



D



39. Rajah 16 menunjukkan aras tenaga yang mewakili tindak balas antara asid nitrik dan larutan kalium hidroksida.
Diagram 16 shows the energy level diagram that represents the reaction between nitric acid and potassium hydroxide solution.



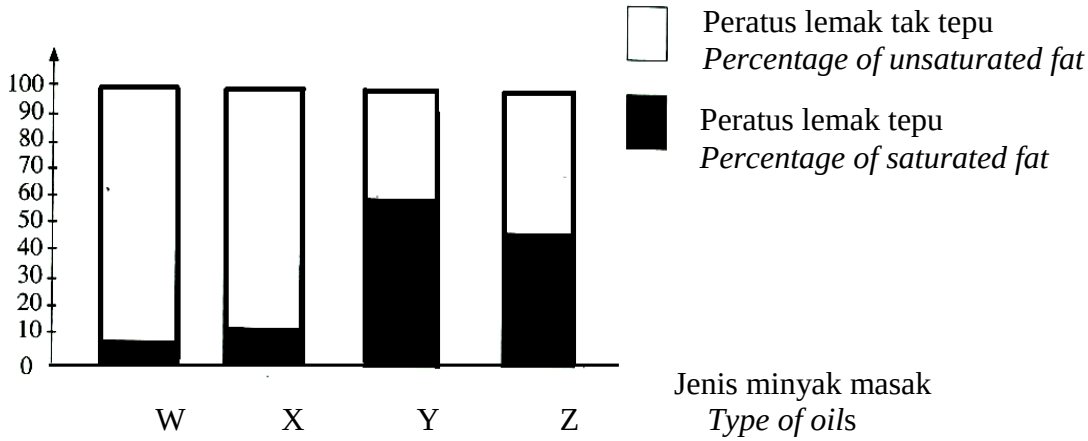
Rajah 16 / Diagram 16

Berapakah haba yang terbebas apabila 50 cm^3 asid nitrik 2.0 mol dm^{-3} ditambahkan kepada 25 cm^3 larutan kalium hidroksida 2.0 mol dm^{-3}?
What is the heat released when 50 cm^3 of 2.0 mol dm^{-3} nitric acid is added to 25 cm^3 of 2.0 mol dm^{-3} potassium hydroxide solution?

A 2.85 kJ
B 5.70 kJ
C 11.40 kJ
D 57.00 kJ

40. Goreng minyak penuh menglibatkan proses merendam makanan dalam minyak panas. Pada suhu tinggi, molekul minyak yang mengandungi ikatan ganda dua cenderung untuk bertindak balas dengan oksigen untuk menghasilkan sebatian berbahaya yang bersifat karsinogen.
Deep frying involves the process of submerging food in hot oil. At high temperature, the molecule of oil that contain double bonds tend to react with oxygen to form harmful compound which is carcinogenic.

Rajah 17 menunjukkan peratusan komposisi bagi lemak tepu dan lemak tak tepu dalam empat jenis minyak masak.
Diagram 17 shows the percentage composition of saturated and unsaturated fats in four types of cooking oils.



Rajah 17 / *Diagram 17*

Minyak masak manakah yang paling sesuai untuk goreng minyak penuh pada suhu tinggi?
Which cooking oil is most suitable for deep frying at high temperature?

A Minyak W
Oil W

B Minyak X
Oil X

C Minyak Y
Oil Y

D Minyak Z
Oil Z

SKEMA JAWAPAN
PRAKTIS KIMIA 4541/1
SET 1

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

LAMPIRAN

(Untuk rujukan guru)

JADUAL SPESIFIKASI UJIAN (JSU)
PRAKTIS KIMIA 4541/1: SET 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	1												1
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													
	2.4 Isotopes and its uses		10							34				2
3. The Mole Concept, Chemical Formula and Equation [F4]	3.1 Relative atomic mass and relative molecular mass													
	3.2 Mole concept								33					1
	3.3 Chemical formula									32				1
	3.4 Chemical equation								25					1
4. The Periodic Table of Elements [F4]	4.1 The development of The Periodic Table of Elements					15								1
	4.2 The arrangement in The Periodic Table of Elements													
	4.3 Elements in Group 18													
	4.4 Elements in Group 1													
	4.5 Elements in Group 17					22								1
	4.6 Elements in Period 3	2												1
	4.7 Transition elements													
5. Chemical Bond [F4]	5.1 Basics of compound formation													
	5.2 Ionic bond													
	5.3 Covalent bond													
	5.4 Hydrogen bond													
	5.5 Dative bond													
	5.6 Metallic bond	11												1
	5.7 Properties of ionic and covalent compounds						30							1
6. Acid, Base and Salt [F4]	6.1 The role of water in showing acidic and alkaline properties													
	6.2 pH value													
	6.3 Strength of acids and alkalis	6			18									2
	6.4 Chemical properties of acids and alkalis													
	6.5 Concentration of aqueous solution													
	6.6 Standard solution													
	6.7 Neutralisation													
	6.8 Salts, crystals and their uses in daily life				16									1
	6.9 Preparation of salts					21								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					2
	7.2 Factors affecting rate of reaction									36				1
	7.3 Application of factors that affect the rate of reaction in daily life													
	7.4 Collision theory													
8.Manufactured Substances in Industry [F4]	8.1 Alloy and its importance					29								1
	8.2 Composition of glass and its uses	5												1
	8.3 Composition of ceramics and its uses													
	8.4 Composite materials and its importance													
9. Redox equilibrium [F5]	9.1 Oxidation and reduction	3				23								2
	9.2 Standard electrode potential													
	9.3 Voltaic cell									37				1

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				26								2
	12.2 Natural rubber				19									1
	12.3 Synthetic rubber													
13. Consumer and Industrial Chemistry [F5]	13.1 Oils and fats											40		1
	13.2 Cleaning agents	13												1
	13.3 Food additives													
	13.4 Medicines and cosmetics					20								1
	13.5 Application of nanotechnology in industry													
	13.6 Application of green technology in industrial waste management													
Total		12	2	0	4	10	1	0	3	6	0	2	0	40