Chem!stry

Name: …… **( )**

Class: ……

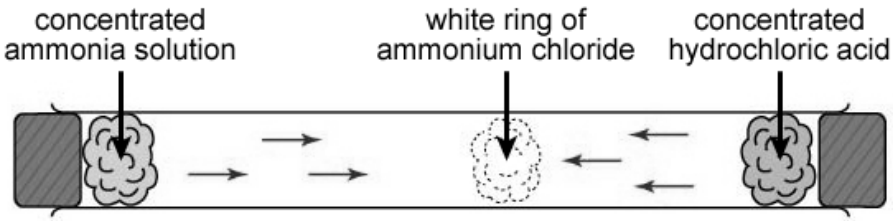
Date: …… **/** …… **/** ……

Revision Questions for the Secondary One End-of-Year Examination

1. The hottest planet, Venus, has a minimum surface temperature of −220°C and maximum surface temperature of +420°C. Which of the following chemicals will **not** show a change of state on Venus when the surface temperature changes from minimum to maximum?

	Chemical	Melting Point / °C	Boiling Point / °C
A	water	0	100
B	sodium chloride	801	1413
C	carbon dioxide	–78	–57
D	oxygen	–219	–183

2. In an experiment, pieces of cotton wool soaked in concentrated ammonia solution and concentrated hydrochloric acid were placed at separate ends of a glass tube as shown in the diagram below. The apparatus were maintained at room temperature of 25 °C. A white ring of ammonium chloride was formed nearer to the cotton wool soaked in concentrated hydrochloric acid.



The experiment was repeated in an air conditioned room at a temperature of 16°C.
Which one of the following is likely to happen?

A The ring of ammonium chloride is not formed.

B The ring of ammonium chloride takes a longer time to be formed.

C The ring of ammonium chloride is formed at the centre of the glass tube.

D The ring of ammonium chloride is formed closer to the cotton wool soaked in the aqueous ammonia solution.

3. Which of the following statements about elements, compounds and mixtures are true?

1. Elements and compounds have fixed melting points.
2. The properties of a compound are similar to those of its elements.
3. A mixture can be separated into its compounds by physical means.
4. Elements can exist either in the form of atoms or molecules.

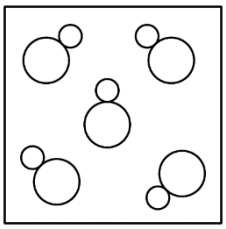
A 1 and 2 only
B 1 and 3 only
C 1, 3 and 4 only
D 1, 2, 3 and 4

4. Which of the following lists consists of compounds only?

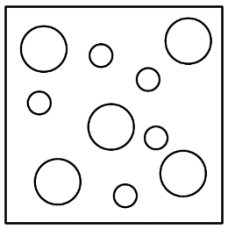
A ammonia, air and sodium chloride
B copper(II) sulfate, oxygen and iron
C steel, sodium chloride and copper(II) sulfate
D water, carbon dioxide and sodium chloride

5. In the diagrams below, circles of different sizes represent atoms of different elements.
Which diagram represents hydrogen chloride gas?

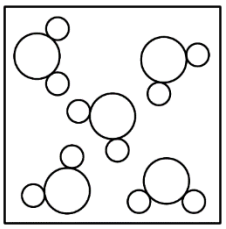
A



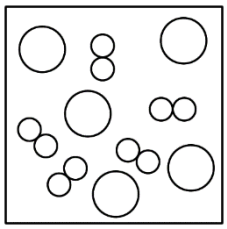
B



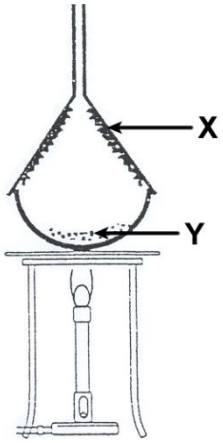
C



D



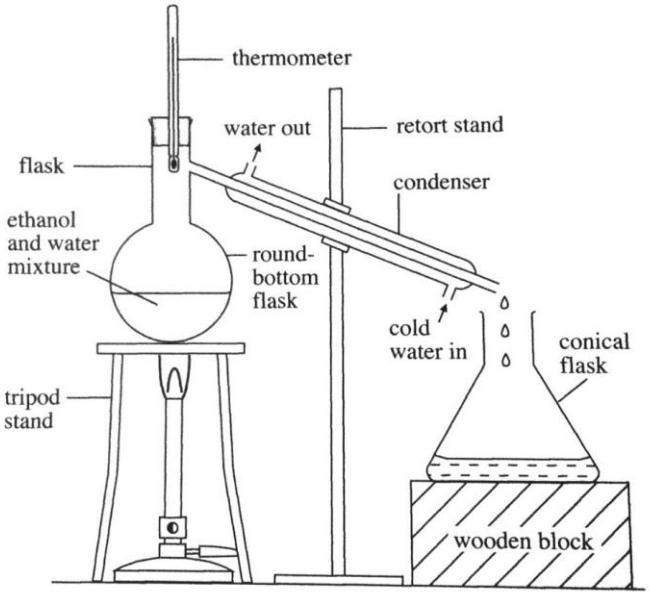
6. A mixture consisting of substances **X** and **Y** was separated using the apparatus shown below.



Which of the following mixtures is best separated by this method.

	X	Y
A	iodine	sugar
B	solid carbon dioxide	iodine
C	iodine	sodium chloride
D	ammonium chloride	iodine

7. A student intends to separate a mixture of ethanol and water using the following apparatus.



Ethanol has a boiling point of 78°C and water has a boiling point of 100°C. She found that the liquid collected in the conical flask boils between 82°C to 98°C. She decided to make some changes and repeat the experiment. What change should she make to the experiment?

A Increase the rate of heating.

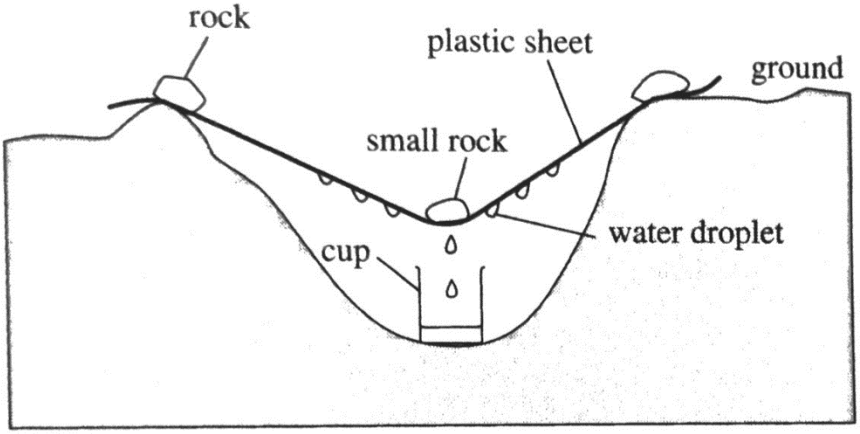
B Change the direction in which water enters the condenser.

C Add some porcelain chips to the liquid mixture in the distillation flask.

D Change the set-up to include a fractionating column.

8. A desert survival kit often contains a plastic sheet and a cup to be used for collecting water at times when drinking water is scarce.

The technique involves digging a hole in the ground and securing the plastic sheet over it. A small rock is placed in the middle of the sheet to weigh it down as shown.

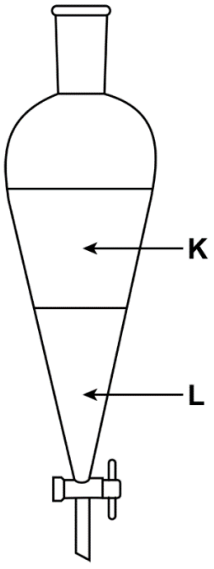


After a few hours, moisture from the ground collects on the underside of the sheet, trickles down the sloped sides and drips into the cup.

Which of the following is the technique used to obtain water in the cup?

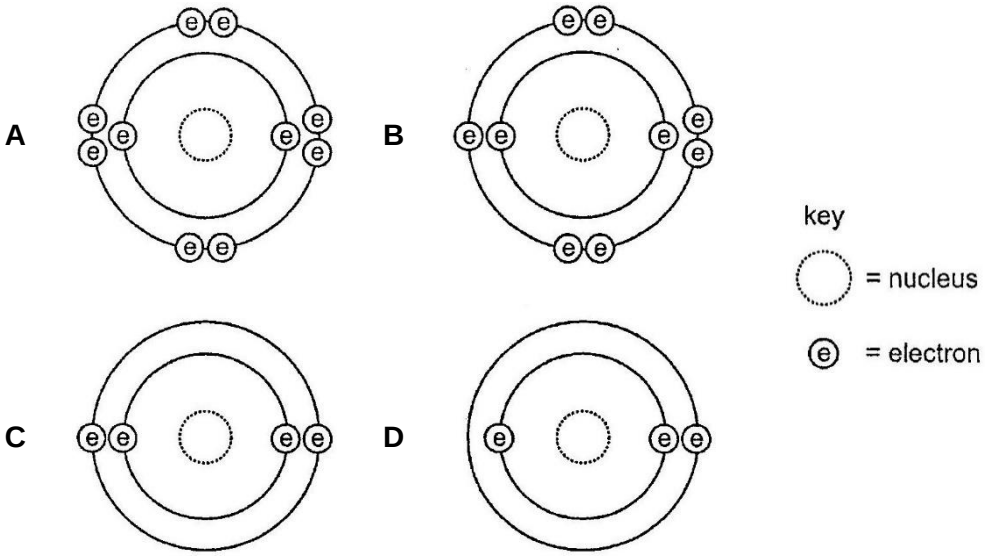
A Distillation
B Dissolving
C Evaporation
D Filtration

9. Which of the following correctly describes the properties of liquids **K** and **L**?

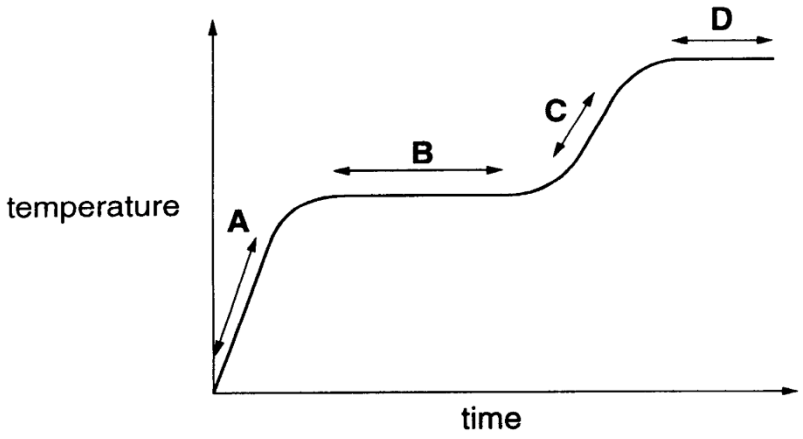


A Liquid **K** is miscible with liquid **L**.
B Liquid **K** is immiscible with liquid **L**.
C Liquid **K** has a higher boiling point than liquid **L**.
D Liquid **K** has a lower boiling point than liquid **L**.

10. The diagram below shows the electronic configuration of four atoms. Which atom is chemically unreactive?



11. The following graph shows the temperature of a solid as it is heated at a constant rate. Which region contains molecules of the substance in **both** the solid and liquid states?

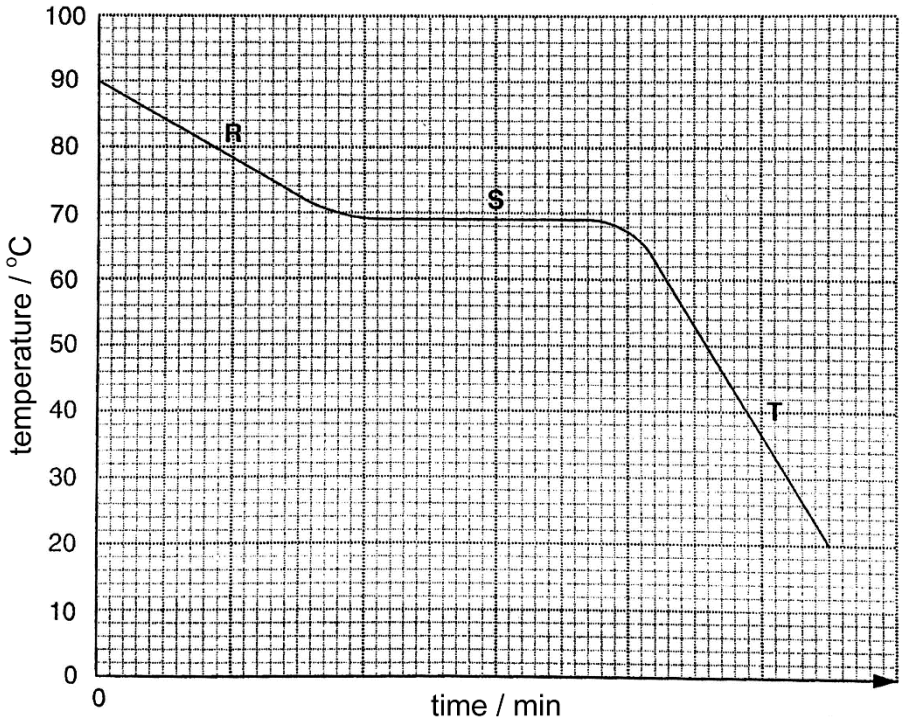


12. Which of the following are **typical** properties of metallic elements?

1. Malleable.
2. Low melting points.
3. Less dense than water.
4. Good conductors of electricity.

A 1 and 3 only
B 1 and 4 only
C 2 and 3 only
D 2, 3 and 4 only

13. A sample of solid stearic acid is heated above 90°C so that it melts. The graph shows the results obtained when this melted stearic acid cools to 20°C.



(a) What is the freezing point of stearic acid? [1]

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(b) Describe the arrangement and movement of particles in section **T** of the graph. [2]

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(c) Based on the graph, state if the stearic acid used is pure or impure. Explain your answer. [2]

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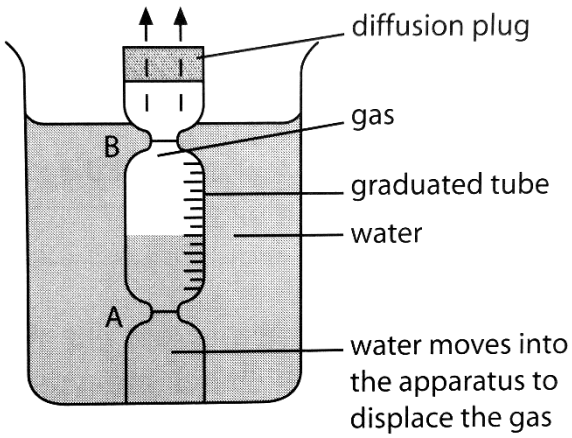
[Total = 5 marks]

14. The apparatus shown below is used for measuring the rates of diffusion of gases.



The table below shows the time taken for various gases to diffuse from the apparatus.

Name and chemical formula of gas	**Time taken for 100 cm^3 of the gas to diffuse from the apparatus at r.t.p.* / s**
Methane, CH_4	100
Chlorine, Cl_2	211
Carbon monoxide, CO	132
Nitrogen, N_2	132
Oxygen, O_2	141

*r.t.p. = room temperature and pressure.

(a) From the table, identify the gas that diffuses the fastest. [1]

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(b) Both carbon monoxide and nitrogen diffused at the same rate. Explain why. [2]

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(c) Using the concept of diffusion, explain the gaseous exchange of carbon dioxide and oxygen in the leaves of plants during photosynthesis. [2]

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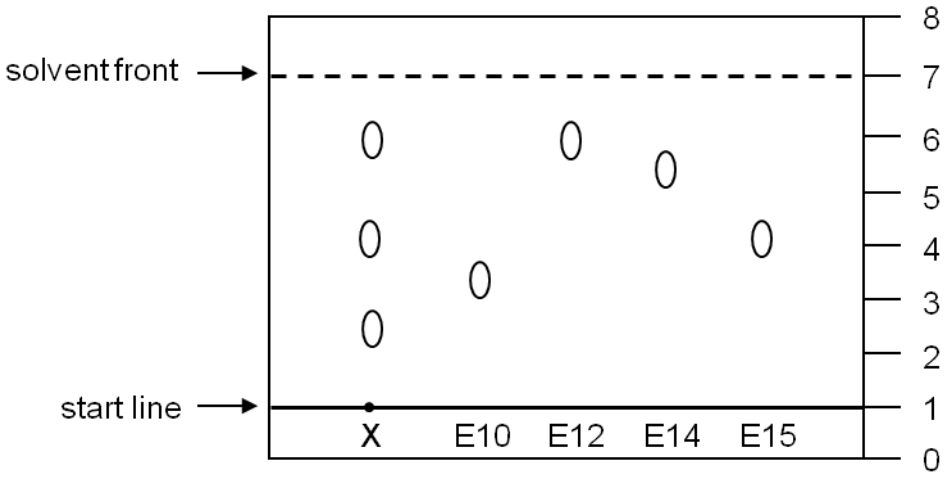
[Total = 5 marks]

15. A batch of candies was suspected to contain a banned food dye. A sample, **X**, of the candy, was dissolved in water and a chromatography was run with the resulting solution. The solutions of four known food dyes (E10, E12, E14 and E15) were also run together with sample **X**.

Dyes with the number codes E10, E14 and E15 are permitted for use by the Health Science Authority. E12 is banned. The diagram below shows the chromatogram obtained.



(a) Identify the food dye(s) present in the candy. [1]

……...

(b) Calculate the R_f value of the banned food dye, E12. Give your answer to two decimal places. [1]

(c) Explain why dye E12 moves further up the filter paper than dye E10. [1]

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(d) The label on the candy wrapper states that a total of four food dyes are used to manufacture the candy. Suggest a reason why only three spots are observed on the chromatogram of sample **X**. [1]

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(e) Why must the start line be drawn in pencil? [1]

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[Total = 5 marks]

- Scan the QR code below for the answers to this assignment.

http://www.nygh.sg/miscellaneous/sec_1_chem/sec_1_chem_ans.pdf

The Periodic Table of the Elements

Group I	Group II											Group III	Group IV	Group V	Group VI	Group VII	Group 0
							1 H hydrogen 1										4 He helium 2
7 Li lithium 3	9 Be beryllium 4											11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
23 Na sodium 11	24 Mg magnesium 12											27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18
39 K potassium 19	40 Ca calcium 20	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	64 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36
85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	– Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
133 Cs caesium 55	137 Ba barium 56	139 La lanthanum 57 *	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	– Po polonium 84	– At astatine 85	– Rn radon 86
– Fr francium 87	– Ra radium 88	– Ac actinium 89 †															

*58-71 Lanthanoid series

†90-103 Actinoid series

140 Ce cerium 58	141 Pr praseodymium 59	144 Nd neodymium 60	– Pm promethium 61	150 Sm samarium 62	152 Eu europium 63	157 Gd gadolinium 64	159 Tb terbium 65	162 Dy dysprosium 66	165 Ho holmium 67	167 Er erbium 68	169 Tm thulium 69	173 Yb ytterbium 70	175 Lu lutetium 71
232 Th thorium 90	– Pa protactinium 91	238 U uranium 92	– Np neptunium 93	– Pu plutonium 94	– Am americium 95	– Cm curium 96	– Bk berkelium 97	– Cf californium 98	– Es einsteinium 99	– Fm fermium 100	– Md mendelevium 101	– No nobelium 102	– Lr lawrencium 103

Key: a / X / b — a = relative atomic mass; X = atomic symbol; b = proton (atomic) number