KEMENTERIAN PENDIDIKAN MALAYSIA
JABATAN PENDIDIKAN NEGERI SARAWAK

PROGRAM SEMARAK KASIH SPM 2.0 JPN SARAWAK TAHUN 2021

KIMIA

KERTAS 1

SET 2

PROGRAM
SEMARAK KASIH SPM 2.0
TAHUN 2021

JABATAN PENDIDIKAN NEGERI SARAWAK

KIMIA
(4541/1)

PRAKTIS KERTAS 1
SET 2

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 **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

SENARAI AHLI PANEL PEMBINA MODUL SEMARAK KASIH SPM 2.0

Bil.	Nama Guru	Sekolah	PPD
1.	Syahrul Azinar bin Abdul Rahman	SM Sains Kuching Utara	PPD Padawan
2.	Victoria Liza Anak Petrus	SMK Tun Abdul Razak	PPD Padawan
3.	Si Hui Ling	SMK Tinggi Kuching	PPD Kuching
4.	Norhani binti Othman	SMK Tunku Abdul Rahman	PPD Kuching
5.	Liew Hui Lee	SMK Batu Lintang	PPD Kuching
6.	Muhammad Zulkhairin Abdullah	SMKA Sheikh Haji Othman Abdul Wahab	PPD Padawan
7.	Cynthia Rawlin Anak Roney	SMK Lake	PPD Bau
8.	Ismadi bin Sirat	SM Teknik Sejingkat	PPD Kuching
9.	Nur Hidayatul Aliaa binti Justin	SM Sains Kuching Utara	PPD Padawan
10.	Siti Zarith binti Abd Wahab	SM Sains Kuching	PPD Padawan
11.	Chin Nyuk Jung	SMK Green Road	PPD Kuching

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	• 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 2

1. Atom yang manakah membentuk ion bercas positif?
Which atom forms a positively charged ion?

A Klorin
Chlorine
B Nitrogen
Nitrogen
C Hidrogen
Hydrogen
D Oksigen
Oxygen

2. Ciri manakah yang betul tentang unsur-unsur dalam Kumpulan 1 dalam Jadual Berkala Unsur apabila menuruni kumpulan?
Which characteristic is correct about elements in Group 1 *in the Periodic Table of Elements as going down the group*?

A Kereaktifan bertambah
The reactivity increases
B Menjadi semakin keras apabila menuruni kumpulan
Becomes harder when going down the group
C Kecenderungan menderma satu elektron berkurang
The tendency to donate an electron decreases
D Takat lebur dan takat didih meningkat
The melting point and the boiling point increase

3. Apakah maksud pengoksidaan?
What is the meaning of oxidation?

A Terima elektron
Gain of electron
B Terima oksigen
Gain of oxygen
C Terima hidrogen
Gain of hydrogen
D Pengurangan nombor pengoksidaan
Decrease in oxidation number

4. Antara yang berikut, yang manakah adalah sebatian?
Which of the following is a compound?

A Karbon
Carbon
B Oksigen
Oxygen
C Air
Water
D Neon
Neon

5. Antara yang berikut, yang manakah betul tentang elektrolit?
Which of the following is correct about an electrolyte?

A Wujud sebagai cecair pada suhu bilik
Exists as liquid at room temperature
B Larut dalam air
Dissolves in water
C Mengkonduksi elektrik dalam keadaan pepejal
Conducts electricity in solid state
D Mempunyai ion-ion bergerak bebas dalam keadaan akueus
Has freely moving ions in aqueous state

6. Apakah faktor yang mempengaruhi pemilihan ion untuk dinyahcas di anod semasa elektrolisis larutan magnesium sulfat menggunakan elektrod karbon?
What is the factor affecting the selectively discharged of ions at the anode during electrolysis of magnesium sulphate solution using carbon electrode?

A Nilai E^o
The E^o *value*
B Kepekatan ion
Concentration of ion
C Jenis elektrod
Type of electrode

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

A Pengurangan amaun hasil tindak balas
Decrease in amount of product
B Pengurangan amaun hasil tindak balas dengan masa
Decrease in amount of product against time
C Peningkatan amaun bahan tindak balas dengan masa
Increase in amount of reactant against time
D Peningkatan amaun hasil tindak balas dengan masa
Increase in amount of product against time

8. Antara yang berikut, yang manakah betul tentang alkana?
Which of the following is correct about alkanes?

A Sebatian mempunyai kumpulan karboksil
The compound has carboxyl group
B Sebatian mempunyai formula am C_nH_{2n}
The compound has general formula C_nH_{2n}
C Sebatian adalah satu hidrokarbon tepu
The compound is a saturated hydrocarbon
D Sebatian mengandungi ikatan ganda dua antara atom-atom karbon
The compound consists of double bond between carbon atoms

9. Pasangan monomer dan polimer manakah yang betul?
Which pair of monomer and polymer is correct?

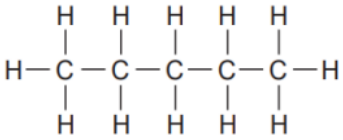
	Monomer ***Monomer***	**Polimer** ***Polymer***
A	Kloroetena *Chloroethene*	Polivinil klorida *Polyvinyl chloride*
B	Metil metakrilat *Methyl methacrylate*	Etena *Ethene*
C	Propena *Propene*	Polistirena *Polystyrene*
D	Isoprena *Isoprene*	Perspeks *Perspex*

10. Seorang pesakit didiagnosiskan mempunyai kanser. Isotop manakah yang digunakan untuk merawat pesakit ini?
A patient is diagnosed of having cancer. Which isotope is used to treat the patient?

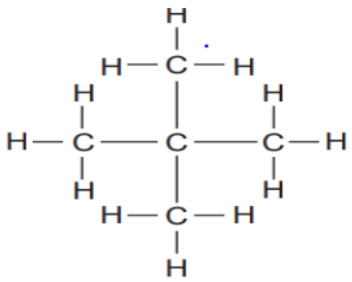
A Fosforus-32
Phosphorus-32
B Kobalt-60
Cobalt-60
C Natrium-24
Sodium-24
D Karbon-14
Carbon-14

11. Berikut merupakan struktur molekul bagi hidrokarbon.
The following is the structural molecules of hydrocarbons.

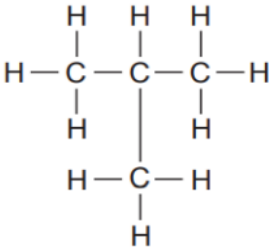
I



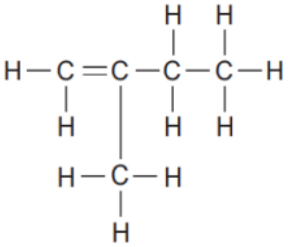
III



II



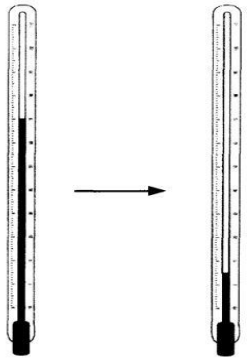
IV



Sebatian manakah merupakan isomer?
Which compounds are isomers?

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

12. Rajah 1 menunjukkan perubahan bacaan termometer bagi satu tindak balas yang berlaku apabila dua bahan berbeza dicampur.
Diagram 1 *shows the change in thermometer readings for a reaction that occurs when two different substances are mixed.*



Sebelum *Before* | Selepas *After*

Rajah 1
Diagram 1

Apakah bahan tersebut?
What are the substances?

A HNO_3 dan NaOH
HNO_3 *and* NaOH

B NaCl dan $AgNO_3$
NaCl *and* $AgNO_3$

C $NaHCO_3$ dan HCl
$NaHCO_3$ *and* HCl

D $CuSO_4$ dan $BaCl_2$
$CuSO_4$ *and* $BaCl_2$

13. Sekumpulan pengakap pergi berkhemah di tepi pantai. Mereka perlu menggunakan air laut untuk semua kerja pencucian.
Bahan manakah yang paling sesuai untuk mencuci pakaian mereka dengan berkesan?
A group of scouts go camping by the seashore. They have to do all their washing using sea water.
What is the suitable substance for them to wash their clothes effectively?

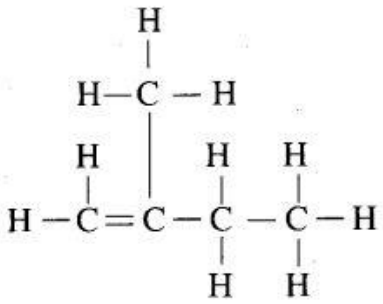
A Sabun
Soap

B Peluntur
Bleach

C Detergen
Detergent

D Antiseptik
Antiseptic

14. Rajah 2 menunjukkan formula struktur suatu sebatian organik.
Diagram 2 *shows the structural formula of an organic compound.*

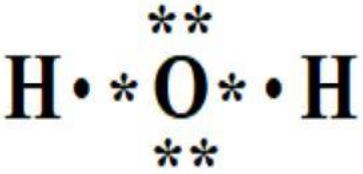


Rajah 2
Diagram 2

Apakah nama IUPAC bagi sebatian organik itu?
What is the IUPAC *name of the organic compound*?

A 2-metilbut-1-ena
2-*methylbut*-1-*ene*
B 2-metilbut-2-ena
2-*methylbut*-2-*ene*
C 2-metilbut-3-ena
2-*methylbut*-3-*ene*
D 3-metilbut-3-ena
3-*methylbut*-3-*ene*

15. Rajah 3 menunjukkan struktur Lewis molekul air
Diagram 3 *shows the Lewis structure of water molecule.*



Rajah 3
Diagram 3

Berapakah bilangan maksimum ikatan hidrogen yang boleh dibentuk oleh molekul air?
What is the maximum number of hydrogen bonds that can be formed by water molecule?

A 1
B 2
C 3
D 4

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

A Argentum nitrat dan kalium klorida
Silver nitrate and potassium chloride
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 Natrium hidroksida dan asid nitrik
Sodium hydroxide and nitric acid

17. Jisim formula relatif bagi suatu sebatian dengan formula empirik CH_2 ialah 56.
Apakah formula molekul bagi sebatian ini?
[Jisim atom relatif: C = 12, H = 1]
The relative molecular mass of a compound with the empirical formula of CH_2 *is* 56.
What is the molecular formula of this compound?
[*Relative atomic mass:* C = 12, H = 1]

A CH_2
B C_2H_4
C C_3H_6
D C_4H_8

18. Jadual 1 menunjukkan kepekatan ion hidrogen dalam asid hidroklorik dan asid sulfurik.
Table 1 *shows the concentration of hydrogen ions in hydrochloric acid and sulphuric acid.*

Asid ***Acid***	**Kepekatan ion hydrogen (mol dm^{-3})** ***Concentration of hydrogen ions*** **(mol dm^{-3})**
Asid hidroklorik 0.1 mol dm^{-3} 0.1 mol dm^{-3} *hydrochloric acid*	0.1
Asid sulfurik 0.1 mol dm^{-3} 0.1 mol dm^{-3} *sulphuric acid*	0.2

Jadual 1
Table 1

Mengapakah kepekatan ion hidrogen dalam asid sulfurik lebih tinggi daripada asid hidroklorik?
Why is the concentration of hydrogen ions in sulphuric acid higher than hydrochloric acid?

A Asid sulfurik lebih tumpat
Sulphuric acid is denser
B Asid sulfurik lebih mudah larut dalam air
Sulphuric acid is more soluble in water
C Asid sulfurik ialah asid yang lebih kuat
Sulphuric acid is a stronger acid
D Asid sulfurik ialah asid diprotik
Sulphuric acid is a diprotic acid

19. Apabila kaca Q dipanaskan pada suhu tinggi dan terus dimasukkan ke dalam air sejuk, Q tidak retak. Apakah kaca yang mungkin mewakili Q?
When glass Q *is heated to high temperature and quickly plunged into cold water,* Q *does not crack. What is the possible glass that represent* Q?

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

20. Krim muka yang dikeluarkan oleh sebuah syarikat X lebih mahal dan lebih efektif daripada krim muka yang dikeluarkan oleh syarikat Z. Mengapakah krim muka syarikat X lebih mahal?
The facial creams manufactured by company X *are more expensive and more effective than facial creams manufactured by company* Z. *Why are facial creams from company* X *more expensive*?

A Tahan lama
Long lasting
B Diperbuat daripada bahan organik
Made up from organic materials
C Mengandungi gliserin yang dapat mengekalkan kelembapan
Contain glycerine that can retain the moisture
D Menggunakan zarah nano yang dapat menembusi kulit dengan lebih baik
Use nanoparticles that can penetrate the skin better

21. Berapakah nilai pH larutan kalium hidroksida, 0.1 mol dm^{-3}?
What is the pH *value of potassium hydroxide* 0.1 mol dm^{-3}?

A 11
B 12
C 13
D 14

22. Jadual 2 menunjukkan proton proton bagi unsur V dan W.
Table 2 *shows the proton numbers of element* V *and* W.

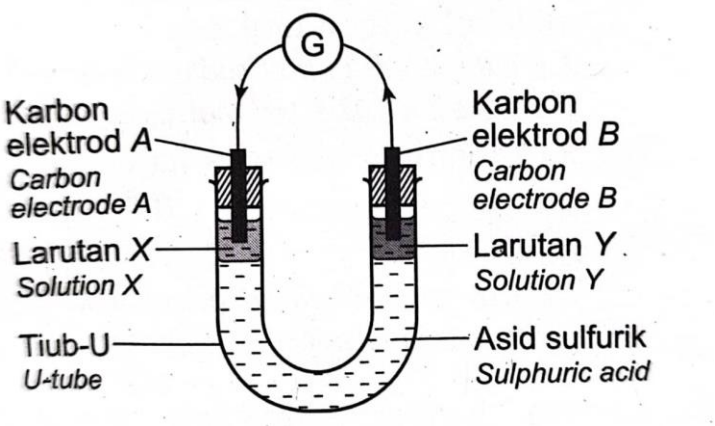
Unsur ***Element***	**Nombor proton** ***Proton number***
V	9
W	17

Jadual 2
Table 2

Pernyataan yang manakah benar mengenai unsur V dan W.
Which statement given is correct about element V *and* W.

A V lebih reaktif dari W
V *is more reactive than* W
B W menerima electron lebih mudah dari V
W *accept electrons easier than* V
C Saiz atom V lebih besar dari W
The atomic size of V *is bigger than* W
D Warna V lebih gelap dari W
The colour of V *is darker than* W

23. Rajah 4 menunjukkan susunan radas untuk mengkaji tindak balas redoks.
Diagram 4 *shows the apparatus set-up to study a redox reaction.*



Rajah 4
Diagram 4

Electron mengalir dari karbon elektrod B ke A melalui wayar penyambung. Antara yang berikut, yang manakah ialah larutan X dan larutan Y?
Electrons flows from carbon electrode B *to* A *through a connecting wire. Which of the following are solution* X *and solution* Y?

	Larutan X ***Solution* X**	**Larutan Y** ***Solution* Y**
A	Ferum(II) sulfat *Iron*(II) *sulphate*	Air bromin *Bromine water*
B	Ferum(III) sulfat *Iron*(III) *sulphate*	Kalium bromida *Potassium bromide*
C	Kalium klorida *Potassium chloride*	Air bromin *Bromine water*
D	Kalium manganat(VII) berasid *Acidified potassium manganate*(VII)	Ferum(III) sulfat *Iron*(III) *sulphate*

24. Jadual 3 menunjukkan susunan electron untuk unsur P dan S.
Table 3 *shows the electron arrangement of elements* P *and* S.

Unsur ***Element***	**Susunan electron** ***Electron arrangement***
P	2.5
S	2.8.1

Jadual 3
Table 3

Apakah formula untuk sebatian dan jenis ikatan yang terbentuk antara unsur P dan S?
What is the formula of the compound and the type of the bond formed between elements P *and* S?

	Formula untuk sebatian ***Formula of compound***	**Ikatan** ***Bond***
A	SP_3	Ionik *Ionic*
B	S_3P	Ionik *Ionic*
C	SP_3	Kovalen *Covalent*
D	S_3P	Kovalen *Covalent*

25. Tindak balas antara aluminium dan kuprum(II) oksida boleh diwakili dengan persamaan kimia berikut.
The reaction between aluminum and copper(II) *oxide can be represented by the following chemical equation.*

$$\mathbf{2Al}_{(p/s)} + \mathbf{3CuO}_{(p/s)} \rightarrow \mathbf{Al_2O_3}_{(p/s)} + \mathbf{3Cu}_{(p/s)}$$

Hitung jisim aluminium yang diperlukan untuk tindak balas lengkap dengan 24 g kuprum(II) oksida.
[Jisim atom relatif: Cu = 64; Al = 27; O = 16]
Calculate the mass of aluminium required for a complete reaction with 24 g *of copper*(II) *oxide.*
[*Relative atomic mass:* Cu = 64; Al = 27; O = 16]

A 2.7 g
B 5.4 g
C 8.1 g
D 10.8 g

26. Antara pernyataan berikut, yang manakah pengelasan polimer berdasarkan ciri?
Which of the following statements are polymers classified based on characteristics?

I Termoplastik
Thermoplastic
II Termoset
Thermoset
III Elastomer
Elastomers
IV Homopolimer
Homopolymer

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

27. Apabila serbuk magnesium berlebihan ditambah kepada 25 cm^3 larutan kuprum(II) sulfat 2.0 mol dm^{-3}, suhu meningkat daripada 30°C kepada 40°C.
Berapakah haba penyesaran bagi kuprum?
[Muatan haba tentu larutan = 4.2J g^{-1} °C; Ketumpatan larutan = 1 g cm^{-3})
When excess magnesium powder is added to 25 cm^3 *of* 2.0 mol dm^{-3} *copper*(II) *sulphate solution, the temperature increases from* 30°C *to* 40°C.
What is the heat of displacement of copper?
[*Specific heat capacity of solution* = 4.2J g^{-1} °C*; Density of solution* = 1 g cm^{-3}]

A -21kJ mol^{-1}
B -42kJ mol^{-1}
C -210kJ mol^{-1}
D -420kJ mol^{-1}

28. Notasi sel bagi sel kimia dengan menggunakan logam argentum dan magnesium sebagai elektrod adalah seperti berikut:
Cell notation for voltaic cell with silver and magnesium metal as electrodes are as follows:

$$\mathbf{Mg \mid Mg^{2+} \parallel Ag^{+} \mid Ag}$$

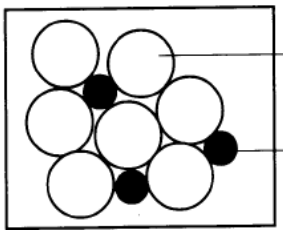
Apakah nilai voltan sel, E^0?
[Rujuk Lampiran untuk nilai keupayaan elektrod piawai]
What is cell voltage sel, E^0?
[*Refer to Appendix for standard electrode potential values*]

A +1.58V
B +3.18V
C -1.58V
D -3.18V

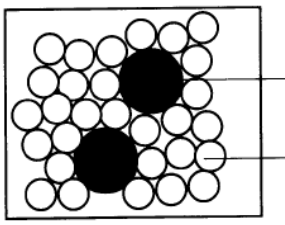
29. Struktur kerangka sebuah jambatan telah bengkok selepas 6 bulan beroperasi. Suatu struktur yang kuat yang boleh menahan kakisan diperlukan untuk membina kerangka yang baharu. Kombinasi bahan manakah yang paling sesuai untuk menghasilkan kerangka tersebut?

The frame structure of a bridge bent after 6 *months operated. A strong structure which can withstand corrosion is needed to construct a new frame.*
Which combination of substance is the most suitable to produce the frame?

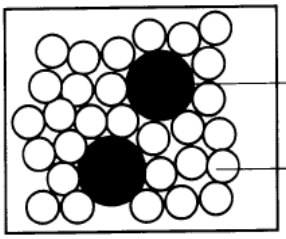
A



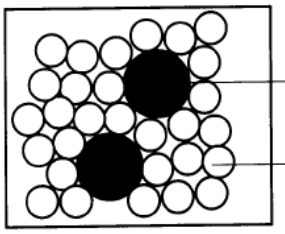
C



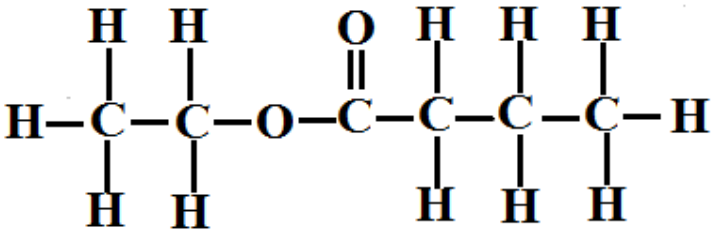
B



D



30. Rajah 5 menunjukkan formula struktur yang mewakili satu bahan perisa makanan.
Diagram 5 *shows a structure formula which represents a food flavouring substance.*



Rajah 5
Diagram 5

Antara yang berikut, yang manakah boleh digunakan untuk membuat perisa itu?
Which the following can be used to make the flavouring?

A Propil propanoat dan etanol
Propyl propanoate and ethanol

B Etanol dan asid butanoik
Ethanol and butanoic acid

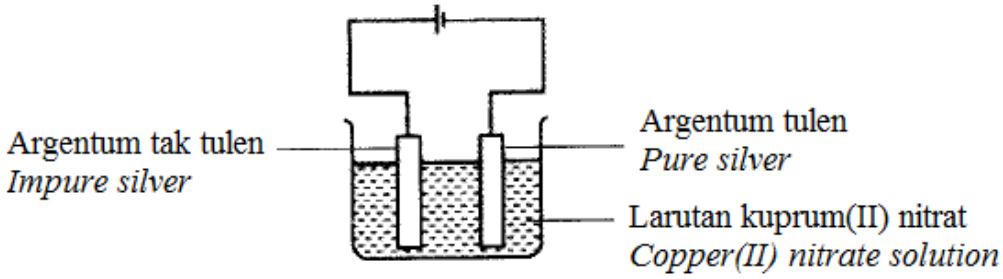
C Butanol dan asid etanoik
Butanol and ethanoic acid

D Propanol dan asid propanoik
Propanol and propanoic acid

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

	Kadar tindakbalas rendah ***Low rate of reaction***	**Kadar tindakbalas tinggi** ***High rate of reaction***
A	Peneutralan antara asid nitrik dan larutan natrium hidroksida. *Neutralisation between nitric acid and sodium hydroxide solution*	Pengaratan besi *Iron rusting*
B	Pengaratan besi *Iron rusting*	Penapaian larutan glukosa *Fermentation of glucose solution*
C	Penguraian ganda dua antara larutan plumbum(II) nitrat dan larutan natrium iodida *Double decomposition between lead*(II) *nitrate solution and sodium iodide solution*	Peneutralan antara asid nitrik dan larutan natrium hidroksida. *Neutralisation between nitric acid and sodium hydroxide solution*
D	Penapaian larutan glukosa *Fermentation of glucose solution*	Penguraian ganda dua antara larutan plumbum(II) nitrat dan larutan natrium iodida *Double decomposition between lead*(II) *nitrate solution and sodium iodide solution*

32. Rajah 6 menunjukkan susunan radas untuk menulenkan argentum.
Diagram 6 *shows the apparatus set-up to purify silver.*



Rajah 6
Diagram 6

Selepas satu jam, didapati argentum tidak ditulenkan.
Apakah yang perlu dilakukan untuk memastikan penulenan berlaku?
After one hour, it is found that the silver is not purified.
What should be done to ensure purification takes place?

A Gunakan larutan argentum nitrat sebagai elektrolit
Use silver nitrate solution as the electrolyte

B Tambahkan kepekatan larutan kuprum(II) klorida
Increase the concentration of copper(II) *chloride solution*

C Saling tukar terminal pada sel
Interchange the terminals in the cell

D Gunakan argentum tulen yang lebih besar
Use a bigger pure silver

33. Seorang penoreh getah mendapati susu getah menggumpal selepas beberapa jam.
Apakah bahan yang perlu ditambah ke dalam susu getah untuk mengelakkannya daripada menggumpal?
A rubber tapper finds that latex coagulates after several hours.
What substances should be added into the latex to prevent it from coagulating?

A Asid nitrik
Nitric acid

B Asid etanoik
Ethanoic acid

C Larutan ammonia
Ammonia solution

D Larutan natrium klorida
Sodium chloride solution

34. Besi berkarat dengan kehadiran oksigen dan air.
Kaedah manakah menyebabkan besi berkarat lebih cepat?
Iron rusts in the presence of oxygen and water.
Which method causes iron to rust faster?

A Penyambungan besi kepada magnesium
Connecting iron to magnesium

B Pengalvanian besi dengan zink
Galvanizing iron with zinc

C Penyentuhan besi dengan plumbum
Touching iron with lead

D Penyaduran besi dengan stanum
Coating iron with tin

35. Jadual 4 menunjukkan pemerhatian apabila satu siri ujian dijalankan bagi mengesahkan anion dan kation dalam sebatian T.
Table 4 *shows the observations when a series of tests are conducted to verify the anion dan cation in a compound* T.

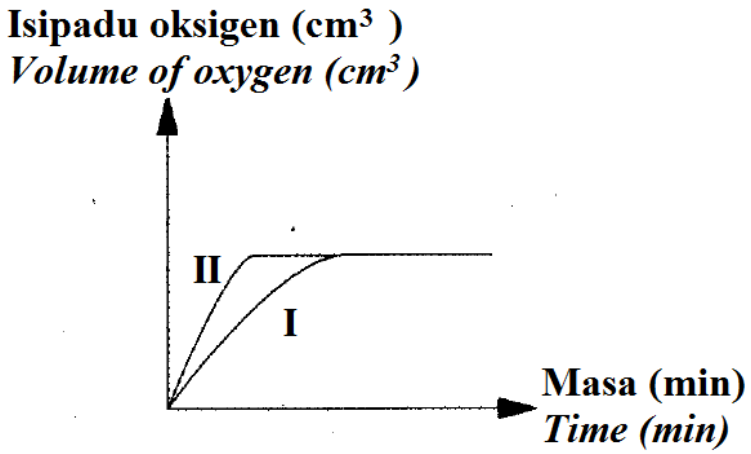
Ujian ***Test***	**Pemerhatian** ***Observation***
Tambah beberapa titik larutan ammonia sehingga berlebihan kepada larutan T *Add a few drops of ammonia solution until excess to solution of* T	Mendakan putih terbentuk dan larut dalam ammonia berlebihan *White precipitate is formed, and it is soluble in excess ammonia solution*
Tambah larutan T kepada larutan argentum nitrat *Add solution of* T *to silver nitrate solution*	Mendakan putih terbentuk *White precipitate is formed*

Jadual 4
Table 4

Apakah anion dan kation yang hadir dalam sebatian T?
What is the anion dan cation present in compound T?

	Anion ***Anion***	**Kation** ***Cation***
A	Sulfat *Sulphate*	Plumbum *Lead*
B	Sulfat *Sulphate*	Zink *Zinc*
C	Klorida *Chloride*	Zink *Zinc*
D	Klorida *Chloride*	Plumbum *Lead*

36. Rajah 7 menunjukkan keputusan eksperimen I dan eksperimen II bagi penguraian larutan hidrogen peroksida dengan kehadiran suatu mangkin.
Diagram 7 shows the results of experiment I *and experiment* II *for decomposition of hydrogen peroxide solution in the presence of a catalyst.*



Rajah 7
Diagram 7

Eksperimen I menggunakan 50 cm^3 larutan hidrogen peroksida 1.0 mol dm^{-3} pada suhu 21°C. Apakah yang digunakan dalam Eksperimen II untuk memperoleh lengkung yang ditunjukkan dalam Rajah 7?
Experiment I *use* 50 cm^3 *of* 1.0 mol dm^{-3} *of hydrogen peroxide solution at temperature* 21°C.
What is used in Experiment II *to obtain the curve shown in Diagram* 7?

	Hidrogen peroksida *Hydrogen peroxide*		**Suhu (°C)** *Temperature* **(°C)**
	Isipadu (cm^3) *Volume* **(cm^3)**	**Kepekatan (mol dm^{-3})** *Concentration* **(mol dm^{-3})**	
A	50	1.0	30
B	50	0.5	25
C	25	1.0	25
D	25	0.5	30

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

$X(p) \rightleftharpoons X^{2+}(ak) + 2e$ $X(s) \rightleftharpoons X^{2+}(aq) + 2e$	$E^0 = -0.90$ V
$Y(p) \rightleftharpoons Y^{3+}(ak) + 3e$ $Y(s) \rightleftharpoons Y^{3+}(aq) + 3e$	$E^0 = +1.88$ V
$Z(p) \rightleftharpoons Z^{2+}(ak) + 2e$ $Z(s) \rightleftharpoons Z^{2+}(aq) + 2e$	$E^0 = +2.86$ V

Jadual 5
Table 5

Berdasarkan nilai E^0, susunkan atom atau ion yang berikut dalam tertib menaik kekuatan agen pengoksidaan.
Based on the E^0 *value, arrange the following atom or ion in an ascending order of the strength of oxidising agent.*

A Z^{2+}, Y^{3+}, X^{2+}
B Z, Y, X
C X, Y, Z
D X^{2+}, Y^{3+}, Z^{2+}

38. Anda diberikan dua sebatian yang berlainan. Satu sebatian adalah kalsium klorida dan satu lagi adalah etanol.
Antara ciri fizikal berikut, yang manakah boleh digunakan untuk membezakan dua sebatian tersebut?
You are given different compounds. One of the compounds is calcium chloride and the other is ethanol.
Which of the following physical properties can be used to differentiate the two compounds?

I Takat lebur
Melting point
II Keterlarutan dalam air
Solubility in water
III Physical state
Keadaan fizikal
IV Kekonduksian elektrik dalam keadaan cecair
Electrical conductivity in liquid state

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

39. Persamaan termokimia berikut menunjukkan tindak balas pembakaran antara heksena, C_6H_{12} dan oksigen.
The following thermochemical equation shows a combustion reaction between hexene, C_6H_{12} *and oxygen.*

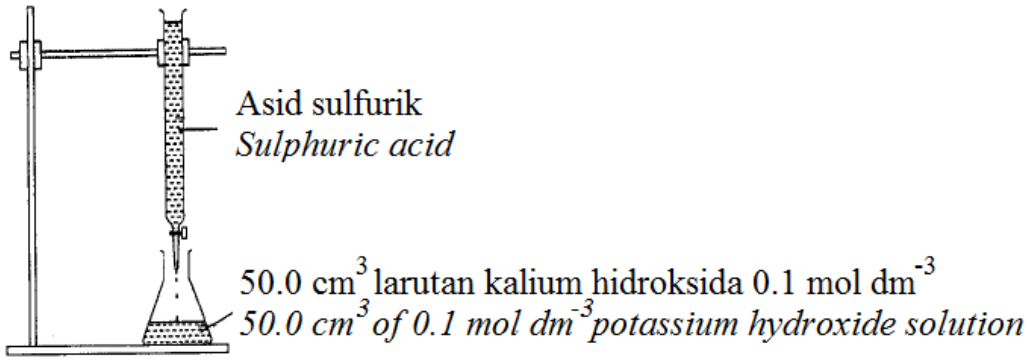
$$\mathbf{C_6H_{12} + 9O_2 \rightarrow 6CO_2 + 6H_2O} \qquad \Delta H = -3500 \text{ kJ mol}^{-1}$$

Berapakah jisim heksena yang perlu dibakar untuk menghasilkan haba yang dapat memanaskan 2 kg air daripada suhu 27 °C ke 100 °C?
[Jisim atom relatif: C=12, H=1, Muatan haba tentu air = 4.2 J $g^{-1}{}^{o}C^{-1}$]

What is the mass of hexene need to be burnt to produce heat that can heat up 2 kg *of water from* 27 °C *to* 100 °C?
[*Relative atomic mass:* C=12, H=1, *Specific heat capacity of water* = 4.2 J g^{-1} $^{o}C^{-1}$]

A 5.71 g
B 5.56 g
C 14.72 g
D 15.07 g

40. Rajah 8 menunjukkan susunan radas bagi tindak balas peneutralan antara asid kuat dan alkali kuat.
Diagram 8 *shows the apparatus set up for the neutralisation between a strong acid with strong alkali.*



Rajah 8
Diagram 8

25.0 cm^3 asid sulfurik meneutralkan 50.0 cm^3 larutan kalium hidroksida 0.1 mol dm^{-3}.
Apakah kemolaran asid sulfurik?
25.0 cm^3 *of sulphuric acid neutralises* 50.0 cm^3 *of* 0.1 mol dm^{-3} *potassium hydroxide solution. What is the molarity of the sulphuric acid*?

A 0.10 mol dm^{-3}
B 0.15 mol dm^{-3}
C 0.20 mol dm^{-3}
D 0.40 mol dm^{-3}

Lampiran/ *Appendix*:

Nilai keupayaan elektrod piawai
Standard electrode potential values

Half-cell equations	E^0 / V (298 K)
$Li^+(aq) + e^- \rightleftharpoons Li(s)$	-3.04
$K^+(aq) + e^- \rightleftharpoons K(s)$	-2.92
$Ca^{2+}(aq) + 2e^- \rightleftharpoons Ca(s)$	-2.87
$Na^+(aq) + e^- \rightleftharpoons Na(s)$	-2.71
$Mg^{2+}(aq) + 2e^- \rightleftharpoons Mg(s)$	-2.38
$Al^{3+}(aq) + 3e^- \rightleftharpoons Al(s)$	-1.66
$Zn^{2+}(aq) + 2e^- \rightleftharpoons Zn(s)$	-0.76
$Fe^{2+}(aq) + 2e^- \rightleftharpoons Fe(s)$	-0.44
$Ni^{2+}(aq) + 2e^- \rightleftharpoons Ni(s)$	-0.25
$Sn^{2+}(aq) + 2e^- \rightleftharpoons Sn(s)$	-0.14
$Pb^{2+}(aq) + 2e^- \rightleftharpoons Pb(s)$	-0.13
$2H^+(aq) + 2e^- \rightleftharpoons H_2(g)$	0.00
$Cu^{2+}(aq) + 2e^- \rightleftharpoons Cu(s)$	+0.34
$O_2(g) + 2H_2O(l) + 4e^- \rightleftharpoons 4OH^-(aq)$	+0.40
$I_2(s) + 2e^- \rightleftharpoons 2I^-(aq)$	+0.54
$Fe^{3+}(aq) + e^- \rightleftharpoons Fe^{2+}(aq)$	+0.77
$Ag^+(aq) + e^- \rightleftharpoons Ag(s)$	+0.80
$Br_2(l) + 2e^- \rightleftharpoons 2Br^-(aq)$	+1.07
$Cr_2O_7^{2-}(aq) + 14H^+(aq) + 6e^- \rightleftharpoons 2Cr^{3+}(aq) + 7H_2O(l)$	+1.33
$Cl_2(g) + 2e^- \rightleftharpoons 2Cl^-(aq)$	+1.36
$MnO_4^-(aq) + 8H^+(aq) + 5e^- \rightleftharpoons Mn^{2+}(aq) + 4H_2O(l)$	+1.52
$H_2O_2(aq) + 2H^+(aq) + 2e^- \rightleftharpoons 2H_2O(l)$	+1.77
$S_2O_8^{2-}(aq) + 2e^- \rightleftharpoons 2SO_4^{2-}(aq)$	+2.01
$F_2(g) + 2e^- \rightleftharpoons 2F^-(aq)$	+2.87

SKEMA JAWAPAN

PRAKTIS KIMIA 4541/1
SET 2

Jawapan Kertas 1
Answers Paper 1

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

LAMPIRAN
(Untuk rujukan guru)

SAMPEL JADUAL SPESIFIKASI UJIAN (JSU)

- **PRAKTIS KIMIA 4541/1: SET 2**

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													**0**
	1.2 Scientific investigation in chemistry													**0**
	1.3 Usage, management and handling of apparatus and materials													**0**
2. Matter and the Atomic Structure [F4]	2.1 Basic concepts of matter	1												**1**
	2.2 The development of the atomic model													**0**
	2.3 Atomic structure	1												**1**
	2.4 Isotopes and its uses	1												**1**
3. The Mole Concept, Chemical Formula and Equation [F4]	3.1 Relative atomic mass and relative molecular mass													**0**
	3.2 Mole concept													**0**
	3.3 Chemical formula				1									**1**
	3.4 Chemical equation								1					**1**
4. The Periodic Table of Elements [F4]	4.1 The development of The Periodic Table of Elements													**0**
	4.2 The arrangement in The Periodic Table of Elements													**0**
	4.3 Elements in Group 18													**0**
	4.4 Elements in Group 1	1												**1**
	4.5 Elements in Group 17								1					**1**
	4.6 Elements in Period 3													**0**
	4.7 Transition elements													**0**
5. Chemical Bond [F4]	5.1 Basics of compound formation													**0**
	5.2 Ionic bond								1					**1**
	5.3 Covalent bond													**0**
	5.4 Hydrogen bond				1									**1**
	5.5 Dative bond													**0**
	5.6 Metallic bond													**0**
	5.7 Properties of ionic and covalent compounds												1	1
6. Acid, Base and Salt [F4]	6.1 The role of water in showing acidic and alkaline properties	1												**1**
	6.2 pH value								1					**1**
	6.3 Strength of acids and alkalis				1									**1**
	6.4 Chemical properties of acids and alkalis													**0**
	6.5 Concentration of aqueous solution													**0**

	6.6 Standard solution													**0**
	6.7 Neutralisation												1	**1**
	6.8 Salts, crystals, and their uses in daily life													**0**
	6.9 Preparation of salts				1									**1**
	6.10 Effect of heat on salts													**0**
	6.11 Qualitative analysis												1	**1**
7. Rate of Reaction [F4]	7.1 Determining rate of reaction	1							1					**2**
	7.2 Factors affecting rate of reaction												1	**1**
	7.3 Application of factors that affect the rate of reaction in daily life													**0**
	7.4 Collision theory													**0**
8.Manufactured Substances in Industry [F4]	8.1 Alloy and its importance								1					**1**
	8.2 Composition of glass and its uses				1									**1**
	8.3 Composition of ceramics and its uses													**0**
	8.4 Composite materials and its importance													**0**
9. Redox equilibrium [F5]	9.1 Oxidation and reduction	1							1					**2**
	9.2 Standard electrode potential													**0**
	9.3 Voltaic cell								1				1	**2**
	9.4 Electrolytic cell	1							1					**2**
	9.5 Extraction of metal from its ore													**0**
	9.6 Rusting												1	**1**
10.Carbon compound [F5]	10.1 Types of carbon compound													**0**
	10.2 Homologous series	1												**1**
	10.3 Chemical properties and interconversion of compounds between homologous series								1					**1**
	10.4 Isomers and naming based on IUPAC nomenclature				2									**2**
11. Thermochemistry [F5]	11.1 Heat change in reactions				1									**1**
	11.2 Heat of reaction								1					**1**
	11.3 Application of endothermic and exothermic reactions in daily life												1	**1**
12. Polymer Chemistry [F5]	12.1 Polymer	1							1					**2**
	12.2 Natural rubber												1	**1**
	12.3 Synthetic rubber													**0**
13. Consumer and Industrial Chemistry [F5]	13.1 Oils and fats													**0**
	13.2 Cleaning agents				1									**1**
	13.3 Food additives													**0**
	13.4 Medicines and cosmetics													**0**
	13.5 Application of nanotechnology in industry				1									**1**
	13.6 Application of green technology in industrial waste management													**0**
Total		**10**	**0**	**0**	**10**	**0**	**0**	**0**	**12**	**0**	**0**	**0**	**8**	**40**