Bahagian A
*Section A*

[60 markah]
[60 *marks*]

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

1 Asetamida merupakan sebatian organik dengan formula kimia, CH_3CONH_2.
Rajah 1 menunjukkan graf suhu melawan masa bagi penyejukan asetamida.
Acetamide is an organic compound with chemical formula, CH_3CONH_2.
Diagram 1 shows a graph of temperature against time for cooling of asetamide.

Rajah/ *Diagram 1*
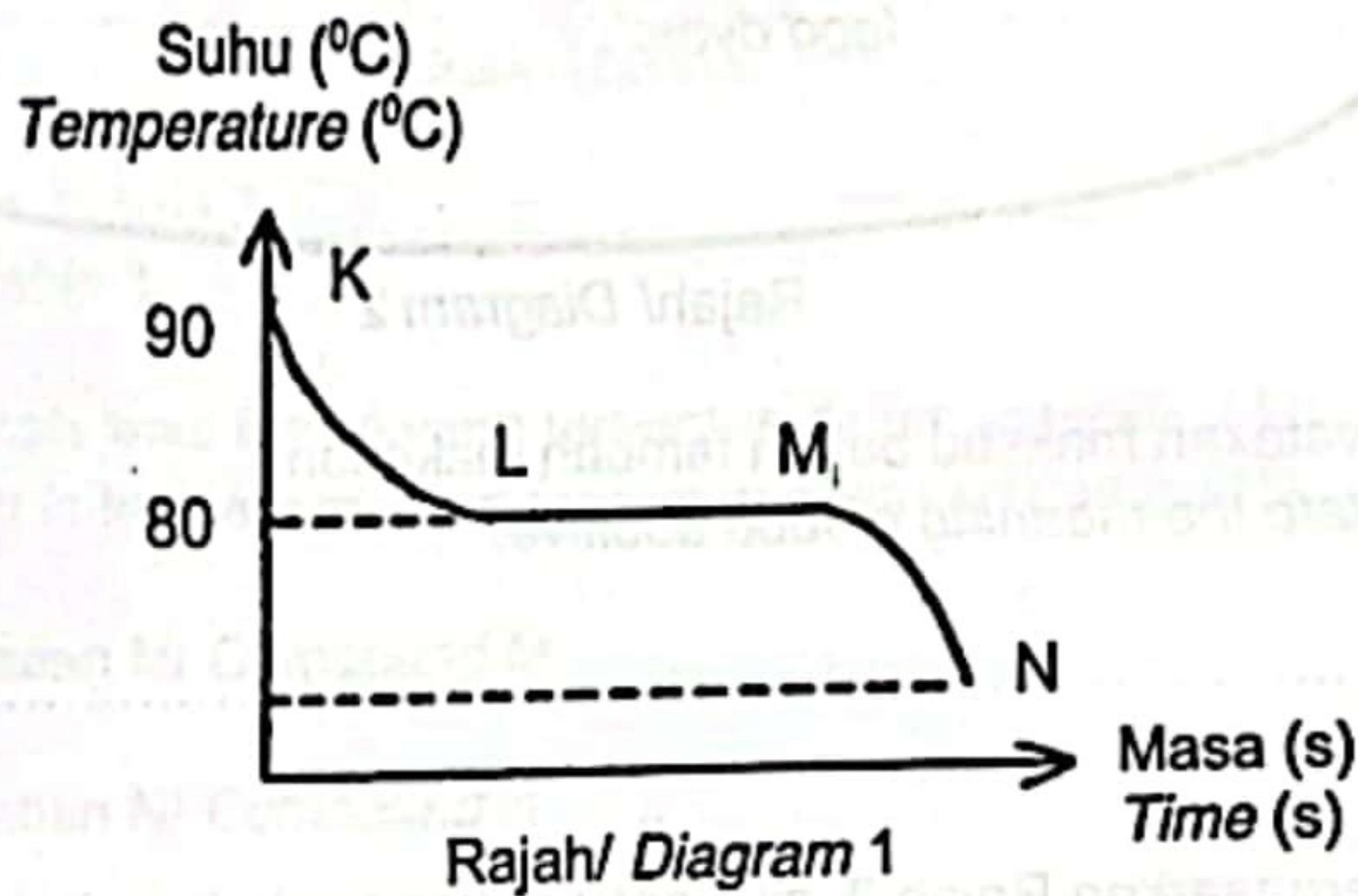
(a) Nyatakan jenis zarah bagi asetamida.
State the type of particle of asetamide.

....
[1 mark]

(b) (i) Apakah takat beku asetamida?
What is freezing point of acetamide?

....
[1 mark]

(ii) Nyatakan keadaan jirim pada KL.
State the state of matter at KL.

....
[1 mark]

(c) Terangkan mengapa suhu tidak berubah pada LM.
Explain why the temperature remain constant at LM.

....

....
[2 marks]

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2   Rajah 2 menunjukkan pembungkus makanan yang memaparkan bahan tambah makanan yang terdapat dalam makanan itu.
Diagram 2 shows food packaging displaying the food additives found in the food.

Marjerin Lazat

Bahan-Bahan: Minyak sayuran, garam, susu pepejal, pengemulsi, asid askorbik, perisa dan pewarna yang dibenarkan.
Ingredients: Vegetable oil, salt, solid milk, emulsifier, ascorbic acid, flavouring and permitted food dyes.
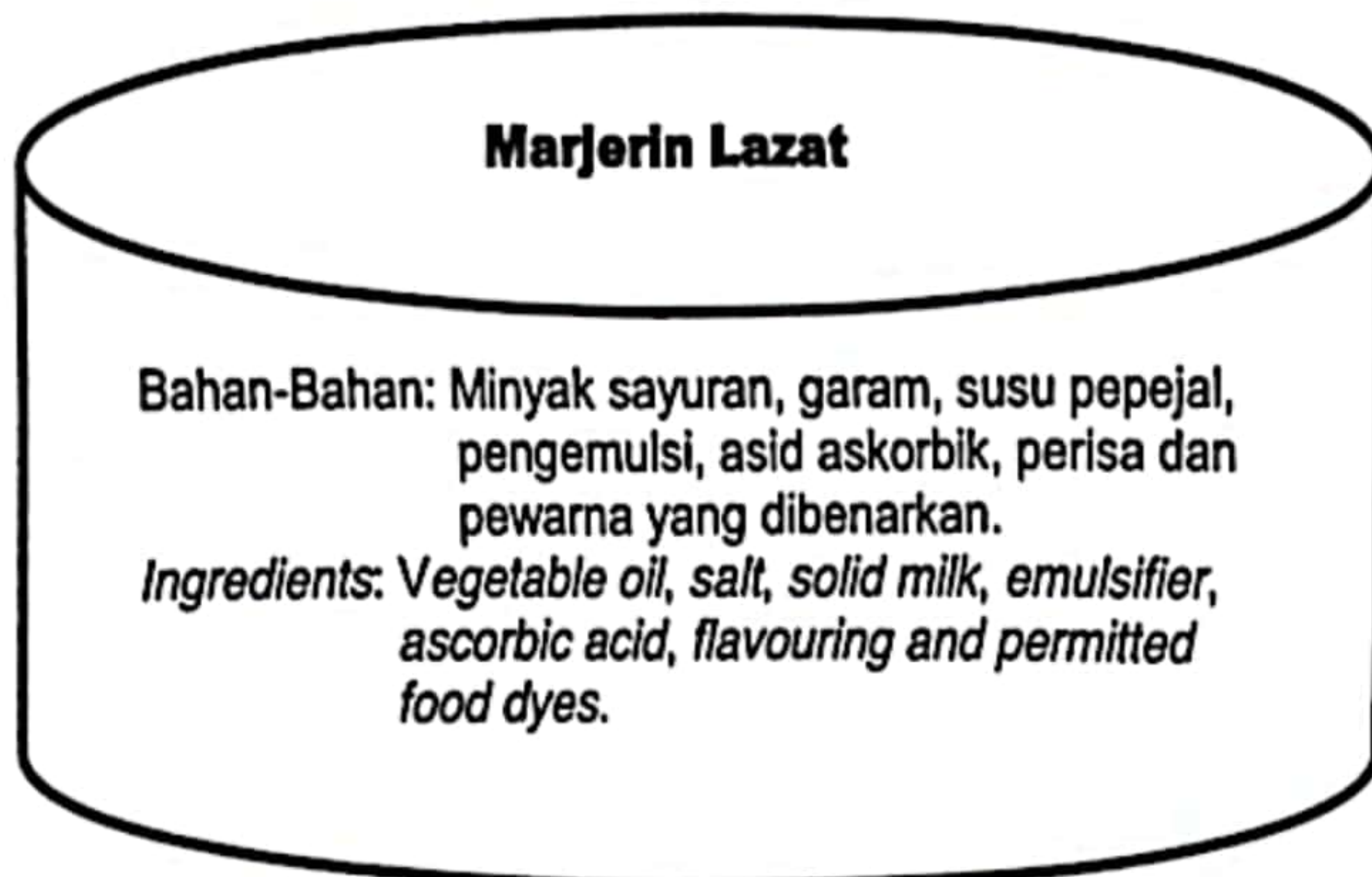
Rajah/ *Diagram 2*

(a)   Nyatakan maksud bahan tambah makanan.
State the meaning of food additive.

....

[1 mark]

(b)   Berdasarkan Rajah 2, pilih **satu** bahan tambah makanan dan nyatakan fungsinya.
*Based on Diagram 2, choose **one** food addictive and state its function.*

Bahan tambah makanan   : ....
Food addictive

Fungsi   : ....
Function

[2 marks]

(c)   Setelah mengambil makanan laut, Ali telah mengalami kegatalan dan hidung berair.
Apakah yang dialami oleh Ali?
Nyatakan jenis ubat yang perlu diambil untuk meredakan gejala tersebut.
After consuming seafood, Ali has experienced itching and runny nose.
What is experienced by Ali?
State the type of medicine that should be taken to relieve the symptoms.

....

....

[2 marks]

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3   Jadual 3 menunjukkan sifat fizik bagi sebatian M dan sebatian N.
Table 3 shows the physical properties of compound M and compound N.

Sebatian Compound	Takat lebur (°C) Melting point (°C)	Takat didih (°C) Boiling point (°C)	Kekonduksian elektrik Electrical conductivity	
			Pepejal Solid	Leburan Molten
M	714	1412	Tidak Boleh Cannot	Boleh Can
N	80	218	Tidak Boleh Cannot	Tidak Boleh Cannot

Jadual/ *Table* 3

(a)   Berdasarkan Jadual 3,
Based on Table 3,

      (i)   Apakah jenis ikatan yang terbentuk dalam sebatian M dan N.
             What is the type of bond formed in compound M and N.

             Sebatian M/ Compound M:...

             Sebatian N/ *Compound* N:...
                                                       [2 marks]

      (ii)   Nyatakan jenis zarah bagi sebatian N.
             State the type of particle of compound N.

             ....
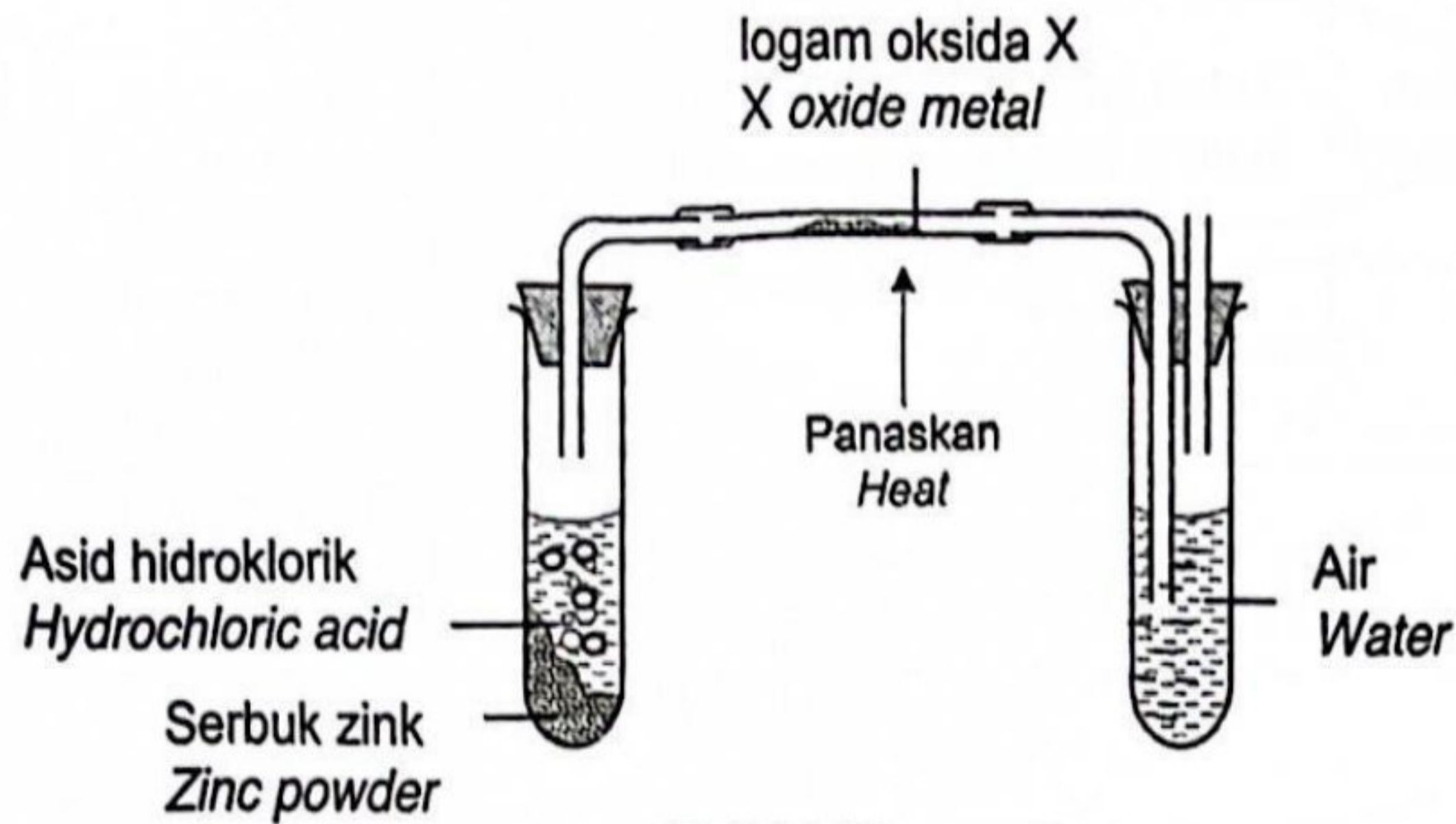   [1 mark]

(b)   Terangkan mengapa takat lebur bagi kedua-dua sebatian itu berbeza.
Explain why the melting point for both compounds are different.

         ....

         ....

         ....
                                                           [2 marks]

(c)   Mengapa sebatian M boleh mengalirkan arus elektrik dalam keadaan leburan?
Why compound M can conduct electricity in molten state?

         ....

         ....
                                                           [1 mark]

4   Rajah 4 menunjukkan susunan radas untuk menentukan formula empirik bagi suatu oksida logam X.
     Diagram 4 shows the apparatus set-up to determine the empirical formula for an oxide of metal X.

logam oksida X
X oxide metal

Panaskan
Heat

Asid hidroklorik
Hydrochloric acid

Air
Water

Serbuk zink
Zinc powder

Rajah/ *Diagram* 4

(a)   Apakah yang dimaksudkan dengan formula empirik?
      What is the meaning of empirical formula?

      ....

      ....
                                                                                                              [1 mark]

(b)   Jadual 4 menunjukkan keputusan eksperimen itu.
      Table 4 shows the result of the experiment.

Penerangan/ *Description*	Jisim/ *Mass* (g)
Jisim tiub kaca *Mass of glass tube*	10.21
Jisim tiub kaca + logam X oksida *Mass of glass tube + oxide of metal X*	16.46
Jisim tiub kaca + logam X *Mass of glass tube + metal X*	15.21

Jadual/ *Table* 4

(i)   Berdasarkan Jadual 4, hitung formula empirik bagi X oksida.
        [Jisim atom relatif: O= 16, X= 64]
        Based on Table 4, calculate the empirical formula for the oxide of X.
        [Relative atomic mass: O= 16, X= 64]

[3 marks]

(ii)   Tulis persamaan kimia bagi tindak balas oksida X dalam tiub kaca.
        Write the chemical equation for the reaction of oxide X in the glass tube.

        ....
                                                                           [1 mark]

(iii)   Tafsirkan persamaan kimia di **4(b)(ii)** dari segi kualitatif dan kuantitatif.
        Interpret the chemical equation in **4(b)(ii)** *in qualitative and quantitative terms.*

        ....

        ....

        ....
                                                                           [2 marks]

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5   Jadual 5.1 menunjukkan dua polimer dan monomernya.
       Table 5.1 shows two polymers and their monomers.

Polimer sintetik *Synthetic polymer*	Monomer *Monomer*
Polipropena *Polypropene*	Propena, C_3H_6 *Propene, C_3H_6*
Polivinil klorida *Polyvinyl chloride*	Monomer Y *Monomer Y*

Jadual/ *Table* 5.1

Berdasarkan Jadual 5.1,
Based on Diagram 5.1,

(a)   Apakah maksud polimer?
        What is meant by polymer?

        ....
                                                                                    [1 mark]

(b)   Polipropena dan polivinil klorida dihasilkan melalui kaedah pempolimeran
        yang sama.
        Nyatakan kaedah pempolimeran tersebut.
        *Polypropene and polyvinyl chloride are produced by the same polymerisation
        method.*
        State the method of polymerisation.

        ....
                                                                                    [1 mark]

(c)   (i)   Nyatakan nama monomer Y.
                State the name of monomer Y.

                ....
                                                                                    [1 mark]

        (ii)   Tunjukkan bagaimana polivinil klorida dihasilkan daripada
                monomernya dalam tindak balas pempolimeran.
                *Show how polyvinyl chloride is produced from its monomer in
                polymerisation reaction.*

                                                                                    [2 marks]

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(d)   Jadual 5.2 menunjukkan keputusan eksperimen bagi mengkaji kekenyalan getah.
Table 5.2 shows the results of experiment to investigate the elasticity of rubber.

Jenis getah *Type of rubber*	Panjang asal kepingan getah (cm) *Initial length of rubber strip (cm)*	Panjang kepingan getah dengan pemberat 150 g (cm) *Length of rubber strip with 150 g weight (cm)*	Panjang kepingan getah selepas pemberat dialihkan (cm) *Length of rubber strip after the weight is removed (cm)*
X	13.00	13.15	13.00
Y	13.00	13.25	13.10

Jadual / Table 5.2

Bandingkan kekenyalan bagi kedua-dua getah itu. Terangkan jawapan anda.
Compare the elasticity of the two rubbers. Explain your answer.

....

....

....

                                                                                    [3 marks]

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6   Jadual 6 menunjukkan maklumat unsur-unsur kala 3 di dalam Jadual Berkala Unsur.
     Table 6 shows the information of the elements of period 3 in the Periodic Table of Elements.

Unsur Element	Na	Mg	Al	Si	P	S	Cl	Ar
Susunan elektron Electron arrangement	2.8.1	2.8.2	2.8.3	2.8.4	2.8.5	2.8.6	2.8.7	2.8.8

Jadual/ *Table* 6

(a)   Nyatakan maksud kala.
      State the meaning of period.

      ....

      ....
                                                                                              [1 mark]

(b)   Jelaskan kenapa semua unsur yang terdapat dalam jadual 6 terletak pada kala yang sama.
      Explain why all the elements in table 6 are located at the same period.

      ....

      ....
                                                                                              [1 mark]
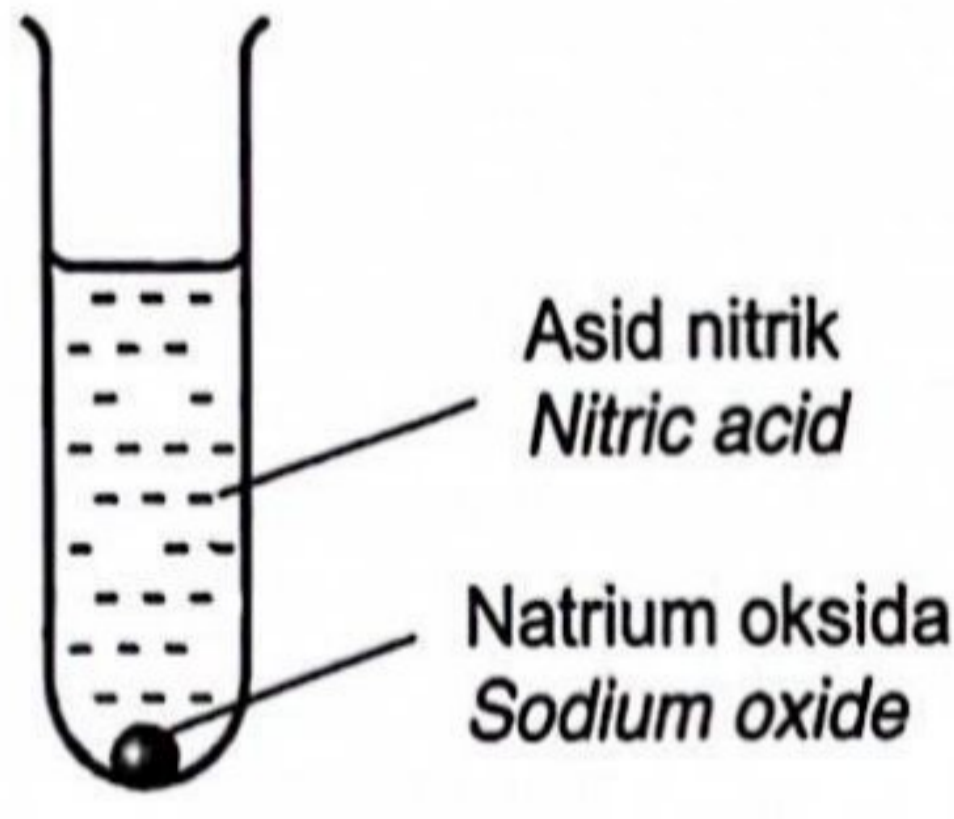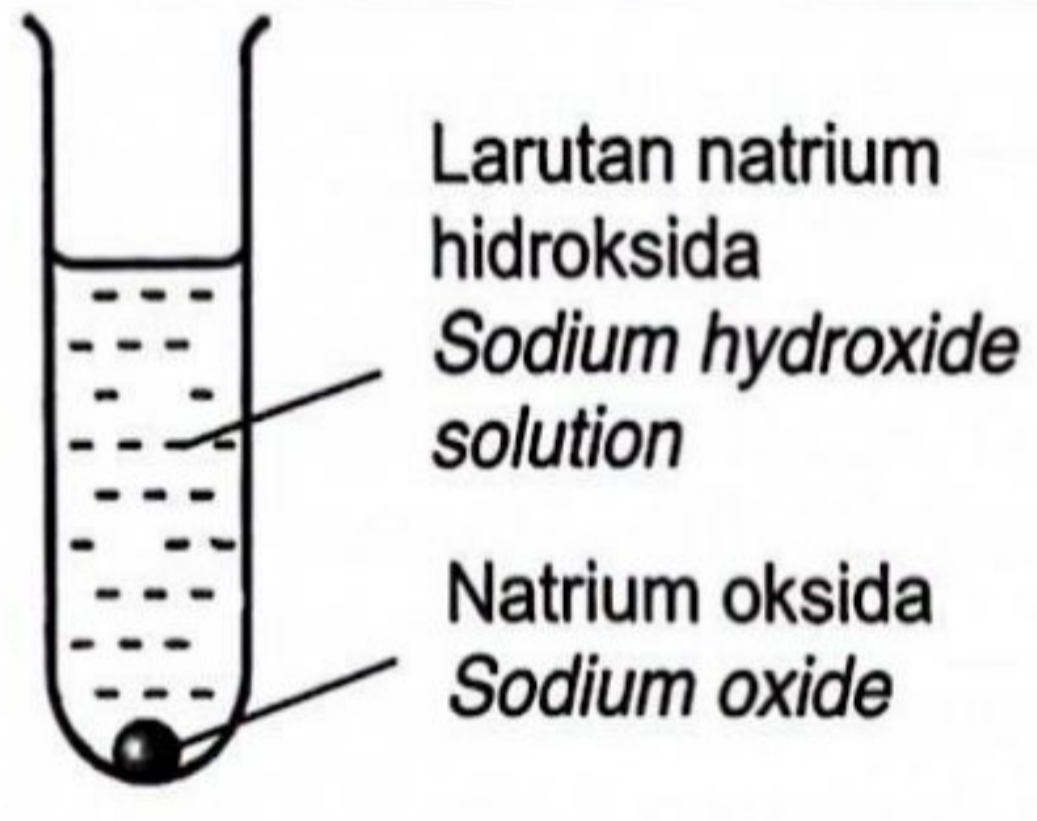
(c)   Merujuk kepada perubahan jejari atom, terangkan mengapa keelektronegatifan bertambah apabila merentasi kala dari kiri ke kanan.
      Referring to the change in atomic radius, explain why the electronegativity increases when across the period from left to right.

      ....

      ....

      ....
                                                                                              [2 marks]

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(d)   Rajah 6 menunjukkan dua set tindak balas melibatkan oksida unsur yang
        dimasukkan ke dalam dua larutan berbeza. Campuran larutan dikacau
        menggunakan rod kaca.
        *Diagram 6 shows two sets of reactions involving oxide of elements which is
        put into two different solutions. Both mixture of solutions are stirred with glass
        rod.*

Set *Set*	Susunan radas *Set up apparatus*	Pemerhatian *Observation*
I	Asid nitrik *Nitric acid* Natrium oksida *Sodium oxide*	Pepejal putih larut menjadi larutan tidak berwarna *The white solid dissolves into colorless solution*
II	Larutan natrium hidroksida *Sodium hydroxide solution* Natrium oksida *Sodium oxide*	Tiada perubahan *No change*

Rajah/ *Diagram* 6

(i)   Terangkan pemerhatian yang diperolehi seperti ditunjukkan dalam
        jadual 6.
        Explain the observation obtained as shown in table 6.

        ....

        ....
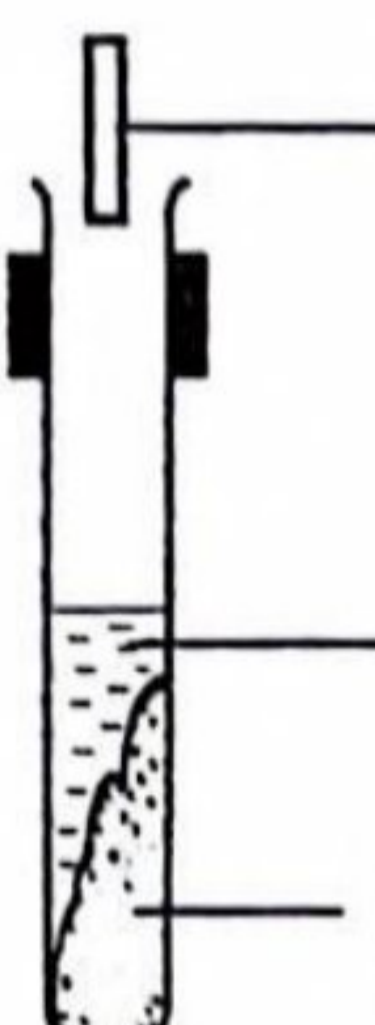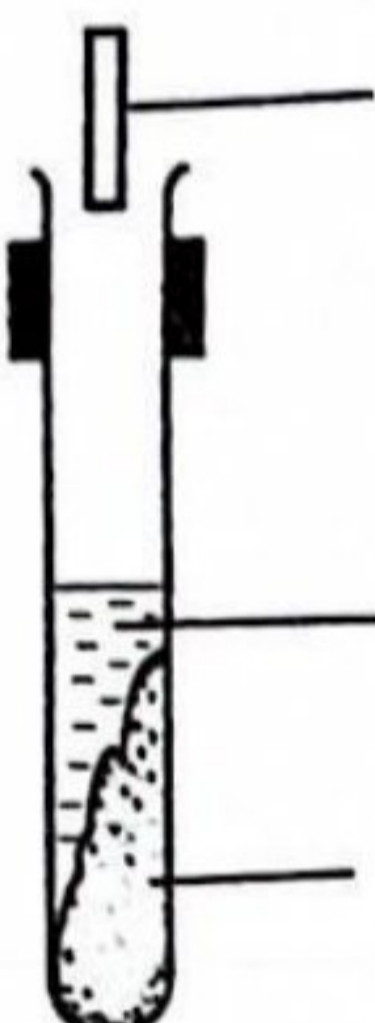
        ....
                                                                                    [3 marks]

(ii)   Tuliskan persamaan kimia bagi tindak balas yang berlaku dalam Set I.
        Write the chemical equation for the reaction occurred in Set I.

        ....
                                                                                    [2 marks]

7 (a) Rajah 7.1 menunjukkan susunan radas yang digunakan dalam eksperimen untuk mengkaji sifat keasidan asid oksalik.
Diagram 7.1 shows the apparatus set-up used in experiment to study the acidic properties of an oxalic acid.

Eksperimen *Experiment*	Susunan radas *Apparatus set-up*	Pemerhatian *Observation*
I	Kertas litmus biru *Blue litmus paper* Air *water* Asid oksalik *Oxalic acid*	Kertas litmus biru bertukar merah *Blue litmus paper turns red*
II	Kertas litmus biru *Blue litmus paper* Propanon *Propanone* Asid oksalik *Oxalic acid*	Tiada perubahan *No change*

Rajah/ *Diagram* 7.1

(i) Nyatakan maksud asid.
State the meaning of acid.

....

[1 mark]

(ii) Namakan ion yang bertanggungjawab untuk menunjukkan sifat keasidan suatu asid.
Name the ion that is responsible to show the acidic properties of an acid.

....

[1 mark]

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(iii)   Terangkan perbezaan bagi pemerhatian antara Eksperimen I dengan
         Eksperimen II.
         Explain the differences in the observation between Experiment I *and
         Experiment* II.

         ....

         ....

         ....
                                                                              [2 marks]

(b)   Asid A adalah asid monoprotik. Asid A yang telah dicelup dengan pH meter
         telah memberi bacaan pH 1.
         Acid A *is a monoprotic acid. Acid* A *that has been dipped with a* pH *meter has
         been giving a* pH 1 *reading.*

         (i)   Cadangkan asid A.
                  Suggest acid A.

                  ....
                                                                              [1 mark]

         (ii)   25 cm^3 asid A melengkapkan peneutralan 50 cm^3 0.5 mol dm^{-3} larutan
                  natrium hidroksida, NaOH. Dengan menggunakan asid A yang
                  dinamakan di **7(b)(i)**, tulis persamaan kimia seimbang bagi tindak
                  balas peneutralan itu.
                  Seterusnya tentukan kepekatan asid A.
                  25 cm^3 of acid A *completely neutralises* 50 cm^3 *of* 0.5 mol dm^{-3} *sodium
                  hydroxide solution,* NaOH. *By using the named of acid* A *at* **7(b)(i)**,
                  *write a balanced chemical equation for the neutralisation reaction.
                  Next, determine the concentration of acid* A.

                                                                              [3 marks]

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(c) Rajah 7.2 menunjukkan Sarah telah disengat oleh seekor lebah di lengannya semasa berada di kawasan rumahnya.
Diagram 7.2 shows Sarah was stung by a bee on her arm while in her home area.

Rajah/ *Diagram* 7.1

Cadangkan apakah bahan yang ada di rumah Sarah yang boleh digunakan untuk rawatan awal.
Wajarkan penggunaan bahan tersebut.
Suggest what materials Sarah has at home that can be used for initial treatment.
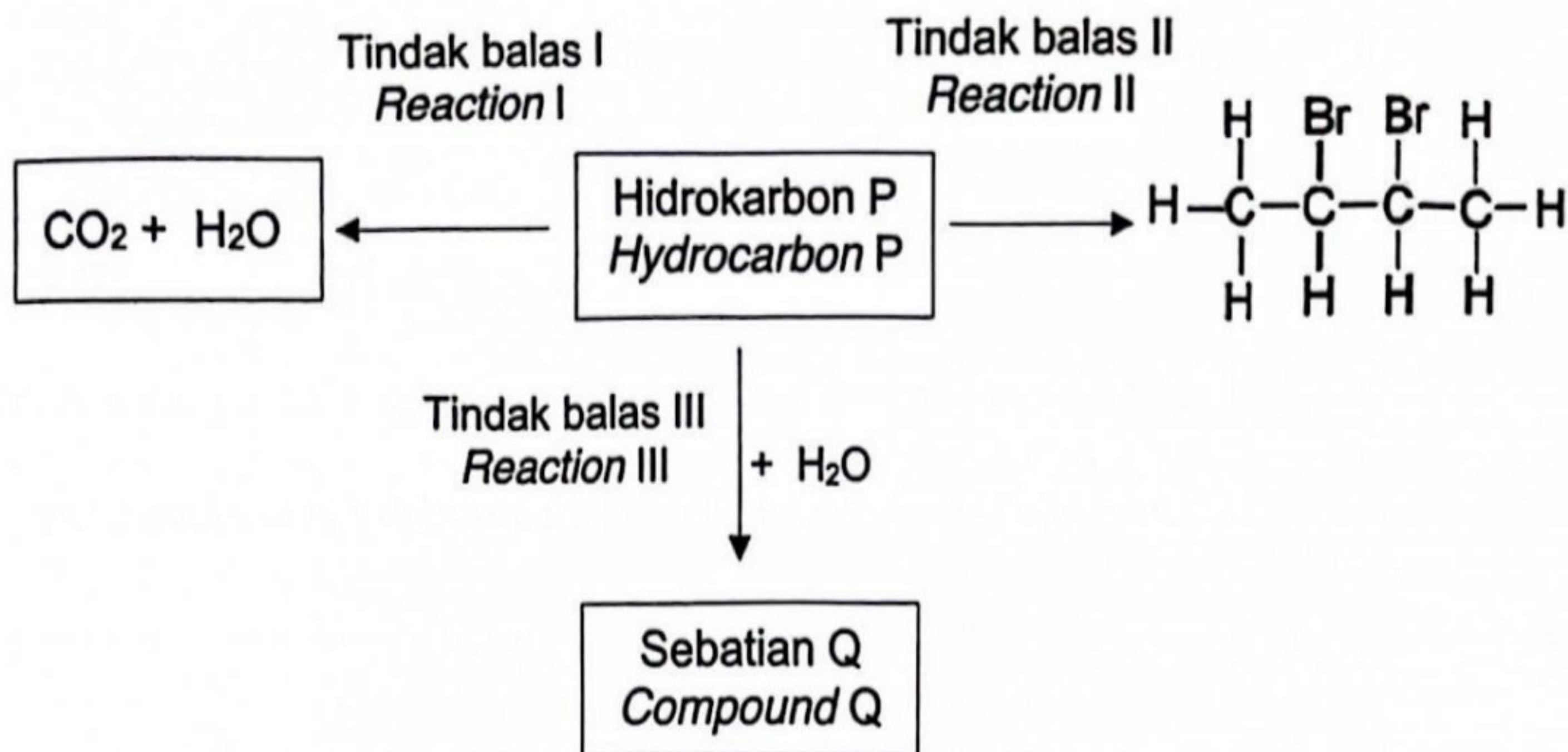*Justify the use of the material.*

....

....

....

[2 marks]

8   Rajah 8 menunjukkan beberapa siri tindak balas kimia bagi hidrokarbon P.
     Diagram 8 shows a series of chemical reactions of hydrocarbon P.

Tindak balas I   Tindak balas II
Reaction I   *Reaction* II

$CO_2 + H_2O$ ← Hidrokarbon P → H—C—C—C—C—H (with H, Br, Br, H on top and H, H, H, H on bottom)
                  Hydrocarbon P

Tindak balas III
Reaction III   + H_2O

Sebatian Q
Compound Q

Rajah/ *Diagram* 8

(a)   Nyatakan maksud hidrokarbon.
       State the meaning of hydrocarbon.

       ....
                                                                                           [1 mark]

(b)   (i)   Nyatakan siri homolog bagi hidrokarbon P.
              State the homologous series of hydrocarbon P

              ....
                                                                                           [1 mark]

       (ii)   Lukis formula struktur bagi hidrokarbon P.
              Draw the structural formula of hydrocarbon P.

                                                                                           [1 mark]

(c)   Dalam tindak balas I, hidrokarbon P terbakar lengkap dalam oksigen
       berlebihan.
       Tulis persamaan kimia bagi tindak balas itu.
       In reaction I, hydrocarbon P burns completely in excess oxygen.
       Write chemical equation for the reaction.

       ....
                                                                                           [2 marks]

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(d)   Tindak balas II boleh digunakan untuk menentusahkan hidrokarbon P.
       Reaction II *can be used to verify hydrocarbon* P.

   (i)   Nyatakan nama bagi tindak balas II.
          State the name of reaction II.

          ....

          [1 mark]

   (ii)   Huraikan secara ringkas bagaimana tindak balas II boleh dijalankan di
          dalam makmal.
          Describe briefly how reaction II *can be carried out in the laboratory.*

          ....

          ....

          [2 marks]

(e)   Dalam tindak balas III, sebatian Q terbentuk apabila hidrokarbon P bertindak
       balas dengan air.
       In reaction III, *compound* Q *is produced when hydrocarbon* P *is reacted with
       water.*

   (i)   Tulis formula molekul bagi sebatian Q.
          Write molecular formula for compound Q.

          ....

          [1 mark]

   (ii)   Sebatian Q boleh bertindak balas dengan asid etanoik menghasilkan
          sebatian R yang berbau seperti buah epal.
          Nyatakan nama sebatian R itu.
          Compound Q *can reacts with ethanoic acid to produce compound* R
          which has smell of an apple.
          State the name of compound R.

          ....

          [1 mark]

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Bahagian B
Section B
[20 markah]
[20 *marks*]

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

9   Tiga eksperimen I, II dan III dijalankan untuk mengkaji faktor- faktor yang mempengaruhi kadar tindak balas. Jadual 9 menunjukkan bahan tindak balas dan keadaan tindak balas yang terlibat.
Three experiments I, II *and* III *are carried out to investigate the factors affecting the rate of reaction. Table* 9 *shows the reactants and conditions of reaction involved.*

Eksperimen Experiment	Bahan tindak balas Reactants	Keadaan tindak balas Condition of reaction
I	Ketulan zink berlebihan + 50 cm³ asid hidroklorik 0.5 mol dm⁻³ *Excess zinc granules +* 50 cm³ *hydrochloric acid* 0.5 mol dm⁻³	Suhu bilik *Room condition*
II	Ketulan zink berlebihan + 50 cm³ asid hidroklorik 0.5 mol dm⁻³ + bahan X *Excess zinc granules +* 50 cm³ *hydrochloric acid* 0.5 mol dm⁻³ + *substance* X	Suhu bilik *Room condition*
III	Ketulan zink berlebihan + 50 cm³ asid hidroklorik 1.0 mol dm⁻³ *Excess zinc granules +* 50 cm³ *hydrochloric acid* 1.0 mol dm⁻³	Suhu bilik *Room condition*

Jadual/ *Table* 9

(a)   Berdasarkan Jadual 9, nyatakan **dua** faktor yang mempengaruhi kadar tindak balas.
Based on Table 9, *state* **two** *factors that affect the rate of reaction.*

[2 marks]

(b)   Tulis persamaan kimia yang seimbang bagi tindak balas dalam eksperimen I.
Hitung isi padu gas yang terbebas dalam eksperimen I.
[Isi padu molar gas pada keadaan bilik ialah 24 dm³ mol⁻]
Write the balanced chemical equation for the reaction in experiment I.
Calculate the volume of gas released in experiment I.
[*Molar volume at room condition is* 24 dm³ mol⁻]

[5 marks]

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(c) Lakarkan graf isi padu gas melawan masa bagi eksperimen I dan II **ATAU** eksperimen I dan III.
Sketch the graph of volume of gas against time for experiment I and II OR experiment I and III.

[3 marks]

(d) Cadangkan nama bahan X yang digunakan dalam eksperimen II. Seterusnya, bandingkan kadar tindak balas dan terangkan dengan menggunakan teori pelanggaran antara tindak balas yang berlaku dalam:

- Eksperimen I dan II

- Eksperimen I dan III

Suggest the name of substance X used in experiment II.
Next, compare the rate of reaction and explain by using collision theory between the reactions that occurs in:

- *Experiment I and II*

- *Experiment I and III*

[10 marks]

10   **(a)**   Berikut adalah satu persamaan tindak balas redoks.
The following is an equation represents a redox reaction.

$$2AgNO_3 + Zn \longrightarrow Zn(NO_3)_2 + 2Ag$$
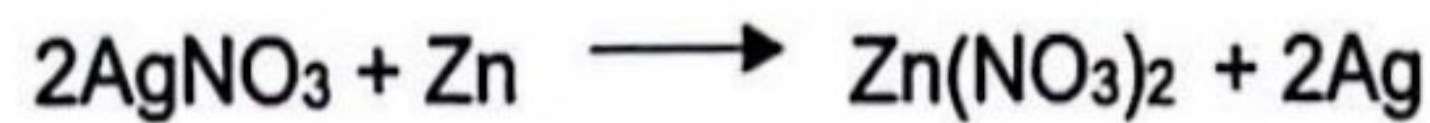
Nyatakan nama bahan yang bertindak sebagai agen pengoksidaan dan agen penurunan.
Terangkan jawapan anda dari segi perubahan nombor pengoksidaan.
State the name of the substance that act as an oxidising agent and a reducing agent.
Explain your answer in terms of change in oxidation number.

[4 marks]

(b)   Rajah 10 menunjukkan susunan radas untuk menyiasat proses elektrolisis dalam set I dan set II dengan menggunakan elektrod karbon.
Diagram 10 shows the apparatus set up to investigate the electrolysis process in cell I and cell II by using carbon electrode for both cells.

Sel *Cell*	Rajah *Diagram*
I	 Elektrod karbon / *Carbon electrode* 0.001 mol dm⁻³ asid hidroklorik 0.001 mol dm⁻³ of hydrochloric acid
II	 Elektrod karbon / *Carbon electrode* 2 mol dm⁻³ asid hidroklorik 2 mol dm⁻³ of hydrochloric acid

Rajah/ *Diagram* 10

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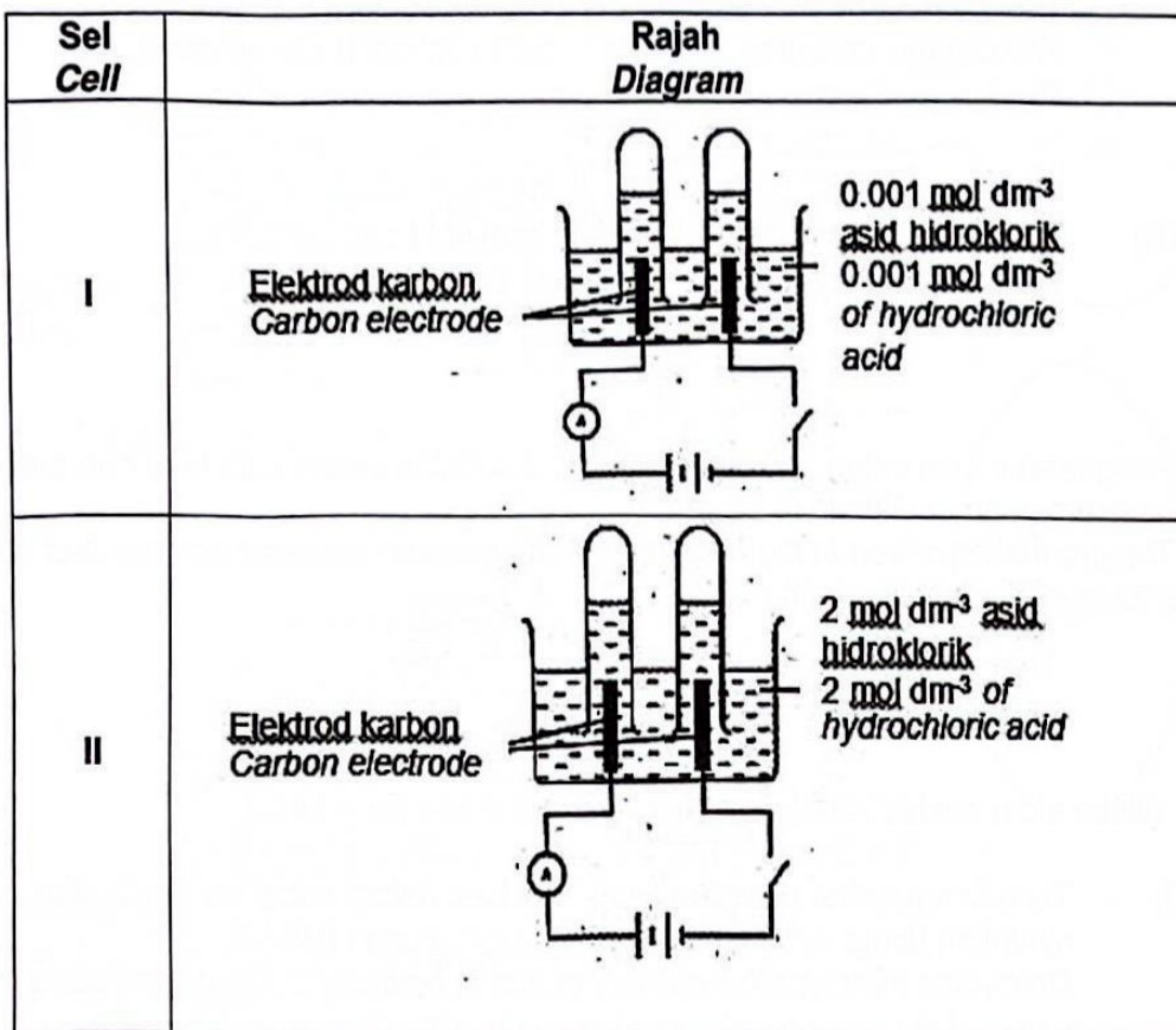
Jadual 10 menunjukkan nilai E^0 bagi sel setengah elektrod piawai.
Table 10 shows E^0 value for half standard potential electrode.

$$2H^+ + 2e \rightleftharpoons H_2 \qquad\qquad E°= \ 0.00 \ V$$
$$O_2 + 2H_2O + 4e \rightleftharpoons 4OH^- \qquad E°= +0.40 \ V$$
$$Cl_2 + 2e \rightleftharpoons 2Cl^- \qquad\qquad E°= +1.36 \ V$$

Jadual/ *Table* 10

(i)   Berdasarkan sel I, nyatakan nama hasil yang terbentuk di katod dan anod.
Based on cell I diagram, state the name of the product formed at the cathode and anode.

[2 marks]

(ii)   Hasil yang dikumpul pada anod dalam set I dan set II adalah berbeza.
Terangkan jawapan anda berdasarkan pemilihan nyahcas ion.
The product collected at anode in cell I and cell II are different.
Explain your answer in terms of selective discharge of ion.

[6 marks]

(iii)   Tulis setengah persamaan di anod bagi sel I dan sel II.
Write the half equations at the anode for cell I and cell II.

[2 marks]

(c)   Penghasilan besi dalam industri melalui tindak balas antara bijih besi dan arang kok seperti persamaan kimia di bawah.
The production of iron in industry through the reaction between iron ore and coke is shown in chemical equation below.

$$2Fe_2O_3 + 3C \longrightarrow 4Fe + 3CO_2$$

[Jisim atom relatif / *relative atomic mass* : O = 16 ; Fe = 56]

(i)   Tentukan nombor pengoksidaan bagi besi dalam sebatian Fe_2O_3 dan nyatakan nama sebatian itu mengikut penamaan IUPAC.
Determine the oxidation number of iron in compound Fe_2O_3 and state the name of the compound according to the IUPAC nomenclature.

[2 marks]

(ii)   Kilang tersebut mampu memproses 320 kg bijih besi sehari dengan menggunakan karbon yang berlebihan. Hitung jisim besi yang dihasilkan dalam sehari.
The factory is able to process 320 kg ore a day by using excess carbon.
Calculate the mass of the iron produced in a day.

[4 marks]

Bahagian C
Section C

[20 markah]
[20 *marks*]

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

11   Rajah 11 menunjukkan bekas P dan bekas Q yang mengandungi asid HX dan
      asid HY. Kedua-dua asid adalah asid monoprotik.
      Diagram 11 shows container P and container Q that containing HX acid and HY acid.
      Both acids are monoprotic acid.

27°C

H^+ X^-
H^+ X^-
H^+ X^-
H^+ X^-

100 cm³ asid HX 1.0 mol dm⁻³
100 cm³ , 1.0 mol dm⁻³ *of acid*
HX

Cawan polisterina
Polystyrene cup

Bekas / *Container* P

H^+ Y^-
HY

27°C

H^+ Y^-
HY

100 cm³ asid HY 1.0 mol dm⁻³
100 cm³ , 1.0 mol dm⁻³ *of asid* HY

Cawan polisterina
Polystyrene cup

Bekas / *Container* Q
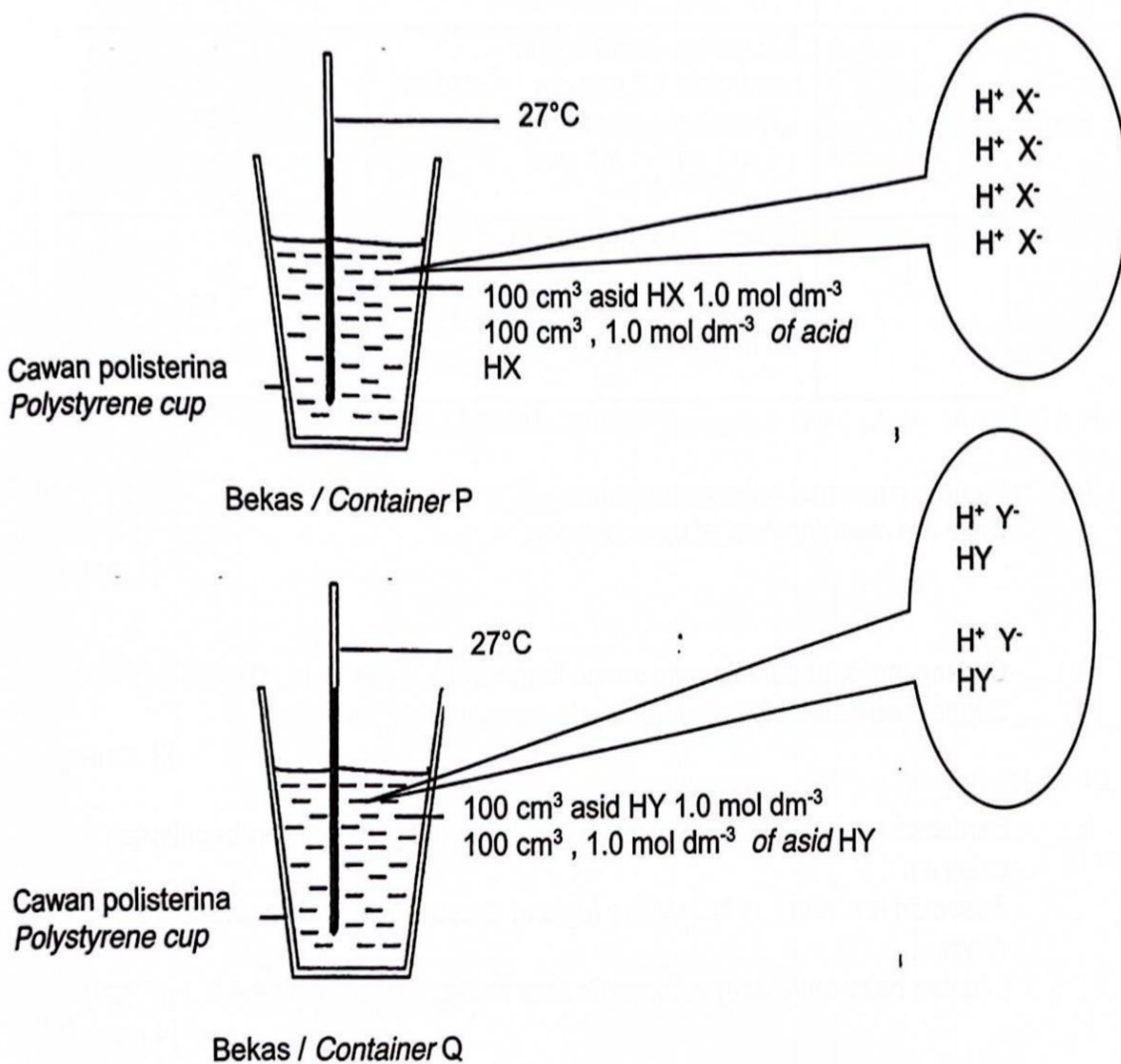
Rajah/ *Diagram* 11

Jadual 11.1 menunjukkan dua tindak balas peneutralan melibatkan tindak balas antara larutan natrium hidroksida dengan asid HX dan tindak balas antara larutan natrium hidroksida dengan asid HY.
Haba peneutralan bagi setiap tindak balas ditunjukkan seperti dalam jadual.
Table 11.1 shows two neutralization reactions involving the reaction between sodium hydroxide solution with HX acid and sodium hydroxide solution with HY acid.
Heat of neutralization for each reaction is shown as in the table.

Tindakbalas Reaction	Bahan tindakbalas Reactants	Haba peneutralan Heat of Neutralisation (kJ mol^{-1})
I	100 cm^3 larutan Natrium hidroksida 1.0 mol dm^{-3} + asid HX 100 cm^3 *of sodium hydroxide* 1.0 mol dm^{-3} + HX *acid*	- 57
II	100 cm^3 larutan Natrium hidroksida 1.0 mol dm^{-3} + asid HY 100 cm^3 *of sodium hydroxide* 1.0 mol dm^{-3} + HY *acid*	- 55

Jadual/ *Table* 11.1

(a) Nyatakan maksud haba peneutralan.
State the meaning heat of neutralisation.

[1 mark]

(b) Cadangkan **satu** contoh yang sesuai bagi asid HX dan asid HY.
*Suggest **one** suitable example for HX acid and HY acid.*

[2 marks]

(c) Berdasarkan tindak balas I, hitungkan suhu tertinggi campuran bagi tindak balas itu.
Based on reaction I, calculate the highest temperature of the mixture for the reaction.
[Muatan haba tentu larutan/ *specific heat capacity of solution* = 4.2 J g^{-1} °C^{-1}]

[4 marks]

(d) Bandingkan haba peneutralan antara tindak balas I dan tindak balas II.
Terangkan jawapan anda.
Compare heat of neutralisation between reaction I and reaction II.
Explain your answer.

[5 marks]

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(e)   Jadual 11.2 menunjukkan bahan api dan haba pembakaran bagi etanol, C_2H_5OH dan kerosin, $C_{12}H_{26}$.
Table 11.2 shows type of fuel and heat of combustion of ethanol, C_2H_5OH and kerosene, $C_{12}H_{26}$.

Bahan api *Fuel*	Haba Pembakaran *Heat of Combustion* $(kJ\ mol^{-1})$
Etanol *Ethanol*	1380
Kerosin *Kerosene*	6290

Jadual/ *Table* 11.2

Berdasarkan Jadual 11.2, pilih **satu** bahan api yang terbaik dari aspek:

- Nilai bahan api

- Kesan terhadap alam sekitar

Wajarkan kedua-dua pemilihan anda itu.

[Jisim molar: etanol = 46 g mol^{-1}, kerosin = 170 g mol^{-1}, JAR, C=12, H=1]

*Based on Table 11.2, choose **one** fuel that is the best in terms of:*

- *Fuel value*

- *Effects on environment*

Justify both of your choices.

[*Molar mass: ethanol = 46 g mol^{-1}, kerosene = 170 g mol^{-1}, RAM, C=12, H=1*]

[8 marks]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

MPP3 2023   SULIT
Selamat mengulangkaji dari telegram@soalanpercubaanspm
Kimia K2

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