SIJIL PELAJARAN MALAYSIA

PEPERIKSAAN PERCUBAAN
2008

CHEMISTRY
FORM 5

Paper 1

1 hour 15 minutes

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU
DO NOT OPEN THIS PAPER UNTIL YOU ARE TOLD TO DO SO

1. Kertas soalan ini adalah dalam dwibahasa

2. Soalan di bahagian atas adalah dalam Bahasa Inggeris. Soalan di bawah dalam tulisan condong adalah dalam Bahasa Melayu yang sepadan.

3. Calon dikehendaki membaca maklumat di halaman 2 atau halaman 3.

Kertas soalan ini mengandungi **28** halaman bercetak

[Lihat sebelah

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INFORMATION FOR CANDIDATES

1. This question paper consists of 50 questions.

2. Answer **all** questions.

3. Answer each question by blackening the correct space on the answer sheet.

4. Blacken only **one** space for each question.

5. If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.

6. The diagrams in the questions provided are not drawn to scale unless stated.

7. You may use a non-programmable scientific calculator.

MAKLUMAT UNTUK CALON

1. *Kertas soalan ini mengandungi* 50 *soalan.*

2. *Jawab* **semua** *soalan.*

3. *Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan.*

4. *Hitamkan* **satu** *ruangan sahaja bagi setiap soalan.*

5. *Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.*

6. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*

7. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*

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Answer all questions.

1. Diagram 1 show the symbol of an atom aluminium.
Rajah 1 menunjukkan simbol atom aluminium.

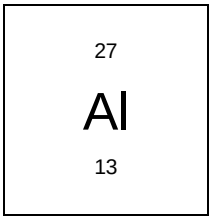

Diagram 1
Rajah 1

Which of the following is correct based on the symbol in diagram 1.
Antara berkut yang manakah benar berdasarkan simbol dalam Rajah 1 ?

	Proton number *Nombor proton*	Nucleon number *Nombor nucleon*	Number of electron *Bilangan elektron*
A	13	27	13
B	14	13	27
C	27	14	13
D	13	27	14

2. Diagram 2 shows the setup of apparatus to determine the empirical formula of an oxide of metal.
Rajah 2 menunjukkan susunan radas untuk menentukan formula empirik suatu oksida logam.

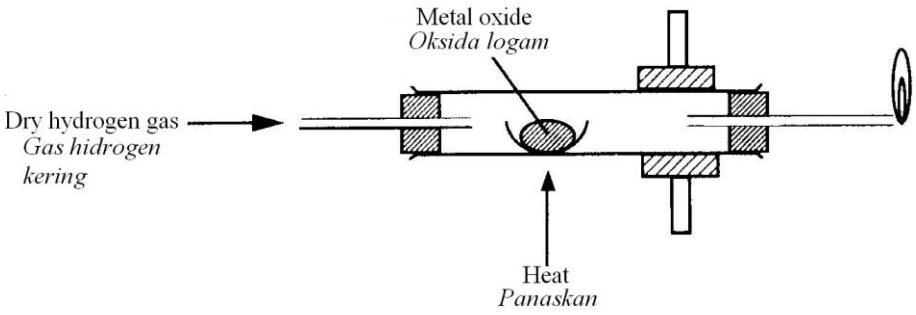

Diagram 2
Rajah 2

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Which of the following oxide of metal is suitable to be used in diagram 2?
Antara oksida logam berikut, yang manakah sesuai digunakan dalam Rajah 2 ?

A Zinc oxide
Zink oksida
B Magnesium oxide
Magnesium oksida
C Aluminium oxide
Aluminium oksida
D lead (II) oxide
Plumbum(II) oksida

3. Ammonia, carbon dioxide, methane and ethanol can be classified as
Ammonia, karbon dioxide, metane dan ethanol boleh dikelaskan sebagai

A ionic compound
sebatian ion
B organic compound
sebatian organik
C covalent compound
sebatian kovalen
D hydrocarbon
hidrokarbon

4. Which of the following compound conducts electricity in molten and aqueous state?
Antara sebatian berikut yang manakah mengalirkan arus elektrik dalam keadaan lebur dan akueus?

A lead(II) bromide
plumbum(II) bromida
B potassium iodide
kalium iodida
C naphthalene
naftalena
D ethanol
etanol

5. A solution Q when added into calcium carbonate, releases a gas that turns limewater cloudy. Which of the following is Q?
Suatu larutan Q apabila ditambahkan kepada kalsium karbonat membebaskan gas yang mengeruhkan air kapur. Yang manakah berikut adalah Q?

A ammonia solution
larutan ammonia
B copper(II) sulphate solution
larutan kuprum(II) sulfat
C dilute sulphuric acid
asid sulfurik cair
D sodium hydroxide solution
larutan natrium hidroksida

6. Carbon is added to molten iron to form steel, an alloy . Which of the following is not the properties of the alloy ?
Karbon ditambahkan kepada leburan besi untuk membentuk aloi keluli . Antara berikut yang manakah bukan sifat aloi?

A harder
Lebih keras
B malleable
mulur
C more resistance to rusting
Mempunyai rintangan yang lebih terhadap pengaratan.
D higher melting point
takat lebur yang lebih tinggi.

7. The following equation represents a reaction for industrial preparation of propanol .
Persamaan berikut mewakili tindak balas penyediaan etanol secara industri.

$$\mathbf{P + H_2O \xrightarrow[\text{Catalyst X, } 300^oC/60atm]{\text{[mangkin X, } 300^oC \text{ / 60 atm]}} CH_3\,CH_2\,CH_2\,OH}$$

What is P and catalyst X?
Apakah P dan mangkin X?

	P	**Catalyst X** ***Mangkin X***
A	C_2H_4	Platinium *platinum*
B	C_3H_6	Nickel *nikel*
C	C_2H_4	Sulphuric acid *Asid sulfurik*
D	C_3H_6	Phosphoric acid *Asid fosforik*

8. Which of the following statement is true for both ethanol and propanol?
Pernyataan yang manakah benar bagi kedua-dua etanol dan propanol ?

A combustion produces similar products
hasil pembakaran adalah sama
B similar physical properties
sifat fizik yang sama
C different chemical properties
sifat kimia yang sama
D have same molecular formula
mempunyai formula molekul yang sama

9. Compound Y has an empirical formula of CH_2O and reacts with magnesium releases hydrogen gas. Which of the following is the correct general formula and homologous series of compound Y?
Sebatian Y mempunyai formula empirik CH_2O dan bertindak balas dengan magnesium membebaskan gas hydrogen. Antara berinkut yang manakah benar bagi formula am dan nama siri homolog sebatian Y?

	General formula ***Formula am***	**Homologous series** ***Nama siri homolog***
A	C_nH_{2n+2}	Alkane *alkane*
B	$C_n H_{2n+1}OH$	Alcohol *alkohol*
C	$C_n H_{2n+1} COOH$	Carboxylic acid *Asid karboksilik*
D	$C_n H_{2n+1} COO C_n H_{2n+1}$	Ester *ester*

10. Which of the following compounds is a hydrocarbon?
Antara sebatian berikut yang manakah hidrokarbon?

A butanol
butanol
B octane
oktane
C 2,3-dimethylbutan-2-ol
2,3-dimetilbutan-2-ol
D polyvinyl chloride
polivinil klorida

11. Which of the following is correct for the process of oxidation?
Yang mana berikut adalah benar bagi proses pengoxidaan?

	Oxygen	**Hydrogen**	**electrons**
A	Addition *menambah*	Addition *menambah*	Addition *menambah*
B	Removal *menyingkirkan*	Removal *menyingkirkan*	Addition *menyingkirkan*
C	Addition *menambah*	Removal *menyingkirkan*	Removal *menyingkirkan*
D	Removal *menyingkirkan*	Addition *menambah*	Removal *menyingkirkan*

12. Which of the following is an endothermic process ?
Antara berikut yang manakah adalah proses endotermik?

A The combustion of ethanol
Pembakaran etanol
B Reaction between sodium hydroxide solution and hydrochloric acid
Tindak balas antara larutan natrium hidroxida dan asid hidroklorik
C Displacement reaction between magnesium and copper(II) sulphate Solution
Tindak balas penyesaran antara magnesium dengan larutan kuprum(II) sulfat.
D Dissolving solid ammonium sulphate in water
Melarutkan pepejal ammonium sulfat dalam air

13. Which of the following medicine is suitable for treatment of tuberclosis?
Ubat yang manakah adalah sesuai untuk merawat penyakit tibi ?

A Aspirin
aspirin
B Codeine
kodein
C Barbiturate
barbiturat
D Streptomycin
Streptomisin

14. Which of the following scientists contributed to the development of atomic model?
Antara ahli saintis berikut, yang manakah menyumbang kepada perkembangan model atom?

I Mendeleev
II J.J. Thomson
III John Newland
IV Niel Bohr

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

15. Diagram 15 shows the set up of apparatus to determine the empirical formula of copper(II) oxide.
Rajah 15 menunjukkan susunan radas satu eksperimen untuk menentukan formula empirik oksida kuprum.

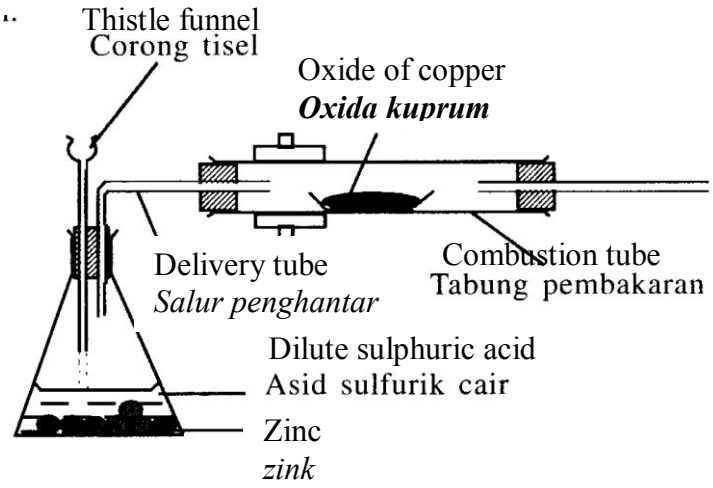

Diagram 15
Rajah 15

Which of the following are mistakes shown in the setup of the apparatus in this experiment?
Antara berikut yang manakah merupakan kesilapan pemasangan Radas bagi eksperimen ini ?

I No Bunsen burner
Tiada penunu bunsen
II the stopper wrongly fixed
Penutup dipasang salah
III the position of the thistle funnel
Kedudukan corong tistle
IV the position of the combustion tube
Kedudukan tiub pembakaran

A I and III only
B II and IV only
C I,II and III only
D I,III and IV only

16. Which of the followings are products of the reaction of magnesium carbonate and dilute sulphuric acid?
Antara berikut yang manakah adalah hasil tindak balas antara magnesium karbonat dengan asid sulfurik cair

I Water
air
II magnesium sulphate
magnesium sulfat
III carbon dioxide
karbon dioksida
IV magnesium oxide
magnesium oksida

A I and III only
B II and IV only
C I,II an III only
D I,III and IV only

17. Which of the following chemical reaction can occur spontaneously?
Yang manakah antara persamaan kimia berikut boleh berlaku secara spontan?

I $HCl + NaOH \longrightarrow NaCl + H_2O$
II $2HNO_3 + ZnCO_3 \longrightarrow Zn(NO_3)_2 + CO_2 + H_2O$
III $MgSO_4 + Cu \longrightarrow CuSO_4 + Mg$
IV $2CH_3COOH + Zn \longrightarrow (CH_3COO)_2Zn + H_2$

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

18. In an experiment to determine the rate of reaction between excess zinc and hydrochloric acid, which of the following can increase the rate of reaction?
Dalam suatu eksperimen untuk menentukkan kadar tindak balas antara zinc berlebihan dengan asid hidroklorik, yang manakah berikut boleh menambahkan kadar tindak balas?

I Increase the amount of zinc
Menambahkan zinc
II increase the size of granulated zinc
Menambahkan saiz ketulan zink
III increase the concentration of hydrochloric acid
Menambahkan kepekatan asid hidroklorik
IV add catalyst copper(II) sulphate solution
Menambahkan mangkin larutan kuprum(II) sulfat

A I and II only
B III and IV only
C I,II and III only
D II,III and IV only

19. Which of the following is an oxidising agent?
Antara berikut yang manakah agen pengoksidaan?

I Chlorine water
Air klorin
II acidified potassium dichromate(VI) solution
Larutan kalium dikromat(VI) berasid
III sodium thiosulphate solution
Larutan natrium tiosulfat
IV acidified potassium manganate(VII) solution
Larutan kalium manganat(VII) berasid

A I and III only
B II and IV only
C I,II and III only
D I,II and IV only

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20. Diagram 20 shows a test tube Y that is used in the experiment to investigate the effect of metal X on the rusting of iron.
Rajah 20 menunjukkan tabung uji Y yang digunakan dalam eksperimen untuk mengkaji kesan logam X ke atas pengaratan besi.

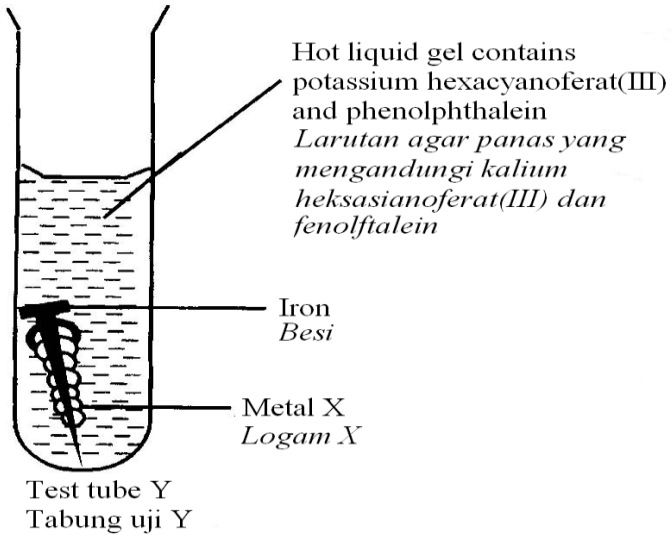

Diagram 20
Rajah 20

After a few days, which of the following metal **X** will cause the liquid gel to turn dark blue .
*Selepas beberapa hari, yang manakah antara logam **X** berikut akan menukar larutan gel menjadi biru hitam?*

I copper
kuprum
II zinc
zink
III lead
plumbum
IV magnesium
magnesium

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

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21. Which of the following compound can decolourise acidified solution of potassium manganate(VII) solution?
Antara sebatian berikut yang manakah boleh menyahkan warna larutan kalium manganat(VII) berasid ?

I butene
butene
II ethanoic acid
asid etanoik
III propanol
propanol
IV ethyl ethanoate
etil etanoat

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

22. The equation below represents the reaction for extraction of iron from iron(III) oxide using carbon.
Persamaan di bawah mewakili tindak balas untuk mengekstrak daripada besi daripada besi(III) oksida

$$Fe_2O_3 + 3C \rightarrow 2Fe + 3CO$$

What is the maximum mass of iron that can be extracted from 96.0g of iron(III) oxide? [Relative atomic mass of C,12; O,16 ; Fe ,56]
Berapakah jisim besi yang boleh diekstrak daripada 96.0g iron(III) oksida ? [Jisim atom relatif : C,12; O,16 ; Fe ,56]

A 22.4g
B 33.6g
C 44.8g
D 67.2g

23. $CuCO_3 + 2HCl \rightarrow CuSO_4 + CO_2 + H_2O$

The equation above shows a chemical reaction between excess copper(II) carbonate and hydrochloric acid. What is the mass of copper(II) sulphate formed if $50cm^3$ of hydrochloric acid 0.5 mol dm^{-3} is used.
[Relative molecular mass of $CuSO_4$ = 160]
Persamaan di atas menunjukkan tindakan kimia antara kuprum(II) karbonat berlebihan dengan asid hidroklorik. Berapakah jisim kuprum(II) sulphate dapat dihasilkan jika $50cm^3$ asid hidroklorik 0.5 mol dm^{-3} digunakan?
[Jisim molekul relatif : $CuSO_4$ = 160]

A 0.8g
B 2.6g
C 4.0g
D 8.0g

24. Table 24 shows the number of electrons of ion M^{3-}
Jadual 24 menunjukkan bilangan elektron bagi ion M^{3-}.

Particle *Zarah*	Number of electron *Bilangan elektron*
Ion M^{3-}	**18**

Table 24
Jadual 24

What is the position of the element M in the Periodic Table?
Apakah kedudukan unsur M dalam jadual berkala?

	Period ***Kala***	**Group** ***Kumpulan***
A	2	3
B	3	5
C	3	7
D	4	2

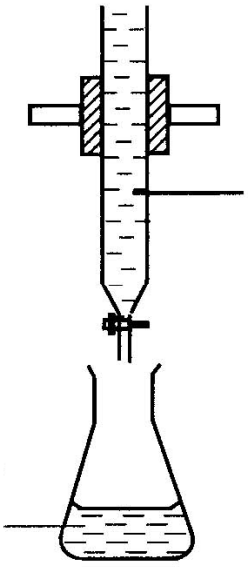
25. The electron arrangement of atom **Z** is 2.8.3 and atom **T** has a proton number of 16 . What is the molecular formula of the compound formed between **Z** and **T**?
*Susunan elektron bagi atom **Z** ialah 2.8.3 dan atom **T** mempunyai nombor proton 16. Apakah formma sebatian yang terbentuk antara **Z** dengan **T** ?*

A ZT_2
B Z_2T
C Z_2T_3
D Z_3T_4

26. 35cm^3 sodium hydroxide solution 2.0 mol dm^{-3} is diluted with distilled water to 250 cm^3 in a standard flask, what is the concentration of the diluted sodium hydroxide solution?
35cm^3 larutan natrium hidroksida 2.0 mol dm^{-3} diicairkan dengan air suling kepada 250cm^3 dalam sebuah kelalang piawai, apakah kepekatan larutan natrium hidroksida yang telah dicairkan?

A 0.20 mol dm^{-3}
B 0.28 mol dm^{-3}
C 0.40 mol dm^{-3}
D 0.56 mol dm^{-3}

27. Diagram 27 shows the setup of apparatus for neutralisation of potassium hydroxide solution with sulphuric acid.
Rajah 27 menunjukkan susunan radas bagi proses penitratan larutan Kalium hidroksida dengan asid sulfurik.



25 cm^3 potassium hydroxide solution 0.2 mol dm^{-3} and phenolphthalein

25 cm^3 larutan kalium hidroksida 0.2 mol dm^{-3} dan penunjuk fenolftalein

Diagram 27
Rajah 27

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At end point ,the volume of sulphuric acid used is 10.40cm^3 , what is the concentration of sulphuric acid?
Pada takat akhir, isipadu asid sulfurik yang digunakan ialah 10.40cm^3, apakah kepekatan asid sulfurik ?

A 0.08 mol dm^{-3}
B 0.15 mol dm^{-3}
C 0.24 mol dm^{-3}
D 0.34 mol dm^{-3}

I

28. T he molecular formula of ammonium sulphate is $(NH_4)_2SO_4$ and it is widely used as fertiliser . Given the relative atomic mass of H=1; N=14; O=16 and S=32, what is the percentage of nitrogen in ammonium sulphate?
Formula molekul ammonium sulfat ialah dan banyakan digunakan sebagai baja. Diberi jisim atom relative H=1; N=14; O=16 dan S=32, berapakah peratus nitrogen dalam ammonium sulfat?

A 21.2%
B 24.6%
C 27.3%
D 72.7%

29. Table 29 shows the total volume of carbon dioxide gas collected at various time interval in a reaction of calcium carbonate with hydrochloric acid.
Jadual 29 menunjukkan jumlah isipadu gas karbon dioksida yang terkumpul pada sela masa tertentu dalam suatu tindak balas antara kalsium karbonat dengan asid hidroklorik.

Masa/s	0	30	60	90	120	150	180	210
Isipadu gas / cm^3	0	4.20	7.70	10.90	13.70	15.20	16.00	16.00

Table 29
Jadual 29

What is the average rate of reaction in the second minute?
Berapakah kadar tindak balas purata dalam minit kedua?

A $0.128\ cm^3\ s^{-1}$
B $0.114\ cm^3\ s^{-1}$
C $0.100\ cm^3\ s^{-1}$
D $0.088\ cm^3\ s^{-1}$

30. Which of the following hydrocarbon is most suitable to be used as petrol?
Antara hidrokarbon berikut, yang manakah paling sesuai digunakan sebagai petrol ?

A methane
metane
B butane
butane
C hexane
heksane
D octane
oktane

31. The equation below shows the heat of reaction between zinc and copper(II) sulphate solution.
Persamaan di bawah menunjukkan haba tindak balas antara zinc dengan larutan kuprum(II) sulfat.

$$\mathbf{Zn(s) + CuSO_4(aq) \longrightarrow ZnSO_4(aq) + Cu(s) \quad \triangle H = -210 kJ\ mol^{-1}}$$

The initial temperature of the copper(II) sulphate solution is 30.0 ^{o}C, what is the final temperature of the solution if excess powdered zinc is added into $50.0cm^3$ of copper(II) sulphate solution 0.5 mol dm^{-3}?
[specific heat capacity of solution = 4.2 $Jg^{-1}\,{}^{o}C^{-1}$]
Suhu awal larutan kuprum(II) sulfat ialah 30.0^{o}C, berapakah suhu akhir larutan jika serbuk zink berlebihan ditambahkan kepada $50.0cm^3$ larutan kuprum(II) sulfat 0.5 mol dm^{-3}?
[haba muatan larutan =4.2 $Jg^{-1}\,{}^{o}C^{-1}$]

A $12.5\ ^{0}$C
B $25.0\ ^{0}$C
C $55.0\ ^{0}$C
D $80.0\ ^{0}$C

32. What is the number of atoms in 3.68g of ethanol, C_2H_5OH?
[relative atomic mass of H=1; C=12, O=16; Avogadro constant = 6×10^{23} mol^{-1}]
Berapakah bilangan atom dalam 3.68g etanol, C_2H_5OH?
[Jisim atom relatif : H,1; C,12; O,16; Pemalar Avogadro 6×10^{23} mol^{-1}]

A 4.8×10^{22}
B 2.2×10^{23}
C 6.0×10^{23}
D 2.4×10^{24}

33. Diagram 33 shows the setup of apparatus for the determination of heat of reaction.
Rajah 33 menunjukkan susunan radas untuk menentukan haba tindak balas.

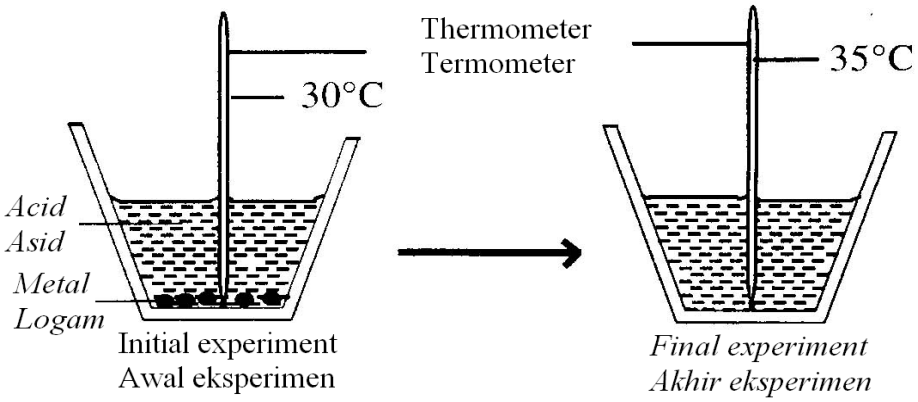

Diagram 33
Rajah 33

Based on diagram 33, which of the following statement is true?
Berdasarkan Rajah 33 pernyataan berikut yang manakah benar?

I Process of bond formation occurs.
Proses pembentukan ikatan berlaku
II The temperature increases during the reaction.
Suhu meningkat semasa tindak balas berlaku
III The value of ΔH for the reaction is positive.
Nilai ΔH dalam tindak balas ini adalah positif
IV The energy content of the products is lower than the energy content of the reactants.
Kandungan tenaga hasil tindak balas lebih rendah daripada kandungan tenaga bahan tindak balas

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

34. The equation below shows a precipitation reaction and its heat of reaction.
Persamaan di bawah menunjukkan tindak balas pemendakan dan haba tindak balasnya.

$$Pb(NO_3)_2(aq) + Na_2SO_4(aq) \rightarrow PbSO_4(s) + 2NaNO_3(aq) \quad \Delta H = -50.4 \text{ kJ mol}^{-1}$$

Which of the following is true about the reaction that is represented by the above equation?
Antara pernyataan berikut yang manakah benar tentang tindak balas yang diwakili oleh persamaan di atas ?

I lead(II) ion undergoes reduction
Ion plumbum(II) diturunkan
II The reaction is exothermic
Tindak balas adalah eksotermik
III Suhu menurun semasa tindak balas
Temperature decreases during the reaction
IV The heat released by 0.4 mole of lead(II) nitrate is 20.16 kJ.
Haba yang dibebaskan oleh 0.4 mol ion lead(II) nitrat ialah 20.16kJ

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

35. Equation below represents the combustion of butanol in excess oxygen.
Persamaan di bawah mewakili tindak balas pembakaran butanol dalam oxygen berlebihan.

$$C_4H_9OH(l) + 6O_2(g) \longrightarrow 4CO_2(g) + 5H_2O(l)$$

Which of the following product is obtained when 0.5 mole of butane undergoes complete combustion?
[1 mol of gas occupies a volume of 24 dm^3 at room conditions;
Avogadro constant : 6.0×10^{23} mol^{-1}]
Antara berikut yang manakah terhasil apabila 0.5 mol butana terbakar dengan lengkapnya ?
[1 mol gas menempati 24 dm^3 pada keadaan bilik;
Pemalar Avogadro: 6.0×10^{23} mol^{-1}]

I 2.5 mol water
2.5 mol air
II 2.0 dm^3 carbon dioxide gas released at room conditions
2.0 dm^3 karbon dioksida terbebas pada keadaan bilik
III 1.2×10^{24} molecule of carbon dioxide
1.2×10^{24} molekul karbon dioksida
IV 1.6×10^{24} molecule water
1.6×10^{24} molekul air

A I and III only
B I and IV only
C II , III and IV only
D I, II,III and IV

36. Compound P has a composition of 34.46 % of element M and the rest is element X . What is the empirical formula of compound P?
[Relative molecular mass of M =56; X=35.5]
Sebatian P mempunyai komposisi 34.46% unsur M dan bakinya unsur X. Apakah formula empirik bagi sebatian P?
[Jisim molekul relatif M =56; X =35.5]

A M_2X
B MX_2
C MX_3
D M_2X_3

37. Which of the following has the same number of electrons or isoelectronic with sulphide ion?
[Proton number of Al=13; P=15; S=16; Cl=17; Ca=20]
Antara berikut yang manakah mempunyai bilangan elektron atau isoelektronik dengan ion sulfida?
[Nombor proton : Al=13; P= 15; S=16;Cl=17; Ca=20]

I	Al^{3+}
II	P^{3-}
III	Cl^{-}
IV	Ca^{2+}

A 1 and II only
B III and IV only
C I,II and III only
D II, III and IV

38. Astatine, At is an element below chlorine of the same group in the periodic table. Determine the molecular formula of its product and the reactivity of astatine with iron compared to the reaction chlorine with iron.
Astatin, At adalah suatu unsur di bawah klorin dalam kumpulan yang sama pada Jadual Berkala. Tentukan formula hasil dan kereaktifan tindak balas astatin dengan besi berbanding tindak balas antara klorin dengan besi.

	Formula of product ***Formula Hasil***	**Reactivity** ***Kereaktifan***
A	$FeAt_2$	Less *Kurang*
B	$FeAt_2$	More *Lebih*
C	$FeAt_3$	Less *Kurang*
D	$FeAt_3$	More *Lebih*

39. Which of the following statements is true about soap?
Antara kenyataan berikut yang manakah adalah benar bagi sabun?

I	Soap forms scum with hard water
II	Soap is better cleansing agent than detergent in hard water
III	The hydrocarbon part of soap is soluble in grease
IV	Soap increases the surface tension of water.

A. I and III only
B. III and IV only
C. I, II and IV only
D. I, II, III and IV

40. Diagram 40 shows the setup of apparatus for electrolysis of zinc chloride solution 2.0 mol dm^{-3}.
Rajah 40 menunjukkan susunan radas bagi elektrolisis larutan zink klorida 2.0 mol dm^{-3}.

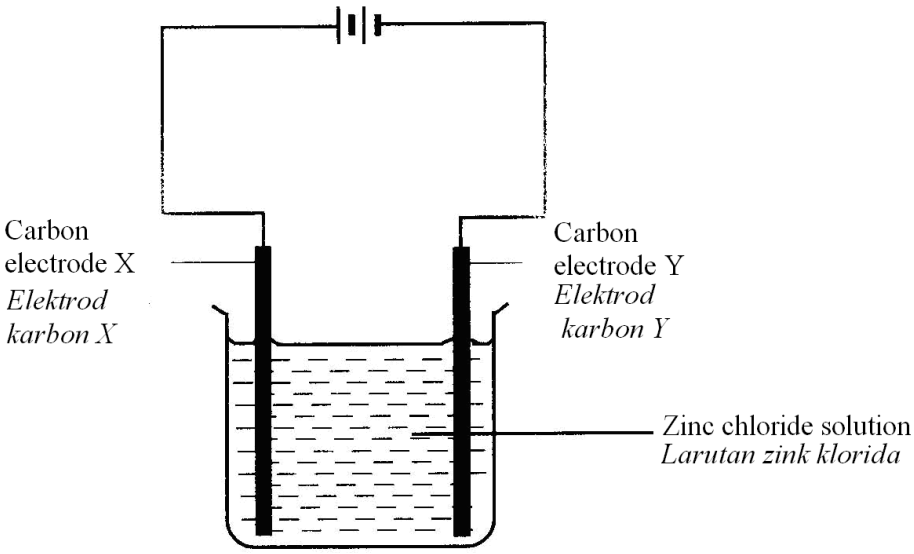


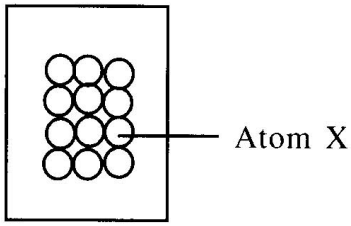
Diagram 40
Rajah 40

What are the products produced at carbon electrode X and carbon electrode Y?
Apakah yang terbentuk di elektrod karbon X dan elektrod karbon Y?

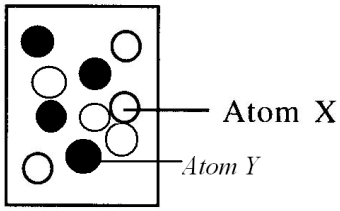
	Electrode X *Elektrod X*	Electrode Y *Elektrod Y*
A	Oxygen gas *Gas oksigen*	Zinc *zink*
B	Chlorine gas *Gas klorin*	Hydrogen gas *Gas hidrogen*
C	Oxygen gas *Gas oksigen*	Hydrogen gas *Gas hidrogen*
D	Zinc *zink*	Chlorine gas *Gas klorin*

41. Which of the following arrangement of atoms will increase the hardness of the substance produced?
Antara susunan atom berikut yang manakah akan menambahkan kekerasan bahan yang terhasil ?

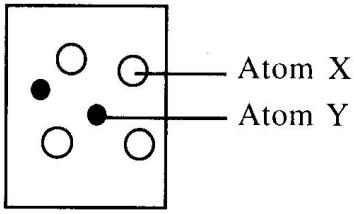
A



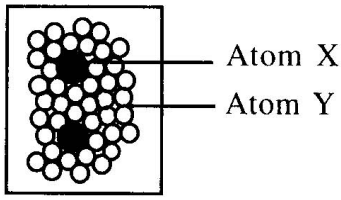
B



C



D



42. Equation below shows a reaction to produce yellow precipitate of sulphur.
Persamaan di bawah menunjukkan tindak balas untuk menghasilkan mendakan kuning sulfur.

$$Na_2S_2O_3(aq) + 2HCl(aq) \rightarrow NaCl(aq) + SO_2(g) + S(s) + H_2O(l)$$

Which of the following will increase the rate of sulphur produced.
Antara berikut yang manakah akan meningkatkan kadar penghasilan sulfur ?

I increase the volume of sodium thiosulphate solution
Menambahkan isipadu larutan natrium tiosulfat
II Add a few drops of concentrated hydrochloric acid
Menambahkan beberapa titis asid hidroklorik pekat
III increase the pressure
Menambahkan tekanan
IV increase the temperature of reaction
Menambahkan suhu tindak balas

A I and III only
B II and IV only
C I, II and IV only
D I, II, III and IV

43. Below is an ionic equation.
Dibawah adalah suatu persamaan ion.

$$Fe^{2+}(aq) + MnO_4^-(aq) + 8H^+(aq) \longrightarrow Fe^{3+}(aq) + Mn^{2+}(aq) + 4H_2O(l)$$

Which of the following is true about the equation?
Antara berikut yang manakah benar mengenai persamaan itu ?

I Fe^{2+} is oxidised to Fe^{3+}
Fe^{2+} dioksidakan kepada Fe^{3+}
II MnO_4^- is an oxidising agent
MnO_4^- ialah agen penoksidaan
III the solution changes from brown to green
Larutan berubah warna dari perang kepada hijau
IV Electrons are transferred from Fe^{2+} to MnO_4^-
Elektron berpindah dari Fe^{2+} kepada MnO_4^-

A I and II only
B III and IV only
C I, II and IV only
D I, II, III and IV

44. Which of the following substance will reduce zinc oxide to zinc when heated strongly together?
Antara bahan berikut yang manakah dapat menurunkan zink oksida kepada zink apabila dipanaskan bersama dengan kuat?

A Bromin water
Air bromin
B Powdered carbon
Serbuk karbon
C Acidified potassium dichromate solution
Larutan kalium dikromat(VI) berasid
D Acidified potassium manganate(VII) solution
Larutan kalium manganat (VII) berasid

45. $25cm^3$ of hydrochloric acid 2.0 mol dm^{-3} is poured into $25cm^3$ of sodium hydroxide 2.0 mol dm^{-3}, the temperature increases from 28.0°C to 41.6°C. What is the heat of neutralization for this reaction. [specific heat capacity of sotution =4.2 $Jg^{-1}\ ^oC^{-1}$]
$25cm^3$ asid hidroklorik 2.0 mol dm^{-3} dicampur kepada $25cm^3$ larutan natrium hidroksida 2.0 mol dm^{-3}, suhu meningkat dari 28.0°C kepada 41.6°C. Berapakah haba peneutralan bagi tindak balas ini?
[haba muatan larutan = 4.2 $Jg^{-1}\ ^oC^{-1}$]

A 28.56 kJ mol^{-1}
B 50.12 kJ mol^{-1}
C 57.12 kJ mol^{-1}
D 61.42 kJ mol^{-1}

46. Which of the following is the most suitable catalyst and conditions required for production of ammonia in industry.
Antara berikut yang manakah adalah mangkin dan keadaan yang paling sesuai untuk penyediaan ammonia secara industri.

	Catalyst Mangkin	**Temperature °C Suhu °C**	**Pressure /atm Tekanan/atm**
A	Iron *Besi*	450	200
B	Vanadium(V) oxide *Vanadium(V) oksida*	500	2
C	Nickel *nikel*	180	5
D	Phosphoric acid *Asid fosforik*	300	60

47. Table 47 shows the proton number of element P and Q.
Jadual 47 menunjuikkan nombor proton bagi unsur P dan Q.

Element Unsur	**Proton number Nombor proton**
P	20
Q	17

Jadual 47

Which of the following statement is correct about the compound formed between P and Q?

Manakah antara pernyataan berikut adalah benar mengenai sebatian yang terbentuk di antara P dengan Q?

I molecular formula is PQ_3
Formula molekul ialah PQ_3
II soluble in water
Larut dalam air
III conduct electricity in molten state.
boleh mengkonduksikan elektrik dalam keadaan lebur
IV High melting and boiling point.
Takat lebur dan takat didih yang tinggi

A I and II only
B II and III only
C 1, III and IV only
D II, III and IV

48. Table 48 shows the experimental result of three chemical cells.
Jadual 48 menunjukkan keputusan eksperimen bagi tiga sel kimia

Chemical cell ***Sel kimia***	**Pair of metals** ***Pasangan logam***	**Negative terminal** ***Terminal Negatif***	**Votage of cell/V** ***Voltan sel/V***
X	Pdan R	R	2.8
Y	R dan S	S	1.6
Z	Q dan R	R	0.5

Table 48
Jadual 48

Which of the following can be concluded from table 48?
Antara berikut yang manakah boleh disimpulkan dari Jadual 48 ?

I Voltage of cell is 2.3V when P and Q is used as electrode.
Voltan sel adalah 2.3V apabila P dan Q digunakan sebagai elektrod
II The lowest voltage of cell when R and Q is used as electrode.
Voltan sel yang terendah ialah apabila R dan Q digunakan sebagai elektrod
III Electron flows from terminal R to terminal P in a cell of pair of metals Pand R.
Elektron mengalir dari terminal R ke terminal P dalam sel berpasangan logam P dan R.
IV The descending reactivity of the metal can be arranged in order R,Q,S,P
Kereaktifan logam secara menurun disusun dalam tertib R,Q,S,P

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

49. Table 49 shows the concentration of two different type of acids.
Jadual 49 menunjukkan kepeketan dua jenis asid yang berlainan.

Concentration of hydrochloric acid *Kepekatan asid hidroklorik*	= 1.0 mol dm $^{-3}$
Concentration of ethanoic acid *Kepekatan ammonia akueus*	= 1.0 mol dm $^{-3}$

Table 49
Jadual 49

Based on the information given in table 49, which of the following is correct?
Berdasarkan maklumat yang diberi dalam jadual 49, yang manakah berikut adalah benar?

I Ethanoic acid is a weaker acid than hydrochloric acid
Asid etanoik adalah asid yang lebih lemah daripada asid hidroklorik
II The pH value of hydrochloric acid is higher than ethanoic acid
Nilai pH asid hidroklorik adalah lebih tinggi daripada asid etanoik
III The concentration of H^+ ion is higher in hydrochloric acid than in ethanoic acid.
Kepekatan ion H^+ dalam asid hidroklorik adalah lebih tinggi daripada asid etanoik
IV With magnesium, the rate of reaction with ethanoic acid is higher than with hydrochloric acid.
Dengan magnesium, kadar tindak balas dengan asid etanoik adalah lebih tinggi daripada asid hidroklorik.

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

50. Equation below shows the part of an industrial process for preparation of sulphuric acid.
Persamaan di bawah menunjukkan sebahagian proses industri untuk penyediaan asid sulfurik.

$$2SO_2(g) + O_2(g) \longrightarrow 2SO_3(g)$$

Which of the following is correct for the above equation?
Antara berikut yang manakah adalah benar bagi persamaan di atas?

I The industrial process is named as Haber process.
Proses industri itu dinamakan sebagai proses Haber
II The catalyst used in this process is vanadium(V) oxide
Mangkin yang digunakan dalam proses ini ialah vanadium(V) oksida.
III The conditions for this process are pressure of 1atmosphere and temperature of 500^oC.
Keadaan untuk proses in ialah tekanan 1atmosfera dan suhu 500^oC.
IV The catalyst used in this process increases the frequency of collision between molecules of SO_2 and O_2.bertambah.
Mangkin yang digunakan dalam proses ini menambahkan frekuensi perlanggaran antara molekul SO_2 dan O_2.

A I and II only
B II and III only
C I and IV only
D II,III and IV only

---------- ***SOALAN TAMAT*** ----------

SULIT
4541/2
Kimia
Kertas 2
Mei 2008
2 1/2 jam

LOGO SEKOLAH

PEPERIKSAAN PERCUBAAN SPM
2008

KIMIA
Kertas 2
Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tuliskan nombor kad pengenalan dan angka giliran anda pada ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan di halaman kiri adalah dalam bahasa Melayu. Soalan di halaman kanan adalah dalam bahasa Inggeris.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Mekayu atau bahasa Inggeris.*
5. *Calon dikehendaki membaca maklumat di halaman 2 dan halaman 3.*

Untuk kegunaan Pemeriksa

Bahagian	Soalan	Markah Penuh	Markah Diperolehi
A	1	10	
	2	10	
	3	8	
	4	10	
	5	12	
	6	9	
B	1	20	
	2	20	
C	3	20	
	4	20	
Jumlah			

Kertas soalan ini mengandungi 22 mukasurat termasuk muka hadapan

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Section A
(60 Marks)

Answer **all** questions in this section.
*Jawab **SEMUA** soalan dalam bahagian ini*

1. Table 1 shows the atomic structure of six elements. A,B,C,D,E and F are not the actual symbols of the elements.
Jadual 1 menunjukkan struktur atom bagi enam unsur. A,B,C,D,E dan F bukan merupakan simbol sebenar bagi unsur tersebut.

Element ***Unsur***	**Proton** ***Proton***	**Neutron** ***Neutron***	**Electrons** ***Elektron***
A	6	6	6
B	6	8	6
C	8	10	8
D	11	12	11
E	18	22	18
F	20	20	18

Table 1
Jadual 1

Use information from Table 1 to answer the following questions.
Guna maklumat daripada Jadual 1 bagi menjawab soalan-soalan berikut.

(i) State one element that exists as a positive ion?
Nyatakan satu unsur yang wujud sebagai ion positif?

……
[1 mark]

(ii) State the electron arrangement of the element mentioned in 1(i).
Nyatakan susunan elektron bagi unsur yang dinyatakan di 1(i)

……
[1 mark]

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(iii) State the element that exist as a noble gas?
Nyatakan unsur yang wujud sebagai gas nadir?

……
[1 mark]

(iv) Explain why element in 1(iii) does not react with other elements.
Jelaskan mengapa unsur di 1(iii) tidak bertindakbalas dengan unsur lain.

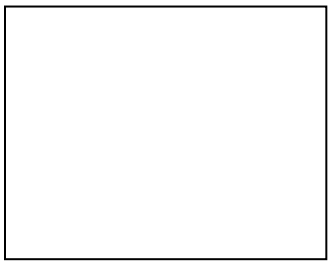
.....

.....
[1 mark]

(v) Which elements exists as diatomic molecule?
Unsur yang manakan wujud sebagai molekul dwiatom?

……
[1 mark]

(vi) Draw the arrangement of particles in the substance in 1(v) that exists at room temperature and pressure.
Lukis susunan zarah bagi bahan di 1(v) yang wujud pada tekanan dan suhu bilik.



[1 mark]

(vii) Write the chemical equation of the reaction for the compound formed between element C and D.
Tulis persamaan kimia bagi tindak balas untuk pembentukkan sebatian daripada unsur C dan D.

……
[2 mark]

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(viii) What is meant by *isotope*?
Apakah yang dimaksudkan dengan isotop?

.....
[1 mark]

(ix) Which of the elements in the table above are isotopes?
Yang manakah unsur dalam jadual d iatas merupakan isotop?

.....
[1 mark]

2.

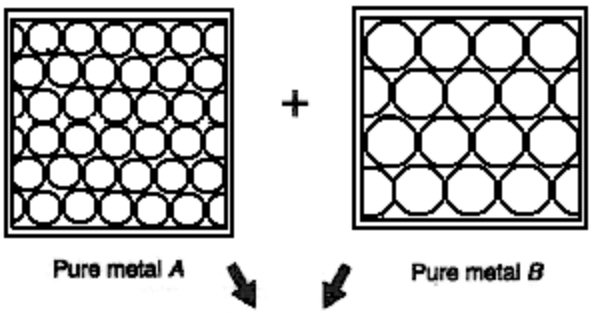

Diagram 2
Rajah 2

The Digram 2 shows the formation of an alloy bronze.
Rajah di atas menunjukkan pembentukkan aloi gangsa.

(a) (i) Name the components of bronze .
Namakan komponen-komponen dalam gangsa .

.....
[1 mark]

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(ii) State which is harder by comparing the alloy and its pure metal.
Nyatakan yang manakah lebih keras dengan membandingkan aloi dengan logam tulennya,

……

[1 mark]

(iii) Explain your answer in (a)(ii)
Terangkan jawapan anda dalam (a)(ii)

.....

.....

.....

[2 marks].

(iv) State one uses of bronze.
Nyatakan satu kegunaan gangsa

.....

[1 mark]

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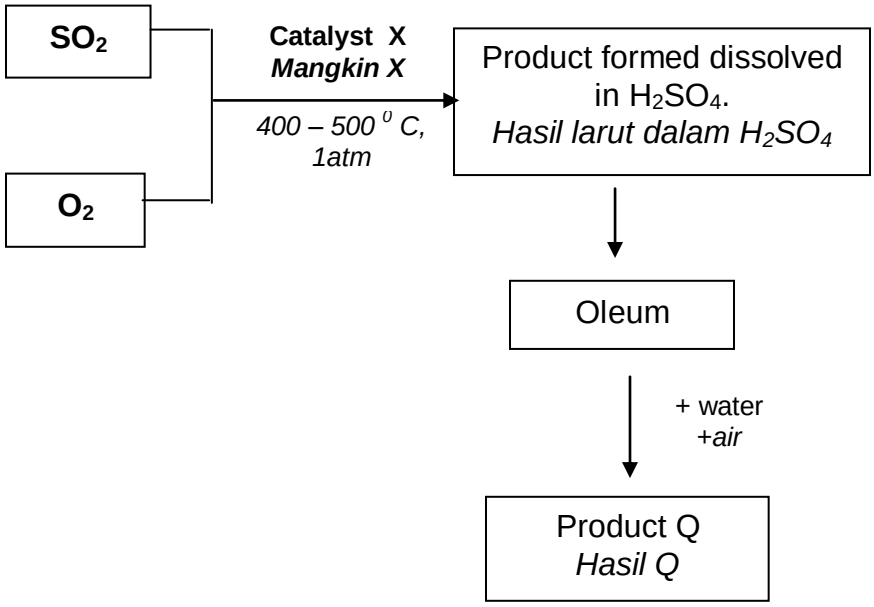
(b)



The flow chart shows part of the steps in the Contact Process.
Carta alir menunjukkan sebahagian langkah dalam Proses Sentuh.

(i) Write the chemical equation for the reaction between oleum and water to produce product Q.
Tuliskan persamaan kimia untuk tindak balas antara oleum dengan air bagi menghasilkan bahan Q

.....

.....
[2 marks]

(ii) Name the catalyst X used for the above reaction ?
Namakan mangkin X yang digunakan untuk tindak balas ini ?

.....
[1 mark]

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(iii) Give two uses of product Q in our everyday life.
Berikan dua kegunaan hasil Q dalam kehidupan harian kita.

.....

.....
[2 marks]

3.

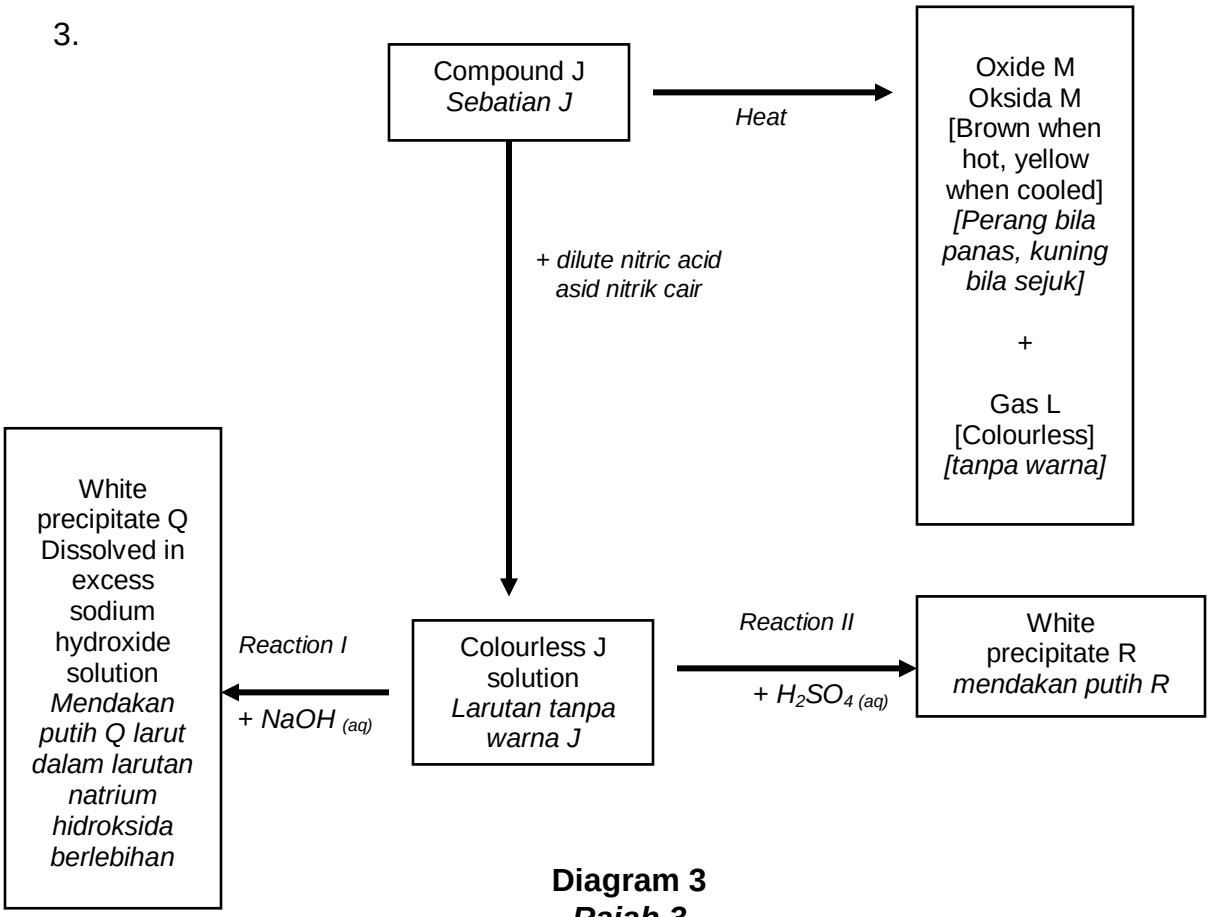

Diagram 3
Rajah 3

Diagram 3 shows a series of chemical test done by a student to identify a compound J.
Rajah 3 menunjukkan beberapa siri ujian kimia yang telah dilakukan oleh seorang pelajar untuk mengenali sebatian J

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(a) With reference to reaction I, white precipitate Q is formed when reacts with sodium hydroxide solution and it is soluble in excess sodium hydroxide solution.
Name all the ions which are probably present in solution J.
Berdasarkan tindakbalas I, larutan J menghasilkan mendakan putih Q apabila bertindak balas dengan larutan natrium hidroksida yang larut dalam larutan natrium hidroksida berlebihan. Namakan semua kation yang dijangka hadir dalam larutan J tersebut.

.....
[1 mark]

(b) Referring to reaction I and II,
name the cation that is present in solution J.
Berdasarkan tindakbalas I dan II, namakan kation yang hadir dalam larutan J itu.

.....
[1 mark]

(c) Write the ionic equation for the reaction forming the white precipitate, R.
Tulis persamaan ion bagi tindak balas pembentukkan mendakan putih R.

……
[2 marks]

(d) Name two cations which produce white precipitates with sodium hydroxide solution that do not dissolve in excess sodium hydroxide solution.
Namakan dua kation yang menghasilkan mendakan putih dengan larutan natrium hidroksida dan tidak larut dalam larutan natrium hidroxida berlebihan.

……
[1 mark]

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(e) Describe a confirmatory test which you can use to differentiate the cations you named in (d).
Huraikan satu ujian kimia yang mana anda boleh gunakan untuk membezakan kehadiran kation yang anda namakan di (d).

.....

.....

.....

.....
[4 marks]

4.

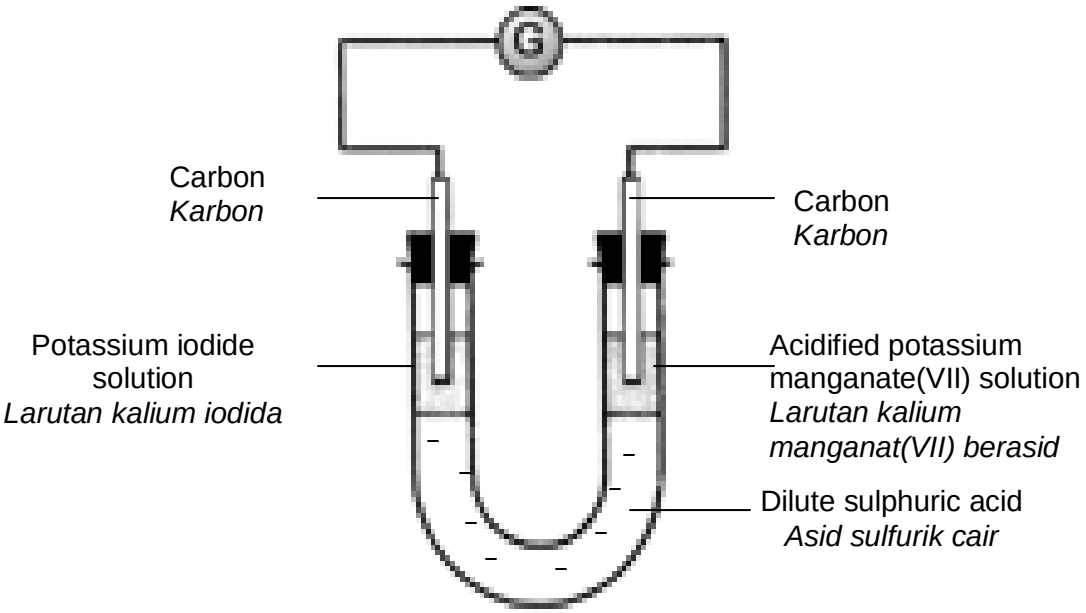

Diagram 4
Rajah 4

Diagram 4 shows the set up of the apparatus of an experiment to investigate the transfer of electrons at a distance. After a few minutes the acidified potassium manganate(VII) solution turns from purple to colourless.

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Rajah 4 menunjukkan susunan radas eksperimen bagi mengkaji pemindahan elektron pada satu jarak. Selepas beberapa minit, larutan kalium manganat(VII) berasid bertukar dari ungu kepada tanpa warna

(a) State the colour change of potassium iodide solution.
Nyatakan perubahan warna bagi larutan kalium iodida.

.....
[1 mark]

(b) Write the half equation for the reaction in (4)(a).
Tulis persamaan setengah bagi tindakbalas di (4)(a).

……
[1 mark]

(c) State the change in oxidation number of iodine.
Nyatakan perubahan nombor pengoksidaan bagi iodin.

……
[1 mark]

(d) Referring to the reaction that takes place in acidified potassium manganate(VII) solution.
Merujuk kepada tindakbalas yang berlaku pada larutan kalium manganat(VII) berasid.

(i) State the type of reaction that occurs.
Nyatakan jenis tindakbalas yang berlaku.

……
[1 mark]

(ii) Write the half equation for the reaction .
Tulis persamaan setengah bagi tindakbalas tersebut.

.....
[2 mark]

(iii) What is the function of acidified potassium manganate(VII) solution?
Apakah fungsinya larutan kalium manganat(VII) berasid ?

……
[1 mark]

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(iv) Name another reagent that can be used to replace acidified potassium manganate(VII) solution water .
Namakan reagan lain yang boleh menggantikan larutan kalium manganat(VII) berasid.

.....
[1 mark]

(e) Show the direction of the electron flows in the diagram 4.
Tunjukkan arah pengaliran electron pada diagram 4.
[1 mark]

(f) What is the function of dilute sulphuric acid in this experiment?
Apakah fungsi asid sulfurik cair dalam eksperimen ini?

……
[1 mark]

5.

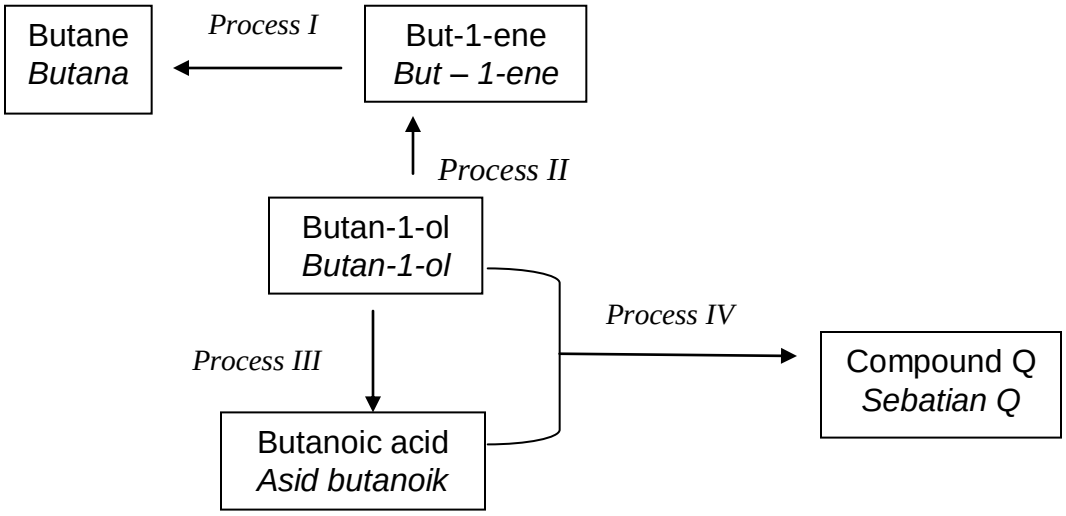

Diagram 5
Rajah 5

Diagram 5 shows a flow chart for a series of changes of organic compounds from one homologous series to another homologous series.
Rajah 5 menunjukkan carta alir satu siri perubahan sebatian karbon bagi satu siri homologos kepada sati siri homologos lain.

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(a) Draw the structural formulae of the isomer of butane.
Lukis formula struktur bagi isomer butane.

[2 marks]

(b) But-1-ene can be used to produce butane in Process I.
But-1-ene boleh digunakan untuk menghasilkan butane pada Proses I.

(i) Name the type of reaction for process I.
Namakan tindak balas bagi proses I..

……..
[1 mark]

(ii) State the condition required for process **I** to occur.
*Nyatakan keadaan yang diperlukan untuk proses **I** berlaku.*

…….
[1 mark]

(c) Process **II** converts but-1-ol to but-1-ene.
*Proses **II** menukarkan but-1-ol kepada but-1-ene*

(i) Write the chemical equation for the reaction
Tulis persamaan kimia bagi tindak balas tersebut.

.....
[2 marks]

(ii) Draw a label diagram for the set up of apparatus required for proses II.
Lukis gambarajah berlabel bagi susunan radas yang diperlukan bagi proses II.

[2 marks]

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(d) Name the reagent used for conversion of butan-1-ol to butanoic acid.
Namakan reagent yang digunakan bagi menukarkan butan-1-ol kepada asid butanoik.

……
[1 mark]

(e) (i) Write the chemical equation for the production of compound Q in process IV.
Tulis persamaan kimia bagi penghasilan sebatian Q pada proses IV.

.....
[1 mark]

(ii) Name the compound Q produced.
Namakan sebatian Q yang dihasilkan.

……..
[1 mark]

6. A student carried out an experiment to determine the rate of reaction between excess granulated zinc,Zn and 50 cm^3 of 0.1 mol dm^{-3} hydrochloric acid,HCl. Volume of hydrogen gas collected is measured at intervals of 30 seconds for a period of 5 minutes. The results obtained are shown in Table 6.
Seorang pelajar menjalankan satu eksperimen bagi menentukan kadar tindak balas ketulan zink , Zn berlebihan dengan 50 cm^3 asid hidroklorik 0.1 mol dm^{-3}. Isipadu gas yang terkumpul diukur pada sela masa 30 saat bagi tempoh 5 minit.
Keputusan yang diperolehi ditunjukkan pada Jadual 6.

Time/s ***Masa/s***	**0**	**30**	**60**	**90**	**120**	**150**	**180**	**210**	**240**	**270**	**300**
Total volume of gas collected/cm^3 ***Jumlah isipadu gas terkumpul/ cm^3***	**0.0**	**6.0**	**11.0**	**16.0**	**20.0**	**24.0**	**28.0**	**33.0**	**35.0**	**35.0**	**35.0**

Table 6
Jadual 6

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(a) What is meant by rate of reaction based on the experiment above?.
Apakah maksud kadar tindak balas merujuk kepada eksperimen di atas?.

.....

.....

[1 mark]

(b) Write a balanced chemical equation for the reaction.
Tulis persamaan kimia bagi tindak balas tersebut.

.....

[2 marks]

(c) Draw the graph of total volume of gas collected against time.
Lukis graf jumlah isipadu gas yang terkumpul melawan masa

[4 marks]

(d) Based on the graph in (c), calculate The rate of reaction at 120 seconds.
Berdasarkan graf di (c), hitung kadar tindak balas pada 120 saat.

[2 marks]

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Section B
[20 marks]

Answer any **one** question from this section.
Jawab mana-mana SATU soalan daripada bahagian ini

7 (a) An electrolytic cell is prepared using copper(II) sulphate solution as an electrolyte. The apparatus set up are shown in Diagram 7.
Sel elektrolisis disediakan menggunakan larutan kuprum(II) sulfat sebagai elektrolit. Susunan radas bagi eksperimen tersebut ditunjukkan pada Rajah 7.

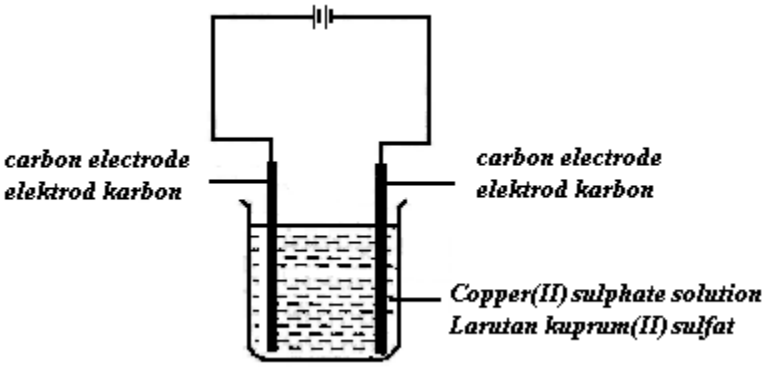

Diagram 7
Rajah 7

(i) What is meant by electrolyte? [2 marks]
Apakah yang dimaksudkan dengan elektrolit.?

(ii) State the ions present in the copper(II) sulphate solution.
Nyatakan ion-ion yang hadir dalam larutan kuprum(II) sulfat.

[2 marks]

(iii) Write a half equation and state the observations that will occur at the anode and cathode. Explain your answers.
Tuliskan persamaan setengah dan nyatakan pemerhatian yang akan berlaku pada anod dan katod. Jelaskan jawapan anda.

[6 marks]

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(b) A student intends to electroplate an iron key with a suitable metal to beautify it.
Design a laboratoty experiment to electroplate the iron key.
Your answer should consist of the following :

- Chemical required
- Diagram showing the set up apparatus
- Procedures of the experiment
- Chemical equation involved in the reaction
- Observation

Seorang pelajar ingin menyadur elektrik kunci besi dengan satu logam yang sesuai supaya kelihatan cantik.
Reka bentuk satu eksperimen di makmal untuk menyadur elektrik kunci besi.
Jawapan anda hendaklah mengandungi yang berikut:

- *Bahan kimia yang diperlukan*
- *Gambar rajah susunan radas yang digunakan*
- *Prosedur menjalankan eksperimen*
- *Persamaan kimia yang terlibat dalam tindak balas*
- *Pemerhatian*

[10 markah]

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8.

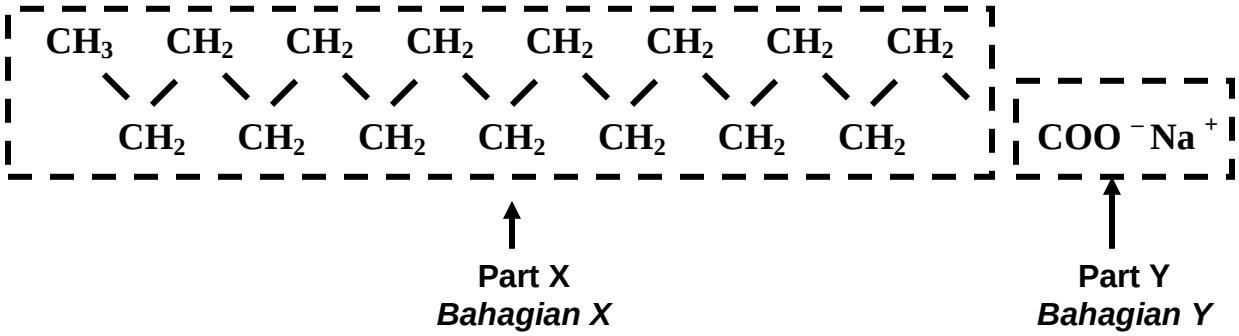

Diagram 8.1
Rajah 8.1

(a) Name part X and part Y. State the solubility of each parts in water and grease.
Namakan bahagian X dan bahagian Y. Nyatakan keterlarutan setiap bahagia di dalam air dan gris.

[4 marks]

(b) Diagram 8.2 shows a set-up of apparatus when a student carried out two experiments to investigate the cleansing effect of soap and detergent on oily stained cloth in hard water.
Rajah 8.2 menunjukkan susunan radas apabila seorang pelajar menjalankan dua eksperimen untuk mengkaji kesan pembersihan bahan pencuci oleh sabun dan detergen keatas kotoran berminyak dalam air liat.

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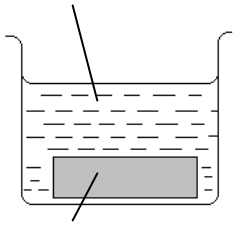
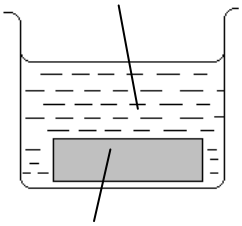
	Experiment ***Eksperimen***	
Arrangement of apparatus ***Susunan radas***	Experiment I: *Eksperimen I:* Soap + hard water *Sabun + air liat*  Cloth with oily stain *Kain kotor yang berminyak*	Experiment II: *Eksperimen II:* Detergent + hard water *Sabun + air liat*  Cloth with oily stain *Kain kotor yang berminyak*
Observation ***Pemerhatian***	Oily stain remained *Kotoran berminyak kekal*	Oily stain disappeared *Kotoran berminyak hilang*

Diagram 8.2
Rajah 8.2

Compare the cleansing effect between Experiment I and Experiment II. Explain why there are differences in the observations. State the substance which is more suitable as a cleansing agent to remove stain in hard water.
Bandingkan kesan pembersihan antara Eksperimen I dan Eksperimen II. Terangkan mengapa terdapat perbezaan dalam pemerhatian tersebut. Nyatakan bahan yang lebih sesuai sebagai bahan pencuci kotoran berminyak dalam air liat.

[6 marks]

(c) Patient X, Y and Z are suffering from dental pain, pneumonia and depression respectively. What are the medicines that can be used to treat patients X, Y and Z ?
Pesakit X,Y dan Z mengalami sakit gigi , pneumonia dan depresan. Apakah ubatan yang boleh digunakan untuk merawat pesakit X, Y dan Z.

[3 marks]

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(d) Based on your answer in (c),
Berdasarkan jawapan anda di (c),

(i) State one precaution that should be followed by patient X while taking the medicine.Explain why.
Nyatakan satu langkah berjaga-jaga yang perlu diikuti oleh pesakit X apabila mengambil ubat. Jelaskan mengapa.

[2 marks]

(ii) Explain why patient Y must complete the whole course of the medicine prescribes to him even if he feels better.
Jelaskan mengapa pesakit Y mesti menghabiskan kesemua ubat yang disyorkan walaupun beliau telah sihat.

[3 marks]

(iii) State two side effects of the medicine taken by patient Z.
Nyatakan dua kesan sampingan terhadap ubat yang diambil oleh pesakit Z.

[2 marks]

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Section C
[20 marks]

Answer any **one** question from this section.
*Jawab mana-mana **SATU** soalan daripada bahagian ini*

9.

Element *Unsur*	Proton number *Nombor proton*
X	**6**
Q	**8**
Y	**12**
Z	**17**

Table 9
Jadual 9

Table 9 shows the proton number of element X, Y and Z.
Jadual 9 menunjukkan nombor proton bagi unsur X,Y dan Z.

(a) Element Y when burnt in a gas jar filled with gas Z, produces a white solid.
Unsur Y dibakar dalam tabung gas yang dipenuhi oleh gas Z, mengeluarkan pepejal putih.

(i) Write the chemical equation for the reaction between gas Z and element Y.
Tulis persamaan kimia bagi tindakbalas antara gas Z dengan unsur Y.

[2 marks]

(ii) State three physical properties of the white solid produced.
Nyatakan tiga sifat fizik bagi pepejal putih yang dihasilkan.

[3 marks]

(b) (i) State the position of element Q in the Periodic table of element.
Ramalkan kedudukan unsur Q dalam Jadual Berkala Unsur.

[1 mark]

(ii) Explain your answer in (b)(i)
Jelaskan jawapan anda di (b)(i).

[2 marks]

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(c) Explain how chemical bonds are formed between
Jelaskan bagaimana ikatan terbentuk antara

(i) Element X and Q [6 marks]
Unsur X dan Q

(ii) Element Y and Z [6 marks]
Unsur Y dan Z

10. (a) What is meant by heat of combustion?
Apakah yang dimaksudkan dengan haba pembakaran?

[1 mark]

(b) Table 10 shows the chemical equations for the heat of combustion of alcohol X and alcohol Y.
Jadual 10 menunjukkan persamaan kimia untuk haba pembakaran bagi alkohol X dan alkohol Y.

Alcohol ***Alkohol***	**Heat of combustion, kJ mol^{-1}** ***Haba pembakaran , kJ mol^{-1}***
$XOH + 3O_2 \rightarrow 2CO_2 + 3H_2O$	-1376
$YOH + 6O_2 \rightarrow 4CO_2 + 5H_2O$	-2678

Table 10

(i) Draw an energy level diagram for one of the alcohol above.
Lukis gambarajah aras tenaga bagi salah satu alcohol di atas.

[2 mark]

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(ii) State the information that can be obtained from the energy level diagram in (b)(i).
Nyatakan maklumat-maklumat yang dapat diperolehi daripada gambar rajah aras tenaga di (b)(i).

[4 marks]

(c) Describe an experiment how you can determine the heat of combustion for one of the alcohol in the laboratory.
Huraikan eksperimen bagaimana anda menentukan haba pembakaran bagi satu alcohol di dalam dimakmal.

Your answer should consist of the following :

- a label diagram for the set up of apparatus,
- procedure
- Calculation.

Jawapan anda hendaklah mengandungi yang berikut:

- *Rajah susunan radas yang berlabel*
- *Prosedur*
- *Pengiraan*

[13 marks]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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4541/3
Chemistry
Paper 3
SEPT 2008
1 ½ jam

LOGO SEKOLAH

NAMA SEKOLAH

PEPERIKSAAN PERCUBAAN SPM
2008

CHEMISTRY

Paper 3

1 hour 30 minutes

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU
DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO

1. *Tuliskan* **nama, kelas dan angka giliran** *anda pada ruangan yang disediakan.*

2. *Kertas soalan ini adalah dalam dwibahasa.*

3. *Soalan di bahagian atas adalah dalam Bahasa Inggeris. Soalan di dalam tulisan condong adalah dalam Bahasa Melayu yang sepadan.*

4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Melayu atau Bahasa Inggeris.*

5. *Calon dikehendaki membaca maklumat di halaman 2.*

Kod Pemeriksa		
Soalan	Markah Penuh	Markah Diperoleh
1	33	
2	17	
JUMLAH		

Kertas soalan ini mengandungi 8 halaman bercetak

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MAKLUMAT UNTUK CALON

1. *Jawab* **semua** *soalan.*

2. *Jawapan kepada* **Soalan 1** *hendaklah ditulis dalam ruangan yang disediakan dalam kertas soalan.*

3. *Jawapan kepada* **Soalan 2** *hendaklah ditulis pada helaian tambahan. Anda boleh menggunakan persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*

4. *Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.*

5. *Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu.*

6. *Rajah yang mengiringi tidak dilukiskan mengikut skala kecuali dinyatakan.*

7. *Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan di dalam kurungan.*

8. *Masa yang dicadangkan menjawab Soalan 1 ialah 45 minit dan Soalan 2 ialah 45 minit.*

9. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*

10. *Kertas soalan ini hendaklah diserahkan di akhir peperiksaan.*

Pemberian markah:

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

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INFORMATION FOR CANDIDATES

1. *Answer* **all** *questions.*

2. *Write your answer for* **Question 1** *in the spaces provided in the question paper.*

3. *Write your answers for* **Question 3** *on the extra sheet. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.*

4. *Show your working, it may help you to get marks.*

5. *If you wish to cancel any answer, neatly cross out the answer.*

6. *The diagrams in the questions provided are not drawn to scale unless stated.*

7. *Marks allocated for each question or part question are shown in brackets.*

8. *The time suggested to answer Question 1 is 45 minutes and Question 2 is 45 minutes.*

9. *You may use a non-programmable scientific calculator.*

10. *This question paper must be handed in at the end of the examination.*

Marks awarded:

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

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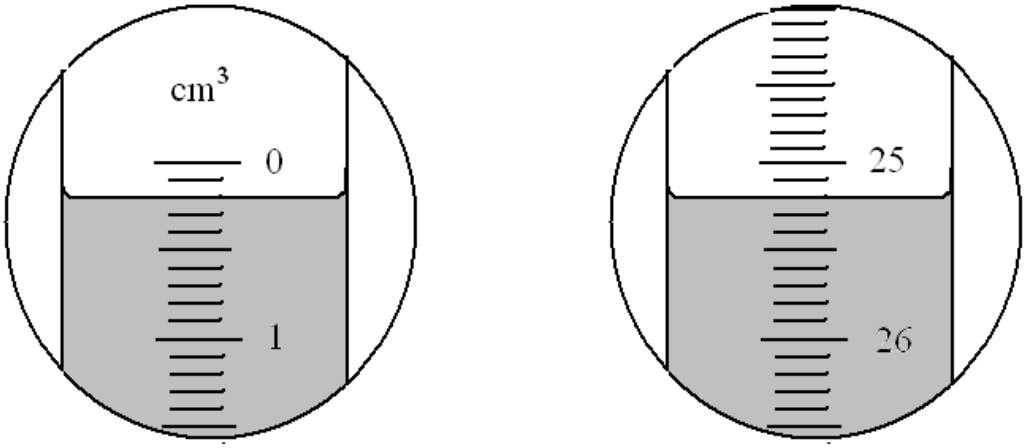
For examiner's use

Diagram 1.1 shows two set of experiments to determine the end point in titration using phenolphthalein as an indicator.
Rajah 1.1 menunjukkan dua set eksperimen bagi menentukan takat akhir titratan menggunakan fenolftalein sebagai penunjuk.

1

EXPERIMENT I

Reaction between 0.2 mol dm^{-3} hydrochloric acid,HCl and 25cm^3 0.2mol dm^{-3} sodium hydroxide solution,NaOH.
Tindak balas antara 0.2 mol dm^{-3} asid hidroklorik,HCl and 25cm^3 mol dm^{-3} larutan natrium hidroksida,NaOH.



Experiment I

Initial burette reading .....
Bacaan awal .buret

Final burette reading .....
Bacaan akhir buret

Experiment II

Reaction between 0.2 mol dm^{-3} sulphuric acid , H_2SO_4 and 25 cm^3 0.2 mol dm^{-3} sodium hydroxide solution, NaOH.
Tindak balas antara 0.2mol dm^{-3} asid sulfurik H_2SO_4 dan 25 cm^3 0.2 mol dm^{-3} larutan natrium hidroksida,NaOH

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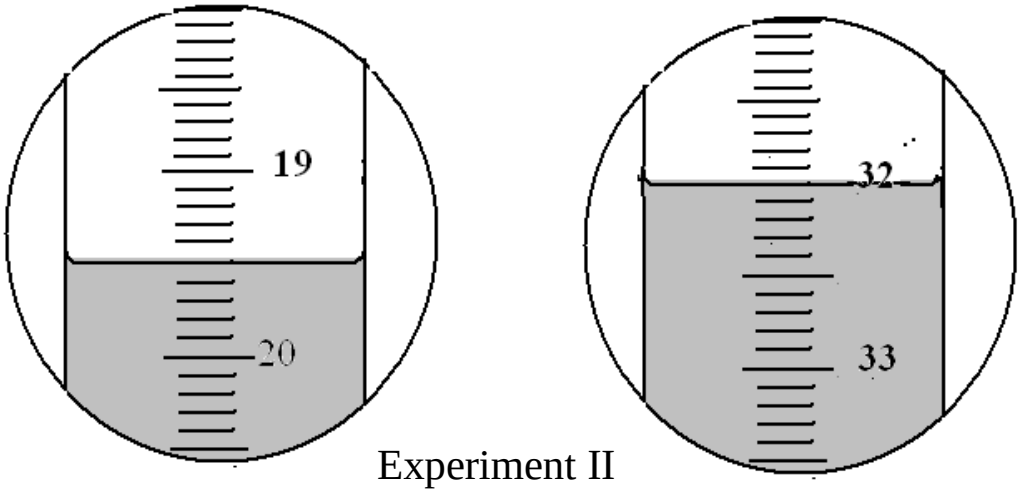
For examiner's use



Experiment II

Initial burette reading .....
Bacaan awal buret

Final burette reading .....
Bacaan akhir buret

Diagram 1.1
Rajah 1.1

(a) Write the initial and the final reading of the burettes in the spaces provided for Experiment 1 and Experiment II.
Tuliskan bacaan awal dan akhir buret di dalam ruang yang disediakan bagi Eksperimen I dan Eksperimen II.

1(a)

[3 *marks*]

(b) Construct a table that can be used to record the data from the experiment.
Bina jadual yang boleh digunakan untuk merekod data bagi bacaan yang diperolehi dari eksperimen.

1(b)

[3 *marks*]

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For examiner's use

(c) State the hypothesis for the above experiment .
Nyatakan hipotesis bagi eksperimen di atas.

1(c)

[3 *marks*]

(d) State all the variables for this experiment.
Berikan semua pembolehubah bagi eksperimen ini

(i) Manipulated variables :

(ii) Responding variables :

(iii) Constant variables:

1(e)

[3 marks]

(e) Why must the initial reading and the final reading be recorded in this experiment.
Mengapakah bacaan awal dan bacaan akhir perlu direkodkan dalam eksperimen ini ?

[3marks]

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For examiner's use

(f) Based on the experiment shown in diagram 1.1 , complete table 1 with correct observations and inferences
Bedasarkan eksperimen yang ditunjukkan dalam rajah I , lengkapkan jadual 1 dengan pemerhatian dan inferen yang berkaitan.

Observation ***Pemerhatian***	**Inference** ***Inferens***

1(f)

[*3 marks*]

(g) State the colour change when the end point of titration is reached .
Nyatakan perubahan warna yang berlaku bila sampai takat akhir titratan.

1(g)

[*3 marks*]

(h) Based on the experiment, state the meaning of neutralisation .
Berdasarkan kepada eksperimen,berikan maksud bagi proses peneutralan .

1(h)

[*3 marks*]

(i) Predict the volume of acid needed to neutralise sodium hydroxide, NaOH if 0.2 mol dm^{-3} of sulphuric acid is replaced with 0.1 mol dm^{-3} sulphuric acid, H_2SO_4 in experiment II.
Ramalkan isipadu asid yang diperlukan untuk meneutralkan natrium hidroksida, NaOH jika 0.2 mol dm^{-3} asid sulfurik digantikan dengan 0.1 mol dm^{-3} asid sulfurik, H_2SO_4 dalam eksperimen II

1(i)

[*3 marks*]

(j) Complete Table 2 by classifying the acids as strong or weak .
Lengkapkan Jadual 1 dengan mengelaskan kesemua asid tersebut kepada asid kuat atau lemah.

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For examiner's use

Name of acids ***Nama asid***	**Types of acids** ***Jenis asid***
Hydrochloric acid, HCl *Asid hidroklorik, HCl*	
Sulphuric acid, H_2SO_4 *Asid sulfurik, H_2SO_4*	
Ethanoic acid, CH_3COOH *Asid etanoik, CH_3COOH*	

Table 2
Jadual 2

1(j)

[*3 marks*]

When X is placed onto water it's move slowly.When Y is used ,it moves very rapidly and produces "hiss " sound. When Z is used , it moves very rapidly and small explosion occurs

Apabila bahan X diletakkan keatas permukaan air ,ia bergerak dengan perlahan. Apabila Y digunakan , ia bergerak pantas dan menghasilkan bunyi "hiss". Apabila Z digunakan,ia bergerak dengan cepat dan letupan kecil terhasil

. *X + water* → *Alkaline solution B + gas A (colourless)*

Y + water → *alkaline solution C + gas A (colourless)*

Z + water → *alkaline solution D + gas A (colourless)*

.

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2. Referring to the above situation,you're required to plan an experiment to compare the reactivity of group I element.Your planning should include the following items:
Berdasarkan situasi di atas , anda dikehendaki merancang satu eksperimen untuk membandingkan kereaktifan unsur-unsur dalam kumpulan I . Perancangan anda mestilah mempunyai item-item berikut:

a. Problem statement
Pernyataan masalah

b. All variables involved
Semua pembolehubah terlibat

c. Hypothesis
Hipotesis

d. List of materials and apparatus
Senarai bahan dan alat radas

e. Procedure
Prosedur

f. Tabulation of data
Penjadualan data

[*17 marks*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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ANSWERS FOR SPM TRIAL O8 **SULIT**
PAPER 1

Question Number	Answer		Question Number	Answer
1	A		26	B
2	D		27	C
3	C		28	A
4	B		29	C
5	C		30	D
6	B		31	C
7	D		32	A
8	A		33	C
9	C		34	B
10	B		35	A
11	C		36	C
12	D		37	D
13	D		38	C
14	B		39	A
15	A		40	B
16	C		41	D
17	C		42	B
18	B		43	C
19	D		44	B
20	A		45	C
21	A		46	A
22	D		47	D
23	C		48	D
24	B		49	A
25	C		50	B

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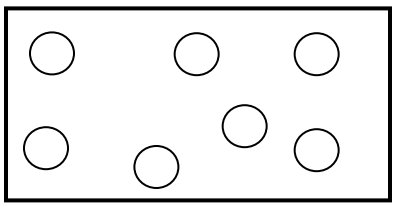
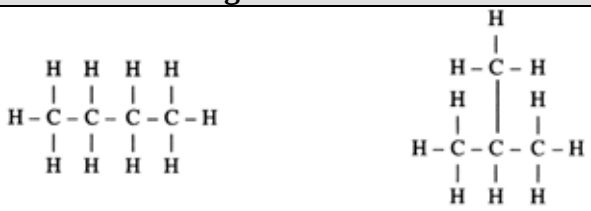
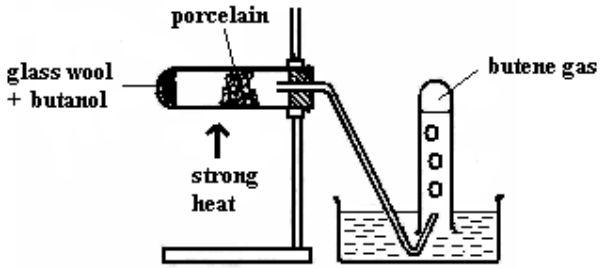
MARKING SCHEME
TRIAL EXAM
SPM 2008

No.		Marking Criteria	Mark	Total
1	(i)	F / F^{2+} / Ca / Calcium / Calcium ion / Ca^{2+}	1	
	(ii)	2.8.8 / 2,8,8	1	
	(iii)	E /Ar / Argon	1	
	(iv)	Atom E has 8 electron valence// atom E has achieved stable/octet electron arrangement	1	
	(v)	C / Oyygen / O	1	
	(vi)		1	
	(vii)	$4D + C_2 \rightarrow 2D_2C$ / $4Na + O_2 \rightarrow 2Na_2O$ -formulae of reactants and products correct - balanced equation	 1 1	
	(viii)	Atoms that has same proton number but different nucleon number	1	
	(ix)	A and B	1	
		TOTAL	10	

No.		Marking Criteria	Mark	Total
2	(a)(i)	Copper and tin	1	
	(ii)	Bronze / alloy	1	
	(iii)	The presence of foreign atoms hinder the sliding of atoms	1 1	
	(iv)	Medals / statues / monuments	1	
	(b)(i)	$H_2S_2O_7 + H_2O \rightarrow 2H_2SO_4$ -formulae of reactants and products correct - balanced equation	 1 1	
	(ii)	Vanadium(V) oxide/ vanadium pentoxide	1	
	(iii)	-Detergent -electrolyte for accumulator	1 1	
		TOTAL	**10**	

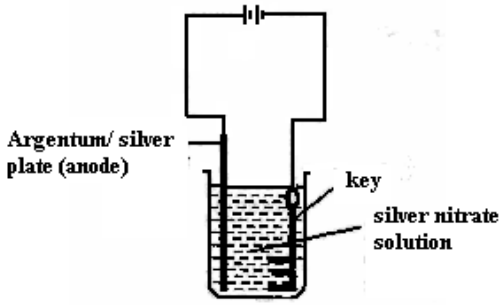
No.		Marking Criteria	Mark	Total
3	(a)	Lead(II) ion , zinc ion, aluminium ion	1	1
	(b)	Lead(II) ion	1	1
	(c)	$Pb^{2+} + SO_4^{2-} \rightarrow PbSO_4$		
		1. correct formula for reactant/ions	1	
		2. Correct formula for product	1	2
	(d)	Magnesium ion , calcium ion	1	1
	(e)	1. Add excess ammonia solution	1	
		2.white precipitate formed	1	
		3. magnesium ion present	1	
		4. no white precipitate/colorless, calcium ion present	1	4
		TOTAL		**9**

No.		Marking Criteria	Mark	Total
4	(a)	Colourless to brown	1	
	(b)	$2I^- \rightarrow I_2 + 2e$	1	
	(c)	-1 to 0	1	
	(d)(i)	Reduction	1	
	(ii)	$MnO_4^- + 8H^+ + 5e \rightarrow Mn^{2+} + 4H_2O$	2	
	(iii)	Oxidizing agent	1	
	(iv)	Acidified solution of potassium dichromate(VI)/ bromine water	1	
	(e)	From potassium iodide solution to acidified potassium manganate(VII) through the external circuit.	1	
	(f)	To allows movement of ions // to allows ions to pass through it // to complete the electric curcuit	1	
		TOTAL	**10**	

No.		Marking Criteria	Mark	Total
5	(a)		1 1	
	(b)(i)	Hydrogenation/ reduction	1	
	(ii)	Catalyst nickel/ platinum and temperature 180-200°C	1	
	(c)(i)	$C_4H_9OH \xrightarrow[\Delta]{} C_4H_8 + H_2O$		
		1. correct formula of reactant	1	
		2. correct formula of products	1	2
	(ii)			
		1. functional diagram	1	
		2. label: glass wool + butanol, butane gas, heat	1	2
	(d)	Acidified potassium dichromate(VI) solution/ acidified potassium manganate(VII) solution	1	
	(e)(i)	$C_4H_9OH + C_3H_7COOH \rightarrow C_3H_7COOC_4H_9 + H_2O$	1	
		1. correct formula of reactant	1	
		2. correct formula of products	1	2
	(ii)	Butyl butanoate	1	1
		TOTAL		**10**

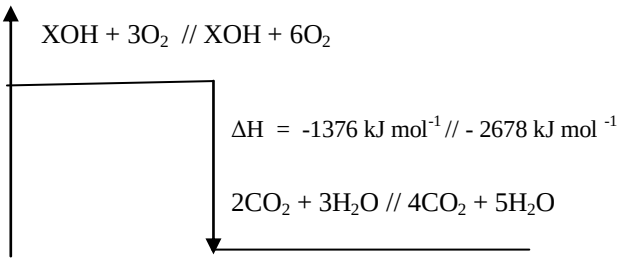
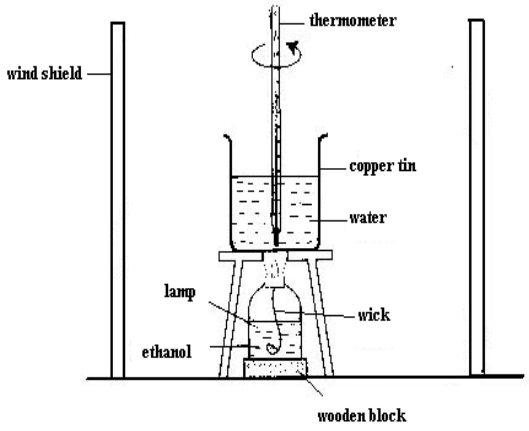
No.		Marking Criteria	Mark	Total
6	(a)	The change in amount of reactant or product against time	1	1
	(b)	$Zn + 2HCl \rightarrow ZnCl_2 + H_2$		
		1. correct formula for products	1	
		2. Balance	1	2
	(c)	1. axis labeled with units	1	
		2. scale consistence	1	
		3. all points are marked correctly	1	
		4. smooth curve	1	4
	(d)	1. (33 – 12) / (210 – 60) // 21/150	1	
		2. [0.13 – 0.15 cm^3/s]	1	2
		TOTAL		**9**

No.		Marking Criteria	Mark	Total
7	(a)(i)	1. Chemical compound which conducts electric current in molten state or aqueous solution	1	
		2. undergoes chemical change	1	1
	(ii)	1.Copper(II) ion, sulphate ion // Cu^{2+}, SO_4^{2-}	1	
		2. hydrogen ion and hydroxide ion //H^+ and OH^-	1	
		or		
		1.Copper(II) ion, hydrogen ion // Cu^{2+}, H^+	1	
		2. sulphate ion , hydroxide ion // SO_4^{2-} ,OH^-	1	2
	(iii)	1. Cathode: $Cu^{2+} + 2e \rightarrow Cu$	1	
		2. Anode: $4OH^- \rightarrow 2H_2O + O_2 + 4e$ - correct formula for reactant and products + no of electrons - balance	1 1	
		3. at anode, colourless gas produced// gas bubble up	1	
		4. at cathode, brown solid formed	1	
		5. the colour of copper(II) sulphate become pale.	1	6
	(b)	1.Argentum//gold//kromium//nikel//copper//zinc	1	
		2.Silver nitrate/silver ion an match with example above. - + nitrate, sulphate, chloride	1	
		3.key as a cathode and metal for plating as a anode	1	
		4. turn on the switch//allow the current	1	
		5. [able to draw complete diagram] cells, electrodes, electrolyte	1	

				
		6. [label] salt solution that contain metal for plating as an electrolyte	1	
		7. Silver plate become thinner//size/mass decrease	1	
		8. Brown/shinny solid deposited	1	
		9. colour of the solution remain unchang // no chang in colour	1	
		10.[anode] : $Ag \rightarrow Ag^+ + e$	1	
		11.[catode] : $Ag^+ + e \rightarrow Ag$	1	
		12. small current // rotate the key slowly // low concentration of an electrolyte // clean the key with sand paper	1	12 **[max 10]**
		TOTAL		**20**

No.		Marking Criteria	Mark	Total
8	(a)	Part X – hydrophobic/hydrocarbon – 1m Part Y – hydrophilic/ionic – 1m Parx X – dissolves in grease – 1m Part Y – dissolves in water – 1m	4	4
	(b)	1.The cloth in experiment II is clean whereas the cloth in Experiment I is still dirty. 2.In hard water,soap react with magnesium ion 3.to form scum 4.Detergent are more effective in hard water 5.Detergent does not form scum 6.Detergent are better cleansing agen then soap to remove oily stain. [each points – 1m]	6	6
	(c)	Patient X : Analgeis/anpirin - 1m Patient Y: Antibiotic/penicillin/streptomycin – 1m Patient Z ; Psychotherapeutic / antidepressant – 1m	3	3
	(d) (i)	Precaution: 1.Take after food. 2. Swallowed with plenty of water Explain: 1. Acidic and can cause irritation of the stomach. 2. To avoid internal bleeding/ulceratiion [precaution – 1m] [explain – 1m]	2	
	(d) (ii)	1.To make sure all the bacteria are killed / becomes ill again – 1m 2. bacteria become more resistant. – 1m 3.Need stronger antibiotic to fight the same infection – 1m	3	
	(d) (iii)	1.Drowsiness – 1m 2. poor coordination/light-headedness – 1m	2	7
		TOTAL		**20**

No.		Marking Criteria	Mark	Total
9	(a)(i)	$Y + Z_2 \rightarrow YZ_2$ // $Mg + Cl_2 \rightarrow MgCl_2$ 1. Correct formula for products 2. Correct formula for reactant	 1 1	 2
	(a)(ii)	1.high boiling/melting point 2.soluble in water// insoluble in organic solvent 3.can conduct electricity in aqueous / molten state		
	(b)(i)	Period 2 , group 6 // group 6, period 2	1	
	(ii)	1. electron arrangement for atom Q is 2.6 2. Have two shell filled with electrons and have 6 valence electrons// the outermost shell filled with 6 electrons	1 1	 2
	(c)(i)	1.electron arrangement for atom X is 2.4	1	
		2. atom X sharing 4 electron to achieved octet electron arrangement.	1	
		3. electron arrangement for atom O is 2.6	1	
		4. each of atom O sharing 2 electron to achieved octet electron arrangement	1	
		5. Both ions are attracted with a strong intermolecular force	1	
		6. covalent compound XO_2 formed.// draw for the electron arrangement of XO_2.	1	6
	(c)(ii)	1. electron arrangement for atom Y is 2.8.2	1	
		2. atom Y donates 2 electron to achieved octet electron arrangement.	1	
		3. electron arrangement for atom Z is 2.8.8.7	1	
		4. each of atom Z received one electron to achieved octet electron arrangement.	1	
		5. Both ions are attracted with a strong electrostatic force	1	
		6. ionic compound YZ_2 formed // Draw electron arrangement of XZ_2.	1	6
		TOTAL		**20**

No.		Marking Criteria	Mark	Total
10	(a)	-heat of combustion is the heat released when 1 mole of ethanol burnt completely in oxygen.	1	1
	(b)(i)	Energy  1. energy is labeled for the y- axis, formula for reactants and products // ΔH = -1376 kJ mol^{-1} // - 2678 kJ mol $^{-1}$ 2. energy level correctly drawn	 1 1	 2
	(b)(ii)	1. 1376 kJ // 2678 kJ of heat is released when 1 mol of XOH//YOH completely burnt in oxygen. 2. the energy content of the reactants is higher than the energy content in products. 3. an exothermic reaction. 4. a rise in temperature.	1 1 1 1	 4
	(d)	 <u>Diagram:</u> 1. labelled diagram: ethanol, water, thermometer, copper tin, lamp 2. arrangement of apparatus is functional	 1 1	

		Procedure: 1. 100cm^3 of water is measured using a measuring cylinder 2. and poured into a copper tin. 3. The intial temperature of water is measured and recorded , θ_1 4. A spirit lamp is filled with butanol/ other alkohol and weighed, x gram 5.The spirit lamp is light and put under the copper can. 6.The water is stirred continuously with a thermometer. 7.When the temperature of water increased by 30^{o}C, the flame is put off. 8.The spirit lamp is weighed again, y gram 9.The highest temperature is recorded, θ_2	1 1 1 1 1 1 1 1 1 1	
		Results: Mass of weight of spirit lamp + butanol /g : x Final mass of spirit lamp + butanol /g : y Mass of butanol used/g : (x-y) // z Highest temperature of water /^{o}C : θ_1 Initial temperature of water /^{o}C : θ_2 Increased in temperature /^{o}C : $(\theta_1 - \theta_2)$ // θ_3		

		<u>calculation:</u> Heat change = mcθ = 100 x 4.2 x ($\theta_2 - \theta_1$) = a J Heat of combustion of butanol = a x 74 / (x- y) Jmol $^{-1}$	 1 1	13
		TOTAL		**20**

Skema kertas 3 pertengahan tahun 2007

<table>
<tr><td>Question No.</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>1(a)</td><td>Able to record all the readings accurately to two decimal point with unit

Sample answer:
0.20cm ^{3} & 30.20cm^3
19.50cm^3 & 32.00cm^3</td><td>Able to record all the readings accurately without decimal point but with unit//able to record all the readings accurately without unit but with decimal point</td><td>Able to record all the reading correctly without decimal point and without unit

a: reading from bottom</td></tr>
<tr><td>1(b)</td><td>Able to construct a table that contains the following information
1. Heading in the table
2. Transfer all reading from 1(a) correctly
3. With unit at the heading

<table><tr><td></td><td>Exp. I</td><td>Exp. II</td></tr><tr><td>Final reading (cm^3)</td><td></td><td></td></tr><tr><td>Initial reading (cm^3)</td><td></td><td></td></tr><tr><td>Volume of acid (cm^3)</td><td></td><td></td></tr></table>
a : Exp I//HCl and NaOH
Exp II/H_2 SO_4 and NaOH</td><td>Able to construct a table that contains following information
1. heading in the table
2. no unit /with unit in data section</td><td>Able to construct a table that contains following information
1. 2 columns with heading only</td></tr>
<tr><td>(c)</td><td>Able to make accurate hipótesis by showing the relationship between manipulated and responding variables

Sample answer:
When different types of acid are used , different volume of acids are required to reach the end point</td><td>Able to make correct hypothesis by stating the (manipulated variables)/ (responding variables)

Sample answer:
Different acids are used to get the end point// different volume of acids are used to get the end point// to get the end point</td><td>Able to state the idea of hypothesis

Sample answer
Volume of acids//types of acids</td></tr>
</table>

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<table>
<tr>
<td>(e)</td>
<td>Able to state the reason accurately why initial and final burette readings are recorded

Sample answer:
To get/find the volume of acid hended to find the molarity of acid used</td>
<td>Able to state the reason correctly why initial and final burette readings are recorded

Sample answer:
to get the (volume of)/total acid used</td>
<td>Able to give the idea why initial and final burette readings are recorded

Sample answer :
To find /get the acid used/needed//tofind / get the end point</td>
</tr>
<tr>
<td>(d)</td>
<td>Able to state all the three variables accurately

Sample answer:
Manipulated variables:
different types of acid used
Responding variables :End point
Constant variables:volume of alkali/NaOH //volume of acid</td>
<td>Able to give any two variables correctly</td>
<td>Able to give any one variables correctly</td>
</tr>
<tr>
<td>(f)</td>
<td>Able to give correctly any three pairs of observation an inferences

Sample answer:
<table><tr><td>Observation</td><td>Inference</td></tr><tr><td>Changes of colour</td><td>Alkali changes to acid</td></tr><tr><td>Volume of acid is reduced</td><td>More acid is needed for titration</td></tr><tr><td>Burette reading increase</td><td>Acid is used for titration// acid drip from the burette</td></tr><tr><td>Solution in the conicle flask increase</td><td>Acid and alkali are mixed</td></tr></table></td>
<td>Able to give any two pairs of observation and inferences correctly</td>
<td>Able to give any one pairs correctly</td>
</tr>
<tr>
<td>(g)</td>
<td>Able to give the changes of colour correctly and accurately

Sample answer
Pink colour change to colourless</td>
<td>Able to give the changes of colour correctly

Sample answer:
Pink change colour // change to colourless/no colour</td>
<td>Able to give the idea of colour change

Sample answer:
Clear
Pink
Light pink
Colourless</td>
</tr>
</table>

<table>
<tr><td>(h)</td><td>Able to give the operational definition accúrately

Sample answer:
The reaction between acid/(HCl and H_2SO_4) and alkali/ NaOH produces salt and 1 mol of water // Reaction between ion H^+ from HCl dan H_2SO_4 dan ion OH^- dari NaOH produces 1 mol of water</td><td>Able to give the operational definition correctly

Sample answer:
The reaction between acid and alkali produces salt and water // the reaction between ion H^+ and OH^- produce water</td><td>Able to give any idea of operational definition

Sample answer :
Water, reaction between acid and alkali</td></tr>
<tr><td>(i)</td><td>Able to predict accurately and correctly

Sample answer
1.Volume H_2SO_4 needed is doubled
2. 25 cm^3</td><td>Able to predict and correctly

Sample answer :
Higher,increase</td><td>Able to give any idea to predict

Sample answer:
Little,a few,not much</td></tr>
<tr><td>(j)</td><td>Able to classify all the acids accurately and correctly

Sample answer:
<table><tr><td>Name of acids</td><td>Types of acids</td></tr><tr><td>HCl</td><td>Strong</td></tr><tr><td>H_2SO_4</td><td>Strong</td></tr><tr><td>CH_3COOH</td><td>weak</td></tr></table></td><td>Able to classify any two correctly</td><td>Able to classify any one correctly</td></tr>
</table>

Question No.	Score 3	Score 2	Score 1
2(a)	Able to give the accurate problem statement.Response is in the question form. (ignore the question mark) **Sample answer**: How does the reactivity of group I elements/(alkali metals)(/metals X, Y and Z) change when react with water?	Able to give the correct problem statement.Response is in the question form(ignore the question mark) **Sample answer** What is the reactivity of group I elements? // Do group I elements react with water?	Able to give the idea of problem statement **Sample answer** Reactivity change// React with water

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2(b)	Able to give all three variables accurately and correctly. **Sample answer**: Manipulated variables: different types of metals Responding variables: reactivity Constant variables : size of metals	Able to give any two variables correctly	Able to give any one variables correctly
2(c)	Able to state the relationship between the manipulated variable and responding variable and the direction accurately **Sample answer**: When going down Group I, metals X,Y and Z becomes more reactive in their reactions with water	Able to state the relationship between the manipulated variable and responding variable **Sample answer** When going down Group I ,the reaction of metals X,Y and Z with water becomes more reactive// Group I metals react with water vigorously	Able to state idea of hypothesis **Sample answer** (Metals)reactive//react vigorously
2(d)	Able to list all the materials and apparatus needed accurately **sample answer**: Materials : metals X,Y and Z, water Apparatus: Knife, forceps,basin/water troughs,,filter paper	Able to list adequate materials and apparatus correctly **Sample answer**: Materials : any 2 metals, water Apparatus : knife	Able to list any one metals and water **Sample answer**: X / Y / Z and water
2(e)	Able to write all the procedures correctly **Sample answer**: 1. Cut a small piece of metal X using a knife and a forceps 2. Dry the oil using filter paper 3. Place metal X slowly onto water surface in a trough 4. Record your observations 5.Repeat using metals Y and Z	Able to write adequate procedures **Sample answer**: Steps 1, steps 3 and steps 4	Able to write minimum procedures **Sample answer**: Steps 1 and steps 3// Steps 3 only

<table>
<tr>
<td>2(f)</td>
<td>Able to exhibit the tabulation of data that includes the following four information:
1. heading for the manipulated
2. all metals
3. heading for the responding variables
4. 2 x 4 / 4 x 2 tables
Sample answer:
<table><tr><td>metals</td><td>Observation/reactivity</td></tr><tr><td>X</td><td></td></tr><tr><td>Y</td><td></td></tr><tr><td>Z</td><td></td></tr></table></td>
<td>Able to exhibit the tabulation of data that includes the following information:
1. Heading for the manipulated and
<table><tr><td>elements</td><td>observation</td></tr><tr><td>X</td><td></td></tr><tr><td>Y</td><td></td></tr></table>responding variables
2. 2 metals

Sample answer</td>
<td>Able to exhibit the tabulation of data that includes the following information
1. heading for the manipulated/responding variable
2. 1 metal

Sample answer

<table><tr><td>Material/substance</td><td></td></tr><tr><td>X</td><td></td></tr></table></td>
</tr>
</table>