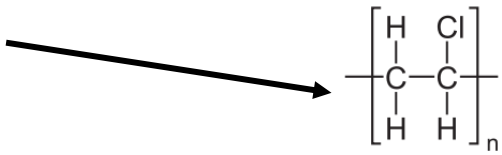
Section A
***Bahagian* A**

[60 marks]
[60 *markah*]

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

1. Diagram 1.1 shows one of the uses of synthetic polymer and its structural formula.
Rajah 1.1 *menunjukkan salah satu kegunaan polimer sintetik dan formula strukturnya.*



Polymer X
Polimer X

Diagram 1.1
Rajah 1.1

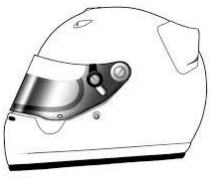
(a) (i) State the meaning of polymer.
Nyatakan maksud polimer.

.....
[1 mark / 1 *markah*]

(ii) State the name polymer X.
Nyatakan nama polimer X.

.....
[1 mark / *1 markah*]

(b) Diagram 1.2 shows a helmet that is wear by motorist for their safety.
Rajah 1.2 *menunjukkan sebuah topi keledar yang digunakan oleh penunggang motosikal untuk keselamatan mereka.*



Material Y
Bahan Y

Diagram 1.2
Rajah 1.2

Material Y is made up from the mixture of glass and plastic.
Bahan Y *diperbuat daripada campuran kaca dan plastik.*

(i) State the name of material Y.
Nyatakan nama bahan Y*.*

.....

[1 mark */ 1 markah*]

(ii) State one advantage of material Y compared to borosilicate glass.
Nyatakan kelebihan bahan Y *berbanding kaca borosilikat.*

.....

[1 mark */ 1 markah*]

(c)

Alloy ***Aloi***	**Component** ***Komponen***
Bronze	90% copper , 5% element X
Gangsa	90% kuprum ,5% elemen X

Table 1 / Jadual 1

Table 1 shows bronze alloy and their components.

Jadual 1 menunjukkan aloi gangsa dan komponennya.

(i) Name element X.
Namakan unsur X.

……...

[1 mark */ 1 markah*]

(ii) Explain why bronze is harder than pure copper.

Terangkan mengapa g*angsa lebih keras daripada kuprum tulen.*

……

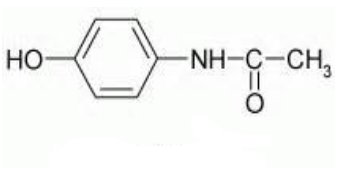
……

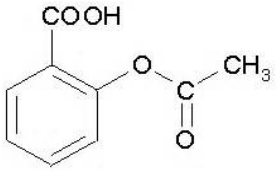
……

[2 mark */ 2 markah*]

(c) Diagram 1.3 shows the structural formula of two types of analgesic that is aspirin and paracetamol.

Rajah 1.3 *menunjukkan formula struktur bagi dua jenis analgesik iaitu aspirin dan parasetamol.*





Paracetamol | Aspirin

Parasetamol | *Aspirin*

Diagram 1.3 / *Rajah* 1.3

(i) *State which analgesic is more suitable for children and gastric patient. Explain your answer based on the formula structure in Diagram 1.3.*

Nyatakan analgesik manakah yang lebih sesuai untuk kanak-kanak dan pesakit gastrik.Terangkan jawapan anda berdasarkan formula struktur dalam Rajah 1.3.

.....

.....

……....

[2 marks */ 2 markah*]

2. Table 2 shows some of the elements found in Period 3 of the Periodic Table of Elementsand their respective proton numbers.
Jadual 2 menunjukkan sebahagian unsur yang terdapat pada Kala 3 di dalam Jadual Berkala Unsur dan bilangan nombor protonnya.

Element *Unsur*	Sodium *Natrium*	Magnesium *Magnesium*	Aluminium *Aluminium*	Silicon *Silikon*	Chlorine *Klorin*	Argon *Argon*
Proton number *Nombor proton*	11	12	13	14	17	18

Table 2 / *Jadual 2*

Based on this table, answer the following questions.
Berdasarkan jadual, jawab soalan-soalan yang berikut.

(a) Write the electron arrangement for atom argon.
Tuliskan susunan elektron bagi atom argon.

.....

[1 mark / *1 markah*]

(b) Define Period in the Periodic Table of Element.
Takrifkan Kala dalam Jadual Berkala Unsur.

.....

[1 mark / *1 markah*]

(c) (i) What will happen to the atomic size of the element when across Period 3 of the Periodic Table of Elements from sodium to argon?
Apakah yang akan terjadi kepada saiz atom bagi sesuatu unsur apabila merentasi Kala 3 Jadual Berkala Unsur dari natrium hingga argon.

.....

[1 mark / *1 markah*]

(ii) Explain your answer in (c) (i).
Terangkan jawapan anda di (c) (i).

.....

.....

[2 marks / *2 markah*]

(d) Name an element that forms an amphoteric oxide.
Namakan unsur yang membentuk oksida amfoterik.

.....

[1 mark / *1 markah*]

(e) Atoms of the elements sodium and chlorine can react to form a compound.
Atom bagi unsur-unsur natrium dan klorin boleh bertindak balas membentuk suatu sebatian.

(i) State the type of bond in the compound formed.
Nyatakan jenis ikatan dalam sebatian yang terbentuk.

.....

[1 mark / *1 markah*]

(ii) Draw the electron arrangement for the compound formed.
Lukiskan susunan elektron bagi sebatian yang terbentuk.

[2 marks / *2 markah*]

3 (a) Diagram 3 shows an educational TV program.
Rajah 3 *menunjukkan satu rancangan TV pendidikan*.

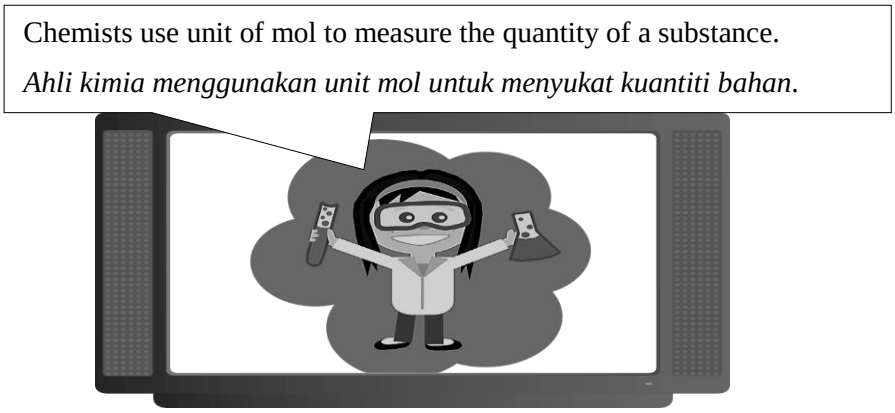


Diagram 3
Rajah 3

(i) What is the meaning of a mole?
Apakah yang dimaksudkan dengan satu mol?

.....

[1 mark / *1 markah*]

(ii) 4 g of Y reacts completely with oxygen. The following equation represents the reaction.
4 g Y *bertindak balas lengkap dengan oksigen. Persamaan berikut mewakili tindak balas tersebut.*

$$2Y + O_2 \rightarrow 2YO$$

Calculate the mass of the product formed in the reaction.
Hitung jisim bagi hasil yang terbentuk dalam tindak balas ini.
[Relative atomic mass: O = 16, Y = 40]
[*Jisim atom relatif*: O = 16, Y = 40]

[3 marks / *3 markah*]

(b) The equation below is not a balance chemical equation:.
Persamaan dibawah adalah bukan persamaan kimia yang seimbang.

$$\text{.....Fe(s)} + \text{.....}O_2\text{(g)} \rightarrow \text{…….}Fe_2O_3\text{(s)}$$

$$\text{…….Fe(}p\text{)} + \text{……}\ O_2(g) \rightarrow \text{……}\ Fe_2O_3(p)$$

(i) Balance the chemical equation above.
Seimbangkan persamaan kimia di atas.

[1 mark / *1 markah*]

(ii) Interpret the chemical equation qualitatively and quantitatively.
Tafsirkan persamaan itu secara kualitatif dan kuantitatif.

.....

.....

[2 marks / *2 markah*]

(c) Alkene E is an unsaturated hydrocarbon. E contains 85.7% of carbon , 14.3% of hydrogen, by mass, and the relative molecular mass of E is 42.
[Relative atomic mass : H=1; C=12]

Alkena E *adalah suatu hidrokarbon tak tepu.* E *mengandungi* 85.7% *karbon,*14.3% *hidrogen mengikut jisim dan jisim molekul relatif bagi* E *ialah* 42*.*
[*Jisim atom relatif :* H=1 ; C=12]

(i) Determine the empirical formula of E.
Tentukan formula empirik bagi E.

[3 marks / *3 markah*]

4 (a) Diagram 4.1 shows a redox reaction between bromine water and iron(II)sulphate solution.

Rajah 4.1 menunjukkan satu tindak balas redoks antara air bromin dan larutan ferum(II)sulfat.

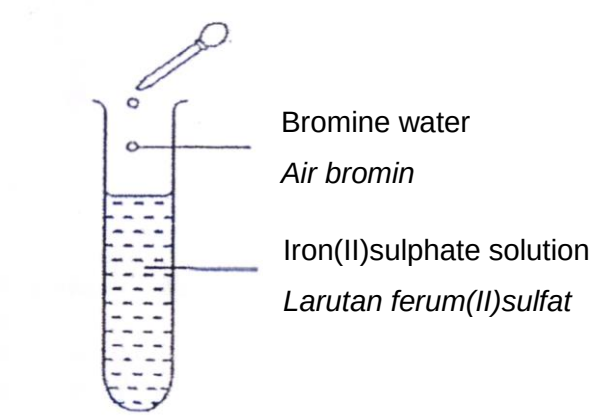


Diagram 4.1 / *Rajah 4.1*

(i) State observation for the reaction.
Nyatakan pemerhatian bagi tindak balas tersebut.

.....
[1 mark / *1 markah*]

(ii) What is the change in the oxidation number of bromine?
Apakah perubahan nombor pengoksidaan bagi bromin?

.....
[1 mark / *1 markah*]

(iii) Write the ionic equation for the reaction.
Tuliskan persamaan ion bagi tindak balas tersebut.

.....
[1 mark / *1 markah*]

(iv) Describe a test to confirm the cation produced.
Huraikan satu ujian untuk mengenal kation yang terhasil.

.....

.....
[2 marks / *2 markah*]

(b) Diagram 4.2 shows an experiment of displacement of halogen from it's halide solution.
Rajah 4.2 menunjukkan suatu eksperimen penyesaran halogen daripada larutan halidanya.

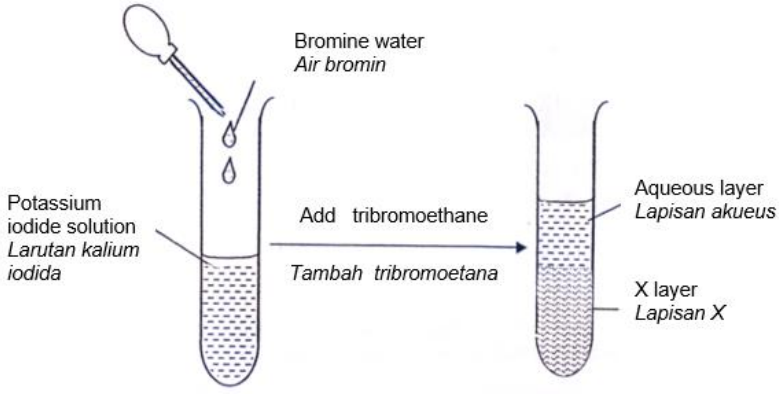


Diagram 4.2 / *Rajah 4.2*

(i) State an observation for the reaction in the test tube before tribromoethane is added.
Nyatakan satu pemerhatian bagi tindak balas di dalam tabung uji sebelum tribromoetana ditambahkan.

.....
[1 mark / 1 *markah*]

(ii) State the name of the substance that is oxidised.
Nyatakan nama bahan yang dioksidakan.

.....
[1 mark / 1 *markah*]

(iii) Write the oxidation reaction equation for this reaction.
Tuliskan persamaan tindak balas pengoksidaan bagi tindak balas ini.

.....
[1 mark / 1 *markah*]

(iv) After tribromoethane is added into the test tube, state the colour of X layer.
Selepas tribromoetana ditambahkan ke dalam tabung uji, nyatakan warna lapisan X.

.....
[1 mark / 1 *markah*]

(v) State another reagent that can replace bromine water.

Nyatakan satu reagen lain yang boleh menggantikan air bromin.

.....

[1 mark / 1 *markah*]

5. A student carried out experiment to determine the value of heat of neutralisation.

Diagram 5 shows the set up of the apparatus used in the experiment

Seorang murid menjalankan eksperimen untuk menentukan nilai haba peneutralan.

Rajah 5 *menunjukkan susunan radas yang digunakan bagi eksperimen tersebut.*

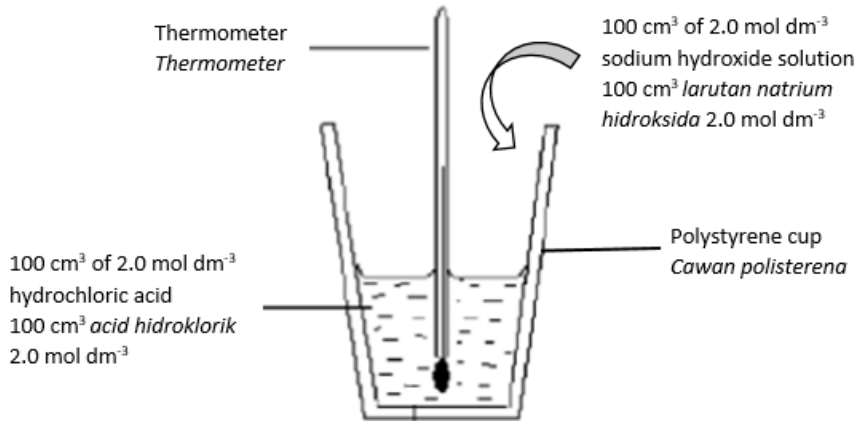


Diagram 5 / *Rajah 5*

The following observation was recorded:

Pemerhatian seperti berikut telah direkodkan:

- Initial temperature of hydrochloric acid
  Suhu awal asid hidroklorik = 28°C
- Initial temperature of sodium hydroxide solution
  Suhu awal larutan natrium hidroksida = 28°C
- Highest temperature of the mixture product
  Suhu tertinggi larutan hasil campuran = 41°C

Based on the observation above,

Berdasarkan pemerhatian di atas,

(a) Given that the specific heat capacity of the solution is 4.2 $Jg^{-1o}C^{-1}$ and the density of the solution is 1.0 gcm^{-3}.
Diberikan muatan haba tentu larutan adalah 4.2 $Jg^{-1o}C^{-1}$ *dan ketumpatan larutan adalah* 1.0 gcm^{-3}.

i. Calculate the change of heat in the experiment.
Kira perubahan tenaga haba dalam eksperimen tersebut.

[1 mark/1 *markah*]

ii. Calculate the heat of neutralisation in the experiment.
Kira haba peneutralan bagi eksperimen tersebut.

[2 marks/2 *markah*]

iii. Draw the energy level diagram for the reaction.
Lukis rajah aras tenaga bagi tindak balas tersebut.

[2 marks/2 *markah*]

(b) Based on the experiment, what is meant by the heat of neutralisation?
Berdasarkan eksperimen tersebut, apakah yang dimaksudkan dengan haba peneutralan?

……

……
[1 mark/1 *markah*]

(c) Why was the experiment conducted in a polystyrene cup instead of a beaker?
Mengapakah eksperimen tersebut dijalankan di dalam cawan polistrena dan bukan di dalam bikar?

……

[1 mark/1 *markah*]

(d) The student repeats the experiment by replacing hydrochloric acid with ethanoic acid. All the other conditions remain unchanged.
Murid tersebut mengulangi eksperimen tersebut dengan menggantikan asid hidroklorik kepada asik etanoik. Semua keadaan yang lain tidak diubah.

i. Predict the value of the heat of neutralisation for the experiment.
Ramalkan nilai haba peneutralan bagi eksperimen tersebut.

……...

[1 mark/1 *markah*]

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

……

.....

……..

[2 marks/2 *markah*]

6. An experiment is carried out to investigate the rate of reaction of zinc with hydrochloric acid. Excess zinc powder is added to 20 cm^3 of 0.2 dm^{-3} hydrochloric acid. The volume of gas collected at regular intervals is shown in diagram 6.1.

   Satu eksperimen dijalankan untuk mengkaji tindak balas antara zink dengan asid hidroklorik. Serbuk zink berlebihan ditambah kepada 20 cm^3 asid hidroklorik 0.2 mol dm^{-3}. Isipadu gas yang terkumpul pada sela masa yang sama ditunjukkan dalam rajah 6.1.

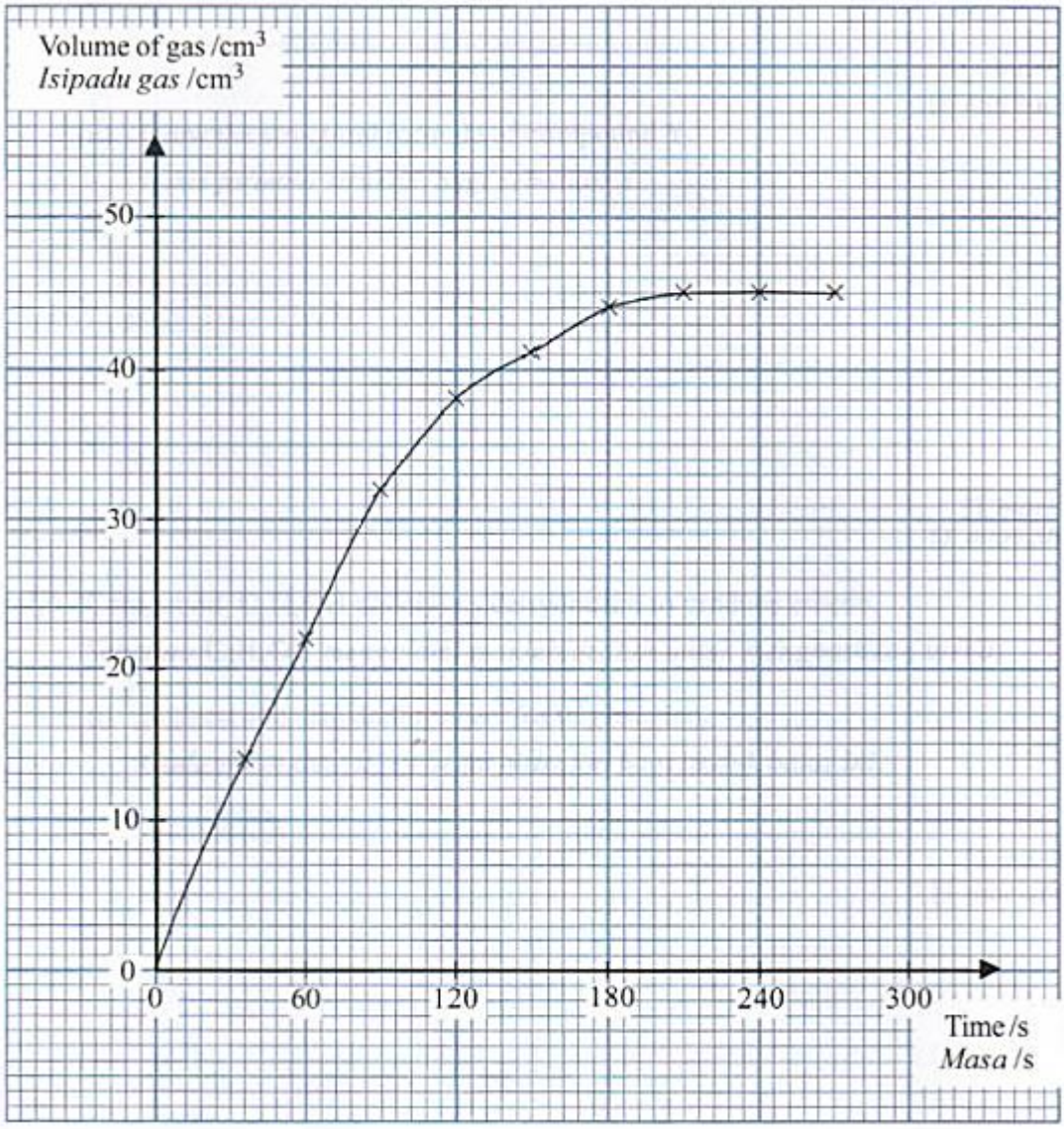


Diagram 6.1 / *Rajah 6.1*

a) State the meaning of the rate of reaction.
Nyatakan maksud kadar tindak balas.

.....

[1 mark / *1 markah*]

b) From the graph in Diagram 6.1, determine:
Daripada graf dalam rajah 6.1, tentukan:

i. The rate of reaction at 120 s
Kadar tindak balas pada 120 s

[2 marks / *2 markah*]

ii. The average rate of reaction between 60 s and 120 s.
Kadar tindak balas purata antara 60 s dan 120 s.

[1 mark / 1 *markah*]

c) Explain why the rate of reaction decreases with time.
Terangkan mengapa kadar tindak balas berkurangan dengan masa.

.....

……..
[1 mark / *1 markah*]

d) Another experiment is carried out to study the factors that affect the rate of this reaction. The result of this experiment is shown in Diagram 6.2. Curve I represents the result of this experiment using excess zinc powder and 50 cm^3 of 1.0 mol dm^{-3} dilute hydrochloric acid.
Satu eksperimen lain dijalankan untuk mengkaji faktor-faktor yang mempengaruhi kadar tindak balas ini. Keputusan eksperimen ini ditunjukkan dalam rajah 6.2. Lengkung I mewakili keputusan eksperimen yang menggunakan serbuk zink berlebihan dan 50 cm^3 asid hidroklorik cair 1.0 mol dm^{-3}.

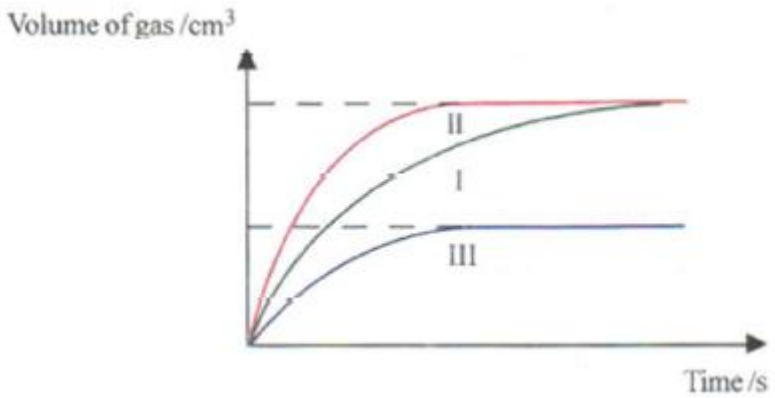


Diagram 6.2 / *Rajah 6.2*

i. Suggest the factors that influence the rate of reaction to obtains the curves labelled II and III.

Curve II
Lengkung II : ……..

Curve III
Lengkung III : ……

[2 marks / *2 markah*]

ii. Describe briefly how to carry out the experiment to obtain the curve labelled III.
Huraikan dengan ringkas bagaimana eksperimen itu dijalankan untuk mendapatkan lengkung berlabel III.

.....

……

……

……

[3 marks / *3 markah*]

iii. Give one reason why the final volume of gas obtained in curve III is half the final volume of gas in curve I.
Beri satu sebab mengapa isipadu akhir yang terhasil dalam lengkung III adalah separuh daripada isipadu akhir gas dalam lengkung I

.....

……

……

.....

[3 marks / *3 markah*]

Section B
***Bahagian* B**
[20 marks]
[20 *markah*]
Answer any **one** question
Jawab mana-mana ***satu*** *soalan*

7 (a) Table 7.1 show the chemical equation of two reactions.
Jadual 7.1 *menunjukkan persamaan kimia bagi dua tindak balas.*

Reaction ***Tindak balas***	**Chemical equation** ***Persamaan kimia***
X	$NaOH + HCl \rightarrow NaCl + H_2O$
Y	$Zn + Cu(NO_3)_2 \rightarrow Zn(NO_3)_2 + Cu$

Table7.1
Jadual 7.1

Determine whether each of the reactions is a redox reaction or not a redox reaction. Explain your answer in term of oxidation number.

Tentukan sama ada setiap tindak balas tersebut merupakan tindak balas redoks atau bukan tindak balas redoks. Terangkan jawapan anda dari segi nombor pengoksidaan.

[4 marks / 4 *makah*]

(b) Diagram 7.1 shows the extraction process of iron in a blast furnance.
Rajah 7.1 *menunjukkan proses pengekstrakan besi dalam relau bagas*

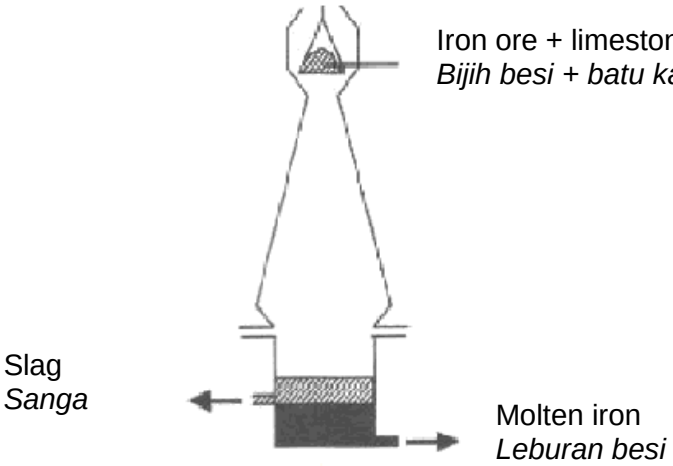


Diagram 7.1
Daigram 7.1

Write chemical equation for the reaction occur in Diagram 7.1.
Tulis persamaan kimia bagi tindak balas yang berlaku dalam Rajah 7.1.

Based on the equation, determine
Berdasarkan persamaan, tentukan:

- the substance that is oxidised
- *bahan yang dioksidakan*

- the substance that is reduced
- *bahan yang diturunkan*

- the oxidizing agent
- *agen pengoksidaan*

- the reducing agent
- *agen penurunan*

[6 marks / *6 markah*]

(c)

Diagram 7.2
Gambar rajah 7.2

Diagram 7.2 shows rusted substances which can be seen in our daily lives.

Gambar rajah 7.2 menunjukkan bahan-bahan berkarat yang boleh dilihat dalam kehidupan harian.

Draw a labelled diagram showing the mechanism of rusting of iron. Explain the process involved in the rusting of iron.

Lukiskan rajah berlabel yang menunjukkan mekanisma pengaratan besi. Terangkan proses-proses yang terlibat.

[10 *marks / 10 markah*]

8. (a) Using suitable examples, explain what is meant by
Dengan menggunakan contoh yang sesuai, terangkan apakah yang dimaksudkan dengan

(i) Acid/ *Asid*

(ii) Alkali/*Alkali*

[4 marks /*4 markah*]

(b) Explain why sodium hydroxide solution and aqueous ammonia of the same concentration have different pH value.

Terangkan mengapa larutan natrium hidroksida dan larutan ammonia yang mempunyai kepekatan yang sama tetapi berbeza nilai pH.

[4 marks /*4 markah*]

(c) Explain how 500 cm^3 of 0.1 mol dm^{-3} hydrochloric acid is prepared from 2.0 mol dm^{-3} hydrochloric acid solution. Show the calculations involved in the preparation of the solution.

Terangkan bagaimana 500 cm^3 asid hidroklorik 0.1 mol dm^{-3} disediakan daripada larutan asid hidroklorik 2.0 mol dm^{-3}. Tunjukkan cara pengiraan ynag terlibat dalam penyediaan larutan itu.

[6 marks /*6 markah*]

(d) State three applications of neutralisation in our daily lives and give an example for each application.

Nyatakan tiga aplikasi peneutralan dalam kehidupan seharian dan berikan contoh bagi setiap aplikasi.

[6 marks /*6 markah*]

Section C
Bahagian C
[20 marks]
[20 *markah*]
Answer any **one** question
*Jawab mana-mana **satu** soalan*

9. a) Solution X is added to solution Y to form barium sulphate. State the name of the reaction and the name of solution X and solution Y. Write the ionic equation for the reaction.

Larutan X ditambahkan kepada larutan Y untuk membentuk barium sulfat. Nyatakan nama bagi tindak balas itu dan nama bagi larutan X dan larutan Y. Tulis persamaan ion untuk tindak balas itu..

[4 marks / *4 markah*]

b) Table 9 shows the information on action of heat for two lead salt, P and Q.

Jadual 9 menunjukkan maklumat bagi tindakan haba ke atas dua garam plumbum P dan Q.

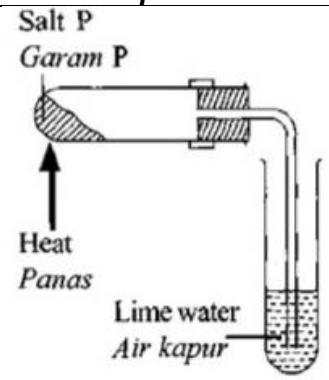
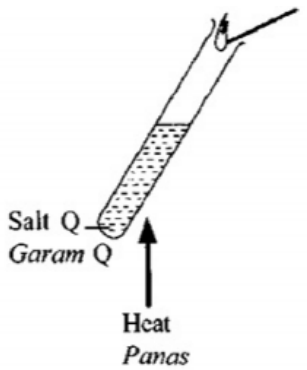
Experiment ***Eksperimen***	**Product** ***Hasil***	**Observation** ***Pemerhatian***
	Residue R *Baki R.*	Brown solid when hot, yellow when cold. *Pepejal perang bila panas, kuning bila sejuk.*
	Gas A *Gas A*	Lime water become chalky. *Air kapur menjadi keruh.*
	Residue R. *Baki R.*	Brown solid when hot, yellow when cold. *Pepejal perang bila panas, kuning bila sejuk.*
	Gas B *Gas B*	Brown gas. *Gas perang*
	Gas C *Gas C*	Rekindles glowing splinter. *Menyalakan kayu uji berbara.*

Table 9 / *Jadual 9*

Based on table 9, identify residue R, gas A, gas B and gas C. Write the chemical formulae for salt P and salt Q.
Berdasarkan Jadual 9, kenal pasti baki R, gas A, gas B and gas C. Tulis formula kimia bagi garam P dan garam Q.

[6 marks / *6 markah*]

c) You are required to prepare a dry zinc sulphate salt. The chemicals supplied are:
Anda dikehendaki menyediakan garam zinc sulfat yang kering. Bahan kimia yang dibekalkan ialah:

- Zinc nitrate solution / *Larutan zink nitrat*
- Dilute sulphuric acid / *Asid sulfurik cair*
- Sodium carbonate solution / *Larutan natrium karbonat*

Describe a laboratory experiment to prepare the salt. In your description, include the chemical equations involved.
Huraikan satu eksperimen makmal untuk menyediakan garam tersebut. Dalam huraian anda, sertakan persamaan yang terlibat.

[10 marks / *10 markah*]

10. Diagram 10 shows a series of reactions involving hydrocarbon Y.
Rajah 10 menunjukkan satu siri tindak balas yang melibatkan hidrokarbon Y.

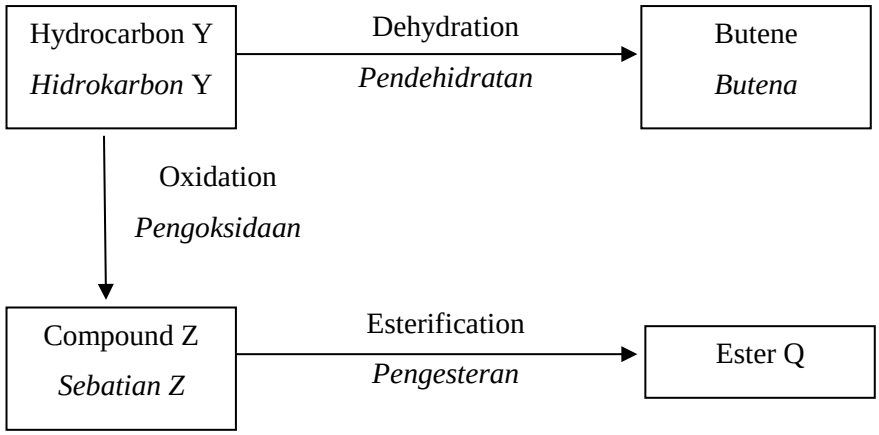


Diagram 10 / *Rajah* 10

(a) Based on Diagram 10,
Berdasarkan Rajah 10,

- name hydrocarbon Y,
namakan hidrokarban Y,
- state the general formula,
nyatakan formula am,
- state the functional group and
nyatakan kumpulan berfungsi dan
- draw the structural formula of hydrocarbon Y.
lukiskan formula struktur bagi hidrokarbon Y

[4 marks/ 4 *markah*]

(b) Write the chemical equation for the dehydration process of hydrocarbon Y. State the conditions required for the reaction to place.

Tuliskan persamaan kimia bagi proses pendehidratan hidrokarbon Y*. Nyatakan keadaan yang diperlukan bagi tindak balas tersebut untuk berlaku.*

[2 marks/ 2 *markah*]

(c) Compound Z is a carboxylic acid. Explain why compound Z is a monoprotic acid and can only conduct electricity in aqueous solution but not in glacial form.

Sebatian Z adalah asid karboksilik. Terangkan mengapa sebatian Z adalah asid monoprotik dan hanya boleh mengalirkan arus elektrik dalam larutan akues tetapi tidak didalam bentuk glasial.

[4 marks/ 4 *markah*]

(d) A student intends to prepare an ester Q from the reaction between compound Z and named alcohol.

Seorang pelajar berhasrat menyediakan sejenis ester Q daripada tindak balas antara sebatian Z dan sejenis alkohol yang dinamakan.

Describe a laboratory experiment to prepare the ester. Your answer should include
the following:

Huraikan satu eksperimen makmal untuk menyediakan ester tersebut. Jawapan anda mesti mempunyai perkara berikut :

- A list of material
  Senarai bahan kimia
- Procedure of the experiment
  Prosedur eksperimen
- Observation and chemical equation
  Pemerhatian dan persamaan kimia
- Name of the ester produced
  Nama ester yang terhasil

[10 marks/ 10 *markah*]

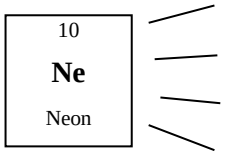
END OF QUESTION PAPER

KERTAS SOALAN TAMAT

THE PERIODIC TABLE OF THE ELEMENTS

1 **H**																2 **He** Helium 4
3 **Li** Lithium 7	4 **Be** Beryllium 9											5 **B** Boron 11	6 **C** Carbon 12	7 **N** Nitrogen 14	8 **O** Oxygen 16	9 **F** Fluorine 19	10 **Ne** Neon 20
11 **Na** Sodium 23	12 **Mg** Magnesium 24											13 **Al** Aluminium 27	14 **Si** Silicon 28	15 **P** Phosphorus 31	16 **S** Sulphur 32	17 **Cl** Chlorine 35	18 **Ar** Argon 40
19 **K** Potassium 39	20 **Ca** Calcium 40	21 **Sc** Scandium 45	22 **Ti** Titanium 48	23 **V** Vanadium 51	24 **Cr** Chromium 52	25 **Mn** Manganese 55	26 **Fe** Iron 56	27 **Co** Cobalt 59	28 **Ni** Nickel 59	29 **Cu** Copper 64	30 **Zn** Zinc 65	31 **Ga** Gallium 70	32 **Ge** Germa- nium 73	33 **As** Arsenic 75	34 **Se** Selenium 79	35 **Br** Bromine 80	36 **Kr** Krypton 84
37 **Rb** Rubidium 86	38 **Sr** Strontium 88	39 **Y** Yttrium 89	40 **Zr** Zirconium 91	41 **Nb** Niobium 93	42 **Mo** Molyb- denum 96	43 **Tc** Technetium 98	44 **Ru** Ruthenium 101	45 **Rh** Rhodium 103	46 **Pd** Palladium 106	47 **Ag** Silver 108	48 **Cd** Cadmium 112	49 **In** Indium 115	50 **Sn** Tin 119	51 **Sb** Antimony 122	52 **Te** Tellurium 128	53 **I** Iodine 127	54 **Xe** Xenon 131
55 **Cs** Caesium 133	56 **Ba** Barium 137	57 **La** Lanthanum 139	72 **Hf** Hafnium 179	73 **Ta** Tantalum 181	74 **W** Tungsten 184	75 **Re** Rhenium 186	76 **Os** Osmium 190	77 **Ir** Iridium 192	78 **Pt** Platinum 195	79 **Au** Gold 197	80 **Hg** Mercury 201	81 **Tl** Thallium 204	82 **Pb** Lead 207	83 **Bi** Bismuth 209	84 **Po** Polonium 210	85 **At** Astatine 210	86 **Rn** Radon 222
87 **Fr** Francium 223	88 **Ra** Radium 226	89 **Ac** Actinium 227	104 **Unq** Unnil– quadium 257	105 **Unp** Unnil– pentium 260	106 **Unh** Unnil- hexium 263	107 **Uns** Unni- lseptium 262	108 **Uno** Unni- loctium 265	109 **Une** Unni- lennium 266									

58 **Ce** Cerium 140	59 **Pr** Praseo– dymium 141	60 **Nd** Neodymium 144	61 **Pm** Promethium 147	62 **Sm** Samarium 150	63 **Eu** Europium 152	64 **Gd** Gadolinium 157	65 **Tb** Terbium 167	66 **Dy** Dyprosium 163	67 **Ho** Holmium 165	68 **Er** Erbium 167	69 **Tm** Thulium 169	70 **Yb** Ytterbium 173	71 **Lu** Lutetium 175
90 **Th** Thorium 232	91 **Pa** Protactinium 231	92 **U** Uranium 238	93 **Np** Neptunium 237	94 **Pu** Plutonium 244	95 **Am** Americium 243	96 **Cm** Curium 247	97 **Bk** Berkelium 247	98 **Cf** Califor- nium 249	99 **Es** Einsteinium 254	100 **Fm** Fermium 253	101 **Md** Mendele- vium 256	102 **No** Nobelium 254	103 **Lr** Lawren- cium 257



INFORMATION FOR CANDIDATES

MAKLUMAT UNTUK CALON

1. This question paper consists of three sections: **Section A**, **Section B** and **Section C**
   Kertas soalan ini mengandungi tiga bahagian: ***Bahagian*** A, ***Bahagian*** B *dan* ***Bahagian C****.*

2. Answer **all** questions in **Section A**. Write your answer for **Section A** in the spaces provided in this question paper.
   Jawab semua soalan dalam ***Bahagian*** **A**. *Jawapan anda bagi* ***Bahagian*** **A** *hendaklah ditulis pada ruang disediakan dalam kertas soalan ini.*

3. Answer any **one** question from **Section B** and any one question from **Section C.**
   Write your answers for **Section B** and **Section C** on the 'helaian tambahan' provided by the invigilators.
   You may use equations, diagrams, tables, graphs and other suitable methods to explain your answers.

   Jawab satu soalan dalam ***Bahagian*** **B** *dan satu soalan daripada* ***Bahagian*** **C**.
   Jawapan anda bagi ***Bahagian*** **B** *dan* ***Bahagian*** **C** *hendaklah ditulis dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan.*
   Anda boleh menggunakan persamaan, rajah, jadual, graf dan cara lain sesuai untuk menjelaskan jawapan anda.

4. The diagrams in the questions are not drawn to scale unless stated.
   Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.

5. Marks allocated for each question or sub-part of a question is shown in brackets.
   Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.
6. Show your working. It may help you to get marks.
   Tunjukkan kerja mengira. Ini membantu anda mendapatkan markah.

7. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
   Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.

8. The Periodic Table of Elements is provided.
   Jadual Berkala Unsur disediakan.

9. You may use non-programmable scientific calculator.
   Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh deprogram.

10. You are advised to spend 90 minutes to answer questions in **Section A,** 30 minutes for **Section B** and 30 minutes for **Section C**.
    Anda dinasihati supaya mengambil masa 90 *minit untuk menjawab soalan dalam* ***Bahagian*** **A**, *30 minit dalam* ***Bahagian*** **B** *dan* 30 *minit untuk* ***Bahagian*** **C**.