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2015 HKDSE Chemistry Paper 1A

Suggested Solutions

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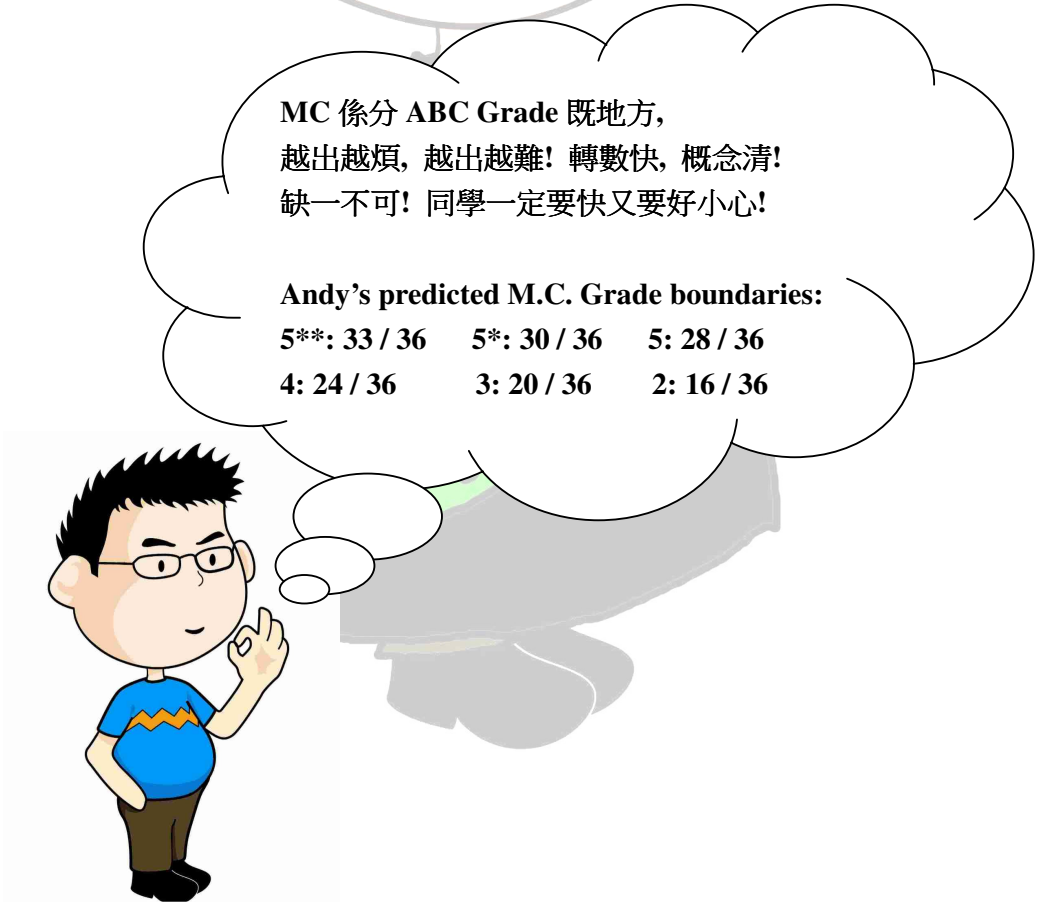
2015 HKDSE Chemistry Paper 1A Suggested Answers

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

*** = May be deleted**

N/A = Not available



Section A

1. A

黎 Sir 提提你 :

- **Aqueous solutions**

  ⇒ Solution with water

  ⇒ $H_2O_{(l)} \Leftrightarrow H^+_{(aq)} + OH^-_{(aq)}$ **which is called self-dissociation of water**

  ⇒ **About 550,000,000** $H_2O_{(l)}$**, only 1** $H_2O_{(l)}$ **dissociate to** $H^+_{(aq)} + OH^-_{(aq)}$

  ⇒ **All aqueous solutions contain** $H^+_{(aq)}$ **ions**

- **Definition of pH value =** $-\log[H^+_{(aq)}]$

  $[H^+_{(aq)}] > 1$ for example, $[H^+_{(aq)}] = 10 \Rightarrow pH = -\log 10 = -1 < 0$

- **Acidic compound: Any compound ionizes in water and give** $H^+_{(aq)}$ **as the only cation. The compound itself is not necessarily contain hydrogen as their constituent elements, for example,** CO_2**, is also consider as acidic gas because when** $CO_{2(g)} + H_2O_{(l)} \rightarrow 2H^+_{(aq)} + CO_3^{2-}{}_{(aq)}$ **.**

- **Not all regent bottles with "corrosive" hazard warning label displayed on the bottle surface. for example, dilute ethanoic acid.**

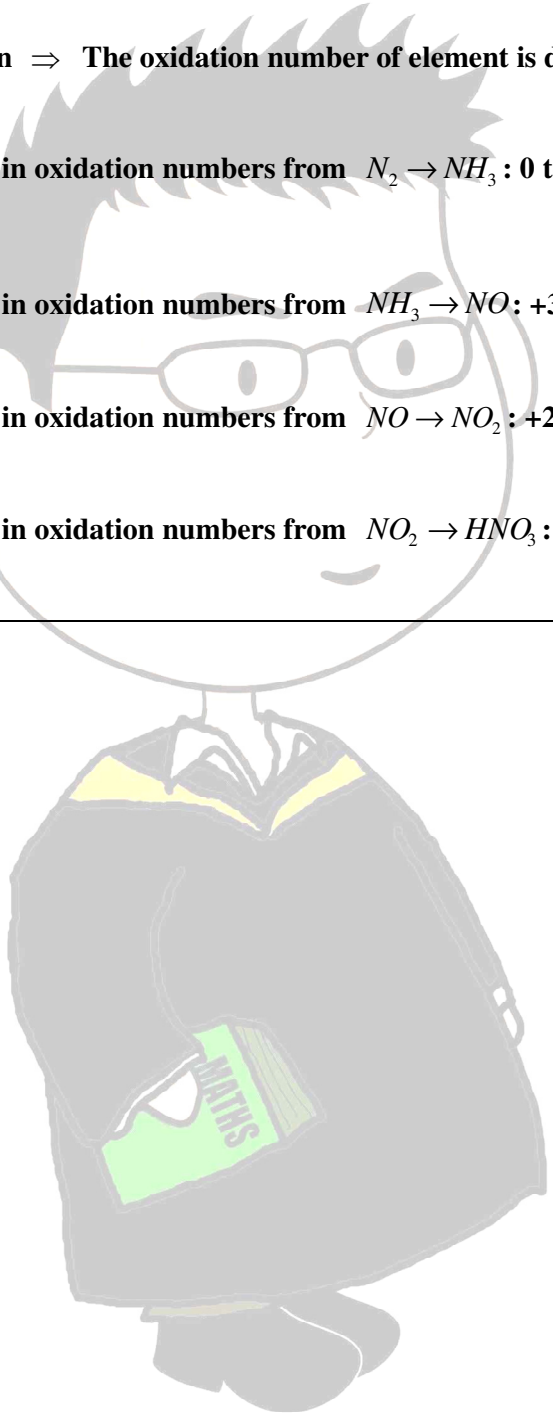
2.	**D**	**黎 Sir 提提你 :** ● **Pass steam over heated magnesium will give magnesium oxide and hydrogen gas. Chemical equation:** $Mg_{(s)} + H_2O_{(g)} \rightarrow MgO_{(s)} + H_{2(g)}$ ● **Heating mercury(II) oxide strongly will reduce it back to mercury and oxygen. Chemical equation:** $2HgO_{(s)} \rightarrow 2Hg_{(l)} + O_{2(g)}$ ● **Eletrolysis of dilute sulphuric acid will give hydrogen gas and oxygen gas as products at cathode and anode respectively. Chemical equation:** **Cathode:** $2H^+_{(aq)} + 2e \rightarrow H_{2(g)}$ **Anode:** $4OH^-_{(aq)} \rightarrow 2H_2O_{(l)} + O_{2(g)} + 4e$ ● **Fractional distillation of liquefied air will gives oxygen, nitrogen and argon as the main products.**

3.	**B**	**黎 Sir 提提你 :** ● $Q_3R_2 \Rightarrow Q^{2+} + R^{3-}$ ● **Q : 0+2 = 2 ⇒ Group II while R: 8 – 3 = 5 ⇒ Group V.**

4.	**D**	**黎 Sir 提提你 :** ● **Reactivity series of metals:** **K > Na > Ca > Mg > Al > Zn > Fe > Pb > Cu > Hg > Ag > Pt > Au** ● **The position of metal above copper (Cu) will react with dilute acid to give metal salts and hydrogen. Chemical equation for some reactions:** $Zn_{(s)} + H_2SO_{4(aq)} \rightarrow ZnSO_{4(aq)} + H_{2(g)}$ $Fe_{(s)} + 2HCl_{(aq)} \rightarrow FeCl_{2(aq)} + H_{2(g)}$ $Ca_{(s)} + 2HCl_{(aq)} \rightarrow CaCl_{2(aq)} + H_{2(g)}$ ● **Therefore, Copper (II) sulphate cannot be prepared from the reaction of a metal with a dilute acid because copper cannot react with dilute sulphuric acid.**

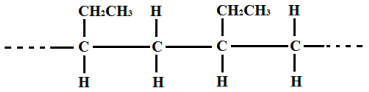
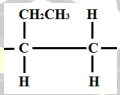
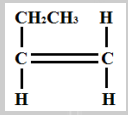
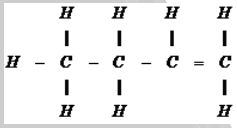
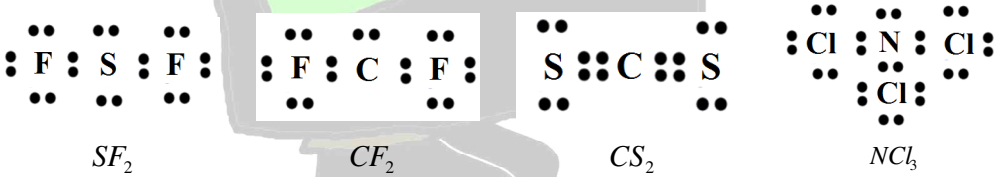
5.	C	黎 Sir 提提你 : ● Potassium hexacyanoferrate(III), $K_3Fe(CN)_{6(aq)}$, is a rust indicator. Oringal colour of $K_3Fe(CN)_{6(aq)}$: Yellow Colour of $K_3Fe(CN)_{6(aq)}$ with $Fe^{2+}{}_{(aq)}$ ions: Deep Blue ● Colour of Phenolphthlein: Colourless (pH: 0-8), Pink (pH: 8-10) and Red (pH: 10-14) ● When iron rust, iron loses 2 electrons to form iron(II) ion. Chemical equation: $Fe_{(s)} \rightarrow Fe^{2+}{}_{(aq)} + 2e$ ● The dissolved oxygen in water accepts the electrons and becomes hydroxide ion. Chemical equation: $2H_2O_{(l)} + O_{2(g)} + 4e \rightarrow 4OH^-{}_{(aq)}$ ● The rusting process is not finished, but it is nothing to do with solving this problem. ● Colour of $K_3Fe(CN)_{6(aq)}$ with $Fe^{2+}{}_{(aq)}$ ions: Deep Blue ● Colour of Phenolphthlein with $OH^-{}_{(aq)}$: Blue ● Original Colour of $K_3Fe(CN)_{6(aq)}$:Yellow

6.	**A**	**黎 Sir 提提你 :** ● **Reduction ⇒ The oxidation number of element is increasing.** ● **Oxidation ⇒ The oxidation number of element is decreasing.** ● **Changes in oxidation numbers from $N_2 \rightarrow NH_3$: 0 to -3 (Reduction!)** ● **Changes in oxidation numbers from $NH_3 \rightarrow NO$: +3 to +2 (Oxidation)** ● **Changes in oxidation numbers from $NO \rightarrow NO_2$: +2 to +4 (Oxidation)** ● **Changes in oxidation numbers from $NO_2 \rightarrow HNO_3$: +4 to +5 (Oxidation)**



7.	**B**	**黎 Sir 提提你 :** ● **Sacrificial protection: A more reactive metal will lose electron instead of the less reactive metal losing electron when they are connected to each other.** ● **Reactivity series of metals:** **K > Na > Ca > Mg > Al > Zn > Fe > Pb > Cu > Hg > Ag > Pt > Au** ● **Option (2), Iron hook will lose electrons instead of the copper board if they are connected to each other ⇒ Iron hook corrodes first.** ● **Option (1), Aluminium board will lose electrons instead of the iron hook if they are connected to each other ⇒ Aluminium corrodes first.** ● **Option (3), Aluminium board will lose electrons instead of the copper hook if they are connected to each other ⇒ Aluminium corrodes first.** ● **Option (4), Iron board will lose electrons instead of the copper hook if they are connected to each other ⇒ Iron board corrode first.**

8.	**D**	**黎 Sir 提提你 :** ● $25.0\,cm^3$ **of** $HCl_{(aq)}$ **⇒ Titration ⇒ must be very accurate! ⇒ Pipette** ● **Conical flask is preferred in titration than beaker** **⇒ Easier to mix contents by swirling and** **⇒ Prevent the solution from spilling out because liquid is splashed up on the sides of the flask will run down the angled walls of the flask back into the solution in the bottom.**

9.	**B**	**黎 Sir 提提你 :** ● **Balanced chemical equation:** $H_2SO_{4(aq)} + Ca(NO_3)_{2(aq)} \rightarrow CaSO_{4(s)} + 2HNO_{3(aq)}$ ● **Numbers of moles of calcium nitrate =** $1 \times \frac{10}{1000} = 0.01\ moles$ ● **Given** $H_2SO_{4(aq)}$ **is in excess, By balanced chemical equation and mole ratio,** ⇒ **Numbers of moles of calcium sulphate = 0.01 moles** ⇒ **Mass of calcium sulphate = 0.01 x (40.1 + 32.1 + 16 x 4) = 1.362 = 1.36 g**
10.	**B**	**黎 Sir 提提你 :** ● **Polymer:**  ⇒ **Repeating unit:**  ⇒ **Monomer:**  ⇒  ⇒ **But-1-ene**
11.	**B**	**黎 Sir 提提你 :**  SF_2 CF_2 CS_2 NCl_3

12.	**C**	**黎 Sir 提提你 :** ● **Neutralization: Acid + Base → Water + Salts** ● **Therefore, Option (3) is the only choice!** ● **Option (1), only calcium carbonate as salt, no water formed.** ● **Option (2), only ammonium bromide is formed, no water formed.** ● **Option (4), carbon dioxide is produced as products, which violate the rule that the product side of neutralization is water and salts only.**

13.	**C**	**黎 Sir 提提你 :** ● **Electrolysis of very dilute sodium chloride solution** ● **Cathode:** $2H^+_{(aq)} + 2e \rightarrow H_{2(g)}$ $\Rightarrow$ $[H^+_{(aq)}]\downarrow < [OH^-_{(aq)}]$ $\Rightarrow$ **Solutions around electrode X become alkaline** $\Rightarrow$ **Litmus indicator turns blue around carbon electrode X** ● **Anode:** $4OH^-_{(aq)} \rightarrow 2H_2O_{(l)} + O_{2(g)} + 4e$ $\Rightarrow$ $[OH^-_{(aq)}]\downarrow > [H^+_{(aq)}]$ $\Rightarrow$ **Solutions around electrode Y become acidic** $\Rightarrow$ **Litmus indicator turns red around carbon electrode Y**

14.	**A**	**黎 Sir 提提你 :** ● **Reactivity series of metals:** **K > Na > Ca > Mg > Al > Zn > Fe > Pb > Cu > Hg > Ag > Pt > Au** ● **Heating oxide of W gives metal W** ⇒ **Reactivity: Metal W is less reactive than Copper** ● **Heating metal X in steam gives a colourless gas** ⇒ **Reactivity: Metal X is more reactive than Lead** ● **Putting metal Y in $CH_3CO_2H_{(aq)}$ gives a colourless gas** ⇒ **Reactivity: Metal Y is more reactive than Copper** ● **Putting metal Z in $CuSO_{4(aq)}$ gives a reddish-brown solid** ⇒ **Reactivity: Metal Z is more reactive than Copper**

15.	**A**	**黎 Sir 提提你 :** ● **Atom: The simplest part of an element, without net charge** ● **Mass of the atom is mainly distributed in the center of the atom called nucleus.** ● **Not all atoms consist of neutron. For example, Hydrogen-1 atom has only 1 proton and 1 electron, no neutron.** ● **For all elements, atoms of the same element have the same atomic numbers, i.e. same numbers of protons.**

16.	**D**	**黎 Sir 提提你 :** ● **Chemical cells: Acidified potassium dichromate and iron(II) sulphate** ● **Cathode:** $Cr_2O_7^{2-}{}_{(aq)} + 14H^+{}_{(aq)} + 6e \rightarrow 2Cr^{3+}{}_{(aq)} + 7H_2O_{(l)}$ ● **Anode:** $6Fe^{2+}{}_{(aq)} \rightarrow 6Fe^{3+}{}_{(aq)} + 6e$ ● **Overall equation:** $Cr_2O_7^{2-}{}_{(aq)} + 14H^+{}_{(aq)} + 6Fe^{2+}{}_{(aq)} \rightarrow 2Cr^{3+}{}_{(aq)} + 7H_2O_{(l)} + 6Fe^{3+}{}_{(aq)}$ ● $[K_2Cr_2O_{7(aq)}]\downarrow$ **by 0.5 – 0.47 = 0.03 M** $\Rightarrow$ $[Cr_2O_7^{2-}{}_{(aq)}]\downarrow$ **by 0.03 M** ● **Numbers of moles of** $Cr_2O_7^{2-}{}_{(aq)}$ **reacted = 0.03 x 100 / 1000 = 0.003 moles** ● **Numbers of moles of** $Fe^{2+}{}_{(aq)}$ **reacted = 0.003 x 6 = 0.018 moles** ● **Concentration of** $FeSO_{4(aq)}$ **= 0.50 – 0.018 / (100 / 1000) = 0.32 M**
17.	**A**	**黎 Sir 提提你 :** ● **Balanced chemical equation:** $4KI_{(aq)} + 2CO_{2(g)} + O_{2(g)} \rightarrow 2K_2CO_{3(aq)} + 2I_{2(aq)}$ ● **The oxidation number of iodine in** $I^-{}_{(aq)}$ **and** $I_{2(aq)}$ **is -1 and 0 and the oxidation number of oxygen in** $O_{2(g)}$ **and** $CO_3^{2-}{}_{(aq)}$ **is 0 and -2. Therefore, Iodide ions in** $KI_{(aq)}$ **is oxidized by oxygen.** ● **The oxidation number of oxygen in** $CO_{2(g)}$ **and** $CO_3^{2-}{}_{(aq)}$ **are both -2. Therefore, Iodide ions in** $KI_{(aq)}$ **is not oxidized by oxygen in** $CO_{2(g)}$**.** ● $K_2CO_{3(aq)}$ **is colourless and** $I_{2(aq)}$ **is yellow in colour.**

18.	**C**	**黎 Sir 提提你 :** ● **Option (1):** $2H_2O_{(l)} \rightarrow 2H_{2(g)} + O_{2(g)}$ **Heat is absorbed to change the water from liquid state to hydrogen and oxygen in gasesous state $\Rightarrow$ Endothermic reaction $\Rightarrow$ $\Delta H > 0$** ● **Option (2):** $2CO_{(g)} + O_{2(g)} \rightarrow 2CO_{2(g)}$ **Heat is released because it is combustion of carbon monoxide in oxygen $\Rightarrow$ Exthothermic reaction $\Rightarrow$ $\Delta H < 0$** ● **Option (2):** $2Na_{(s)} + 2H_2O_{(l)} \rightarrow 2NaOH_{(aq)} + H_{2(g)}$ **Heat is released because it is reaction of metal with water $\Rightarrow$ Exthothermic reaction $\Rightarrow$ $\Delta H < 0$**

19.	**B**	**黎 Sir 提提你 :** ● **Pent-1-ene + Water + [O] → Pentane-1,2-diol** **Purple in colour Colourless** **[O]: From oxidizing agent $KMnO_{4(aq)}$** ● **Pent-2-ene + Water + [O] → Pentane-2,3-diol** **Purple in colour Colourless** **[O]: From oxidizing agent $KMnO_{4(aq)}/H^+$** ● **Therefore, Pent-1-ene and Pent-2-ene cannot be distinguished by using acidified $KMnO_{4(aq)}$** ● **Cyclohexane does not have reaction with acidified $KMnO_{4(aq)}$ while cyclohexene reacts with acidified $KMnO_{4(aq)}$ to form colourless solution.** ● **Polyethene and polychlroethene are plastics and they are inert. Therefore, both of them do not have reaction with acidified $KMnO_{4(aq)}$. Therefore, They cannot be distinguished by using acidified $KMnO_{4(aq)}$.**

20. **B**

黎 Sir 提提你 :

- **Cracking: Large molecule is broken down into smaller molecules in the absence of air.**
- **Experiment: Very long alkane $\xrightarrow{\text{unglazed porcelain}}$ Long alkane + Short alkene**
- **For example, Octane $\xrightarrow{\text{unglazed porcelain}}$ Hexane + ethene or**

  Octane $\xrightarrow{\text{unglazed porcelain}}$ Pentane + propene
- **The exact products of cracking cannot be predicted this is because the point of fracture of reactant alkane depends on vigorous vibration.**
- **However, there is no carbon dioxide produced. Therefore, limewater will not turns milky.**
- **The aqueous bromine solution changes from brown to colourless because the short alkenes produced in cracking will react with bromine to form Dibromoalkanes which are colourless.**
- **The flame will not be brick red in colour because there is no Calcium ions formed during cracking.**

21. **D**

黎 Sir 提提你 :

- **Calcium granules are put in cold water, calcium hydroxide prepcipitate (slightly soluble in water only) and hydrogen gas is formed. Moreover, it is an exothermic reaction.**
- **Balanced chemical equation:** $Ca_{(s)} + 2H_2O_{(l)} \rightarrow Ca(OH)_{2(s)} + H_{2(g)}$, $\Delta H < 0$
- **Therefore, cloudy mixture is formed, the test tube becomes warm and colourless gas bubbles are formed.**

22.	**C**	**黎 Sir 提提你 :** ● **Renewable energy sources: The rate of consumption of energy is less than the rate of production of energy** ● **Nuclear energy is NOT renewable energy since the rate of producing radioactive sources is less than the rate of consumption of radioactive sources.** ● **Tidal energy is renewable energy since it is due to the gravitational effect of the Sun and the Moon on the Earth, which lead to a cyclical movement of the seas. However, the life of the Sun should be longer than that of the Earth according to recent scientists' research. Therefore, whenever the Sun and the Moon exists, there will be tides and so tidal energy.** ● **Biomass is biological material derived from living or recently living organisms. And up to this moment, Biomass is not a popular energy sources so since the rate of producing Biomass is less than the rate of consumption of radioactive sources.**

23. **D**

黎 Sir 提提你 :

- **Limestone powder: Calcium Carbonate ($CaCO_{3(s)}$)**
- **Table salt: Sodium Chloride ($NaCl_{(s)}$)**
- **Adding water:**

  Calcium carbonate insoluble in water $\Rightarrow$ White precipitate!
  Sodium chloride soluble in water $\Rightarrow$ It dissolves, colourless solution formed

- **Performing a flame test:**

  Calcium ion in limestone $\Rightarrow$ Brick red flame!
  Sodium ion in table salts $\Rightarrow$ Golden yellow flame!

- **Adding dilute hydrochloric acid:**

  Calcium carbonate reacts with dilute hydrochloric acid to form calcium chloride solution (Colourless), carbon dioxide and water, warmer.

  Balanced chemical equation: $CaCO_{3(s)} + 2HCl_{(aq)} \rightarrow CaCl_{2(aq)} + H_2O_{(l)} + CO_{2(g)}, \Delta H < 0$

  Sodium chloride dissolves in dilute hydrochloric acid and solution remains colourless

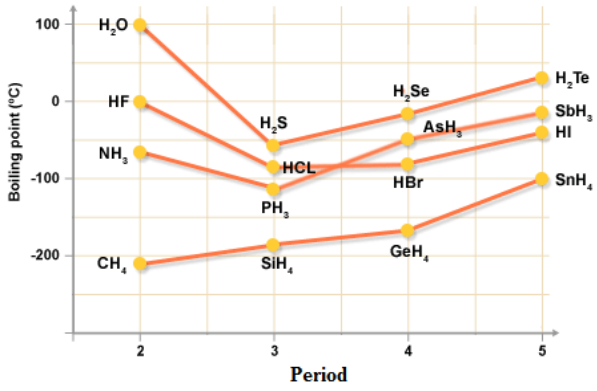
- **Summary table for the results of 3 tests:**

	Limestone Observation	Table salt Observation	Distinguish?
Adding Water	White precipitates	Disappears, Colourless solution	Yes
Flame test	Brick Red flame	Golden yellow flame	Yes
Adding dilute $HCl_{(aq)}$	Colourless gas bubbles formed, warmer	Disappears, Colourless solution	Yes

24. **C**

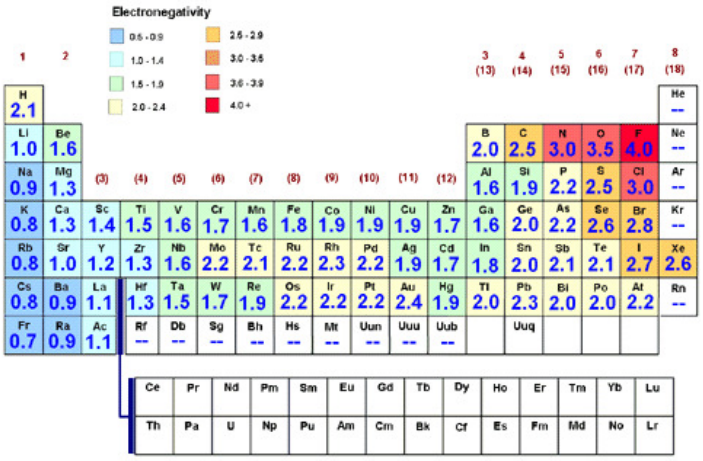
黎 Sir 提提你 :

- **With reference to the graph below, the boiling point of H_2O is higher than that of HF.**



Trend of Boiling points of elements in period 2, 3, 4 and 5 in a periodic table

- **With reference to the table below, the electronegativity of oxygen (3.5) is lower than that of fluorine (4.0).**



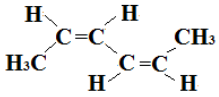
Electronegativity of elements in a periodic table

25.	**B**	**黎 Sir 提提你 :** ● **For Group VII elements down the group,** ⇒ **Numbers of electron shells ↑** ⇒ **Atomic size ↑** ⇒ **Molecular size ↑** ⇒ **Intermolecular forces / van der waals' forces ↑** ⇒ **Energy needed to overcome the attractive forces ↑** ⇒ **Boiling point of group VII elements down the group ↑** ● **For Group I elements down the group,** ⇒ **Numbers of electron shells ↑** ⇒ **Distance between the nucleus and the electrons in outermost shell ↑** ⇒ **Attractive force between the nucleus and the electrons ↓** ⇒ **Melting point of group 1 element down the group ↓** ● **The elements are arranged in the order of increasing atomic numbers or increasing numbers of protons, not the increasing atomic mass.** ● **The electrical conductivity of the third period elements decreases from left to right since the arrangement is metals, semi-metals and non-metals from left to right in the 3rd period.**

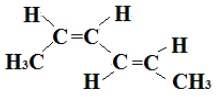
26. **C**

黎 Sir 提提你 :

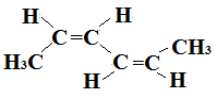
- **Steroisomers: They have their constituent atoms joined in the same order but differ in the way these atoms are arranged in space.**
- **Geometrical isomers are stereoisomers that have different arrangements of their atoms in space due to restricted rotation about a covalent bond.**
- **There are FOUR combinations of isomers when twisting the two double bonds of $H_3C\text{-}CH{=}CH\text{-}CH{=}CH\text{-}CH_3$ as follows: (Did you learn permutation and combinations in mathematics compulsory parts? 2 x 2 = 4)**



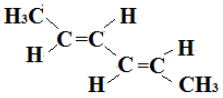
Combination (1)



Combination (2)



Combination (3)



Combination (4)

- **However, if you inspect the four combinations carefully, you will find that combination (1) and combination (3) are only inverted arranged, but the structure are exactly the same.**
- **Therefore, $H_3C\text{-}CH{=}CH\text{-}CH{=}CH\text{-}CH_3$ have 3 geometrical isomers only.**

27. **A**

黎 Sir 提提你 :

- **Balanced chemical equation:** $2XY_{2(g)} \Leftrightarrow X_{2(g)} + 2Y_{2(g)}$, $K_c = 0.60\ mol\ dm^{-3}$
- **Equilibrium constant, Kc =** $\frac{[X_2][Y_2]^2}{[XY_2]^2} = \frac{(\frac{n}{10})(\frac{2}{10})^2}{(\frac{1}{10})^2} = 0.6$ **, by solving, n = 1.5**

28. D

黎 Sir 提提你 :

- **Power form ⇒ Surface area ↑ ⇒ Rate of reaction rate ↑**
  Therefore, option (B) and option (C) is not possible.

- **Concentration of reactants ↑**

  ⇒ Chances of effective collisions ↑

  ⇒ Rate of reaction rate ↑

- **Balanced chemical equation:** $Zn_{(s)} + 2HCl_{(aq)} \rightarrow ZnCl_{2(aq)} + H_{2(g)}$

  Balanced ionic equation: $Zn_{(s)} + 2H^{+}_{(aq)} \rightarrow Zn^{2+}_{(aq)} + H_{2(g)}$

  For option (A), The concentration $H^{+}_{(aq)}$ **in** $HCl_{(aq)}$

  = 1 x 100/1000 = 0.1 M

- **Balanced chemical equation:** $Zn_{(s)} + H_2SO_{4(aq)} \rightarrow ZnSO_{4(aq)} + H_{2(g)}$

  Balanced ionic equation: $Zn_{(s)} + 2H^{+}_{(aq)} \rightarrow Zn^{2+}_{(aq)} + H_{2(g)}$

  For option (D), The concentration $H^{+}_{(aq)}$ **in** $H_2SO_{4(aq)}$

  = 2 x 1 x 100/1000 = 0.2 M

- **Therefore, the answer is option (D).**

Remarks:

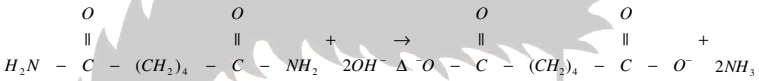
- **Remember that you have to find out the "actual" reactants of the reaction. For this reaction, hydrogen ions are the "actual reactants", not the hydrochloric acid and sulphuric acid.**

29. **C**

黎 Sir 提提你 :

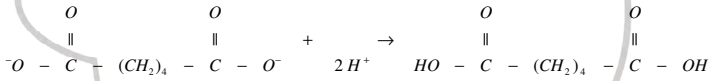
- **Alkaline hydrolysis of Amides: Amide is heated under reflux with sodium hydroxide solution, it is hydrolysed to give carboxylate ion and ammonia.**

  Balanced chemical equation:



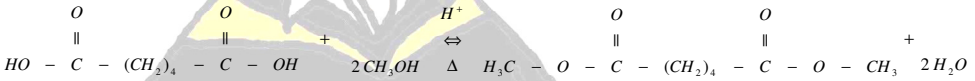
- **Recovery of carboxylic acid: Adding dilute mineral acid (e.g. dilute sulphuric acid) to the carboxylate ion, carboxylic acid can be recovered.**

  Balanced chemical equation:



- **Esterification: Mixture of carboxylic acid and alcohol is heated with the presence of an acid catalyst (e.g. conc. sulphuric acid), an ester is formed.**

  Balanced chemical equation:

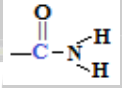
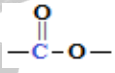
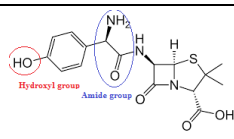


- **Regents : Sodium hydroxide, (dilute and conc.) Sulphuric acid and methanol**

30. **D**

黎 Sir 提提你 :

- **Different functional groups are stated below:**

Hydroxyl group	Amide group	Ester group	Amoxicillin
-OH			

- **Therefore, hydroxyl group and amide group can be found in amoxicillin.**

31.	**B**	**黎 Sir 提提你 :** ● **In a closed container and at a certain temperature, the following equilibrium was attained:** $COCl_{2(g)} \Leftrightarrow CO_{(g)} + Cl_{2(g)}$ ● **Chemical equilibrium is also called dynamic equilibrium, which means the rate of forward reaction is equal to the rate of backward reaction. Therefore, option (2) is correct.** ● **From the equilibrium attained, since we do not know the initial condition of the reaction, we are not sure if the concentration of** $CO_{(g)}$ **and** $Cl_{2(g)}$ **are the same or not. Therefore, option (1) is not correct.** ● **The equilibrium constant, Kc, will only changes if the temperature of the reaction changes. It is independent of the changes in volume, pressure, concentration or numbers of moles of reactants or products. Therefore, option (3) is not correct.**
32.	**A**	**黎 Sir 提提你 :** ● **Oxidation of secondary alcohols by acidified potassium dichromate solution will form ketone.** ● **For option (1), it is secondary alcohol.** ● **For option (2), it is primary alcohol.** ● **For option (3), it is tertiary alcohol.**

33. * N/A

黎 Sir 提提你 :

- **The balanced chemical equation of a equilibrium reaction system in a closed container of fixed volume is stated below:**

  $CO_{(g)} + H_2O_{(g)} \Leftrightarrow CO_{2(g)} + H_{2(g)}$, $\Delta H < 0$

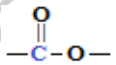
- $\Delta H < 0$ **$\Rightarrow$ Forward reaction: Exothermic / Backward reaction: Endothermic**
- **Adding** $CO_{(g)}$ **$\Rightarrow$ Equilibrium shift right $\Rightarrow$ Rate of formation of** $H_{2(g)}$ **$\uparrow$**
- **Adding a suitable catalysts**
  $\Rightarrow$ Speed up both forward and backward reaction rate
  $\Rightarrow$ Time required to attain equilibrium $\downarrow$
  $\Rightarrow$ Rate of formation of $H_{2(g)}$ **$\uparrow$**

  However, if the reaction is already attained equilibrium,
  $\Rightarrow$ Rate of forward reaction = Rate of backward reaction
  $\Rightarrow$ Net rate of formation of $H_{2(g)}$ **remains unchanged**

- **Temperature $\uparrow$**
  $\Rightarrow$ Average Kinetic energy of molecules $\uparrow$
  $\Rightarrow$ Both rate of forward and backward reaction rate $\uparrow$
  $\Rightarrow$ Time required to attain equilibrium $\downarrow$
  $\Rightarrow$ Rate of formation of $H_{2(g)}$ **$\uparrow$**

  However, Forward reaction is exothermic,
  $\Rightarrow$ Equilibrium shift left to absorb the heat
  $\Rightarrow$ Net rate of formation of $H_{2(g)}$ **$\downarrow$**

- **Now, One problem arises, increasing "rate" or "Net rate" of formation of** $H_{2(g)}$ **should be considered? If considering rate of formation of** $H_{2(g)}$**, both (1), (2) and (3) are the answers but there is no choice for it. If considering "Net rate" of formation of** $H_{2(g)}$**, only option (1) would be the answer and so the answer is A. However, is "net rate" is the same meaning of "rate" stated in the question? In conclusion, this question may be deleted finally.**

34.	**C**	**黎 Sir 提提你 :** ● **Conditions to form hydrogen bonds:** **One molecule has an hydrogen atom attached to a highly electronegative atom which are Fluorine, Oxygen or Nitrogen and the other molecule has an fluorine, oxygen or nitrogen atom with lone pair of electrons.** ● **In the polymer stated in the question, no hydrogen atom attached to Nitrogen, Oxygen or Fluorine ⇒ No hydrogen bond formed!** ● **There are ester bond**  **in the polymer** **⇒ undergo acid hydrolysis or alkaline hydrolysis** **⇒ Polymer chains can be broken in the presence of dilute hydrochloric acid (acid hydrolysis) and in the presence of dilute sodium hydroxide solution (alkaline hydrolysis).**

35.	**B**	**黎 Sir 提提你 :** ● **Chemical structure of silicon: Giant covalent structure** ⇒ **Each silicon atom forms 4 covalent bonds with other silicon atoms to form a giant network of strong covalent bonds** ⇒ **Large amount of energy is needed to break the giant network of strong covalent bonds.** ⇒ **Melting point is very high (About 1414 ^oC)** ● **Chemical structure of aluminium: Giant metallic structure** ⇒ **Each aluminium atom have 3 electrons in the outermost shell and those 3 electrons will move randomly around the metal surface become delocalized electrons** ⇒ **The large amount of delocalized electrons will form a electron cloud / sea of electrons to surround the positive-charged nucleus at the center.** ⇒ **Large electrostatic attractive forces between positive-charged nucleus and electron cloud / sea of electrons** ⇒ **Large amount of energy is needed to break the giant network of strong covalent bonds.** ⇒ **Melting point is also high (About 660 ^oC)** ● **Number of electrons in a silicon atom = 14** ● **Number of electrons in an aluminium atom = 13**
36.	**C**	**黎 Sir 提提你 :** ● **Molar volume is the volume of 1 mole of gas at specific temperature and pressure, which is the same for all kind of gas according to Avogadro's law.** ● **Number of atoms constituting 1 mole of $SO_{2(g)}$ = $1\times3\times6.02\times10^{23}=1.806\times10^{24}$** ● **Number of atoms constituting 1 mole of $N_{2(g)}$ = $1\times2\times6.02\times10^{23}=1.204\times10^{24}$**

The end.

黎 sir 簡介 Andy Lai BEng CUHK, MIEEE

5 ★★ Physics Economics

- ✧ 畢業於香港中文大學電子工程學系，黎 sir 教室創辦人之一.
- ✧ 超過 15 年教授中學文憑 / IB Diploma / GCE / HSC / SAT / AP / GCSE / IGCSE / IB MYP 課程經驗.
- ✧ 為了與學生一起面對中學文憑試, 黎 sir 親身上陣, 以實力於物理科及經濟科奪取 5**, 證明寶刀未老.
- ✧ 熟悉出題趨勢，教授考試取分技巧；鼓勵同學獨立思考，增強同學理解能力.
- ✧ 善用生活化例子講解，教法生動，增加學習趣味；深入淺出，明白學生學習上的困難和需要.
- ✧ 精心編制筆記，適合中文和英文中學學生就讀；精心編制練習和試題，協助同學盡快掌握答題技巧.
- ✧ 黎 sir 在中學和大學時代已是一名傑出學生，曾獲取的多項學業上和運動上的獎學金及獎項.
- ✧ 曾代表香港參加國際性運動比賽，取得優異成績，又讀得又玩得，絕不是死讀書的書呆子.
- ✧ 任教科目：所有數學科，物理科，化學科，生物科，經濟科，商業科.

黎 sir 教室學生佳績: Excellent Results

- ✧ 首屆香港中學文憑 (HKDSE)，多位學生取得 5/5*/5**級以上佳績. 更有學生考獲 5 科 5**級 2 科 5*級 1 科 5 級優異成績，在全港 72620 考生中，排名 28，入讀港大醫學院.
- ✧ 英國高考 (GCE AS/AL)，多位學生取得 A*/A 最高級別，更有學生考獲 5 科 A*.
- ✧ 國際文憑 (IB Diploma)，多位學生取得 6 / 7 級別，更有學生取得總分 40 分以上.
- ✧ 英國會考 (IGCSE / GCSE)，多位學生取得 A / A*成績，更有學生取得 8 科 A*。
- ✧ 加拿大大學預科 (CESI) 數學課程 MCV4U，取得 98 / 100, 99 / 100 成績。
- ✧ 學生成功拔尖 (EAS)，提早入讀港大理學院和中大法律學院.
- ✧ 香港中學會考 (HKCEE)，多位學生取得 20 分以上佳績.
- ✧ 保加利亞國際數學競賽 (BIMC 2013) 隊際賽金牌.
- ✧ 奧數華夏杯/港澳杯/華杯，多位學生取得特等獎/金獎/一等獎/全港第二名.
- ✧ 還有更多，恕不能盡錄，詳情請瀏覽以下網址: www.andylai.hk/result.htm

黎 sir 教室課程特色:

- ✧ 小組教學 (1 – 6 人)，導師親身教學；照顧每位學生需要，事半功倍.
- ✧ 精心編制筆記，練習以近 30 年本地和外國公開試題為藍本.
- ✧ 概念理解，取分技巧並重；協助同學盡快掌握答題技巧.
- ✧ 歡迎自由組合小組上課，時間及課程內容編排更有彈性.
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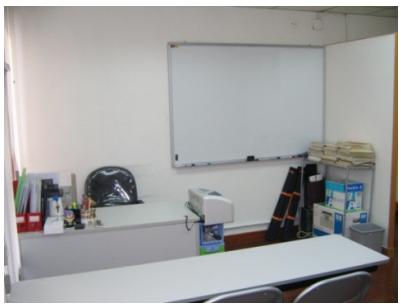

黎 sir 教室 A Lai Learning Center

HKDSE / IB Diploma / GCE AS AL / AP / SAT / HSC

IGCSE / GCSE / IB MYP / KS3 / MO / F.1 – F.6 / Y9 – Y13

資深中學補習導師 小組補習 事半功倍!!!

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- ✧ 現於黎 sir 教室任教補習班，學生就讀於英文中學，中文中學，國際學校及英國留學生.
- ✧ 熟悉近年出題趨勢，教授考試取分技巧；鼓勵同學獨立思考，增強同學理解能力
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- ✧ 黎 sir 在就讀大學時曾於全球最大美資電腦公司任實習生超過一年，大學畢業後旋即於全港大型英資電腦公司，負責主理該公司所代理的全球大型美資電腦公司儲存系統銷售業務.
- ✧ 於短短半年內將該產品線銷售業績提升超過 50%. 同時更被公司評選為"傑出表現員工 Outstanding Performer"，成功將書本上的知識靈活運用於工作上.
- ✧ 黎 sir 為了教學理想，毅然辭去工作，全身投入教學事業，希望將自己的一套學習方法教授學生

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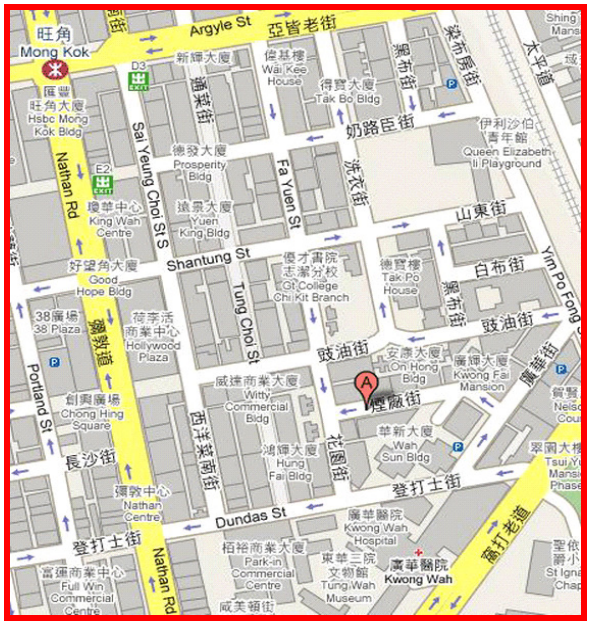

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小巴: 21K, 74, 74S

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