



GREENRIDGE SECONDARY SCHOOL
2006 Mid-year Exam
Pure Chemistry 5068
Paper 1
Secondary Three Express

Date : 10 May 2006

1 h

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Name: _____ ()

Class: 3E1

Parent's signature & date: _____

INSTRUCTIONS TO CANDIDATES

Do **not** open this booklet until you are told to do so.

Write your name and index number on the answer sheet in the spaces provided.

There are **forty** questions in this paper. Answer **all** questions. For each question, there are four possible answers, A, B, C and D. Choose the one you consider correct and record your choice in soft **2B** pencil on the separate answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will **not** be deducted for a wrong answer.

Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page **10**.

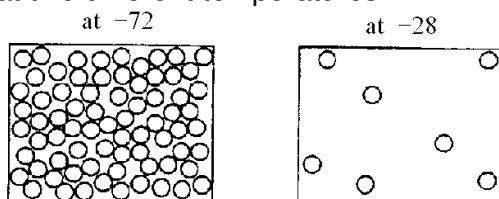
DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO

Name of Setter: Mr Victor Lee

This question paper consists of **10** printed pages including this cover page

- Which one of the following diffuses most rapidly?
 - Cl_2
 - NO_2
 - O_2
 - Ar
- 100 cm^3 of a gas called ethene (C_2H_4) diffused through a porous pot in 100 seconds. How long would it take 100 cm^3 of nitrogen gas (N_2) to diffuse under the same conditions of temperature and pressure?
 - 25 seconds
 - 50 seconds
 - 100 seconds
 - 200 seconds

- The diagrams show the spacing of molecules in a substance at a pressure of 1 atm but at two different temperatures.



Which substance could the diagrams represent?

Substance	Melting point / $^{\circ}\text{C}$	Boiling point / $^{\circ}\text{C}$
A	-100	-80
B	-80	-70
C	-38	-80
D	-28	-72

- When water evaporates,
 - the particles in the water vapour lose energy to their surroundings.
 - the particles in the water vapour are spaced further apart.
 - the speed of the particles in the water and the vapour are the same.
 - the temperature of the remaining water rises.
- Which of these processes involves a weakening of the attraction between particles?
 - Melting
 - Crystallization
 - Condensation
 - Boiling
 - I and II only
 - II and III only
 - I and IV only
 - III and IV only

6. Which gas is obtained industrially by fractional distillation?

- I Chlorine
- II Hydrogen
- III Oxygen
- IV Nitrogen

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

7. The boiling points of some elements are given below:

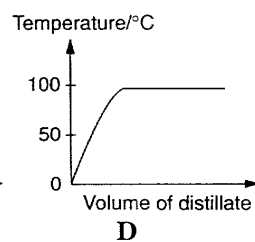
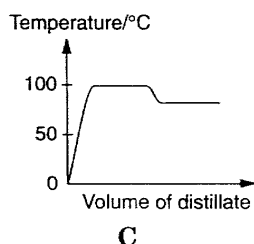
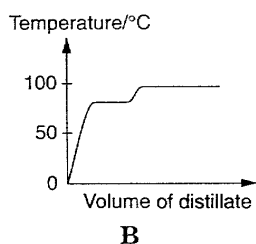
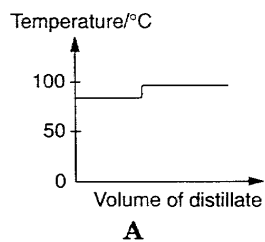
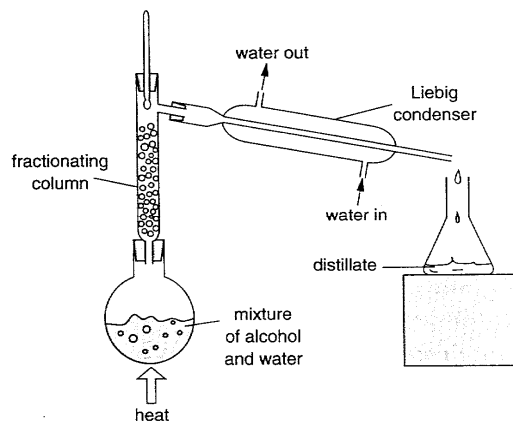
<u>element</u>	<u>boiling point/°C</u>
nitrogen	-196
xenon	-108
oxygen	-183

A mixture of oxygen, nitrogen and xenon at -210°C is allowed to warm up gradually by 20°C . Which of the substances will still be in the liquid state at the higher temperature?

- A oxygen only
- B xenon only
- C a mixture of nitrogen and xenon
- D a mixture of xenon and oxygen

8. The diagram shows the fractional distillation apparatus which was used to separate alcohol (boiling point 78°C) and water (boiling point 100°C).

Which one of the following graphs best shows how the temperature varied with the volume of distillate collected?

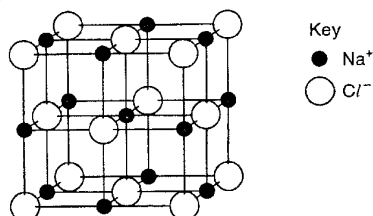


9. When distilling a liquid it is sometimes advisable to place tiny glass beads in the distillation flask. The reason for this is that the glass beads
- A ensure smooth boiling.
 - B can filter out any impurities present.
 - C prevent explosion due to over heating.
 - D provide large surface area for vapour to condense on.
10. Which of these definitions is **incorrect**?
- A The filtrate is the clear liquid which passes through during filtration.
 - B A miscible liquid is one which dissolves in another liquid.
 - C The residue is the substance left behind after sublimation.
 - D The distillate is the condensed liquid from distillation.
11. Which of the following methods is most suitable for separating a mixture of sodium iodide and iodine?
- A Decantation
 - B Filtration
 - C Fractional distillation
 - D Sublimation
12. Which of the following groups contains three elements?
- A argon, phosphorus, copper
 - B brass, phosphorus, aluminium
 - C chlorine, air, xenon
 - D magnesium, bronze, oxygen
13. Fullerene was first discovered by a group of scientists in 1985. The formula of fullerene is C_{60} . From this information alone, we can deduce that
- A fullerene contains only one element.
 - B fullerene is a compound of 60 elements.
 - C fullerene is a mixture of 60 atoms.
 - D fullerene is a mixture of 60 elements.
14. Which of the following substances does **not** have a fixed boiling point?
- I Bronze
 - II Glucose solution
 - III Ethanol
 - IV Chlorine gas
- A I and II only
 - B I and III only
 - C II and III only
 - D III and IV only

15. A compound has the formula $(C_3H_7COO)_2Mg$. How many elements and atoms are present in the formula shown?

	<u>Number of elements</u>	<u>Number of atoms</u>
A	3	14
B	3	27
C	4	14
D	4	27

16. The diagram shows the structure of sodium chloride, Na^+Cl^- .



Which statement about this structure is correct?

- A** Each chloride ion is in contact with only one sodium ion.
B Each chloride ion is in contact with only four sodium ions.
C Each sodium ion is in contact with only four chloride ions.
D Each sodium ion is in contact with only six chloride ions.
17. Which substance could be sodium chloride?

Substance	Melting point / °C	Conduction of electricity	
		In molten form	In aqueous form
A	-125	Poor	Poor
B	-80	Poor	Good
C	760	Poor	Insoluble
D	810	Good	Good

18. In which one of the following sets do both particles have the same total number of electrons?

- A** Cl^- and F^-
B H^+ and H^-
C K^+ and Ca^{2+}
D Ne and Cl^-

19. Which one of the following ions does **not** exist?

- A** $Ca^{2+}_{(aq)}$ **C** $Cl^-_{(aq)}$
B $Fe^{3+}_{(aq)}$ **D** $Al^{2+}_{(aq)}$

20. Particles in the crystal lattice of sodium chloride are held together by

- A** covalent bonds.
B ionic bonds.
C metallic bonds.
D positive ions in a 'sea of electrons'.

21. Isotopes of the same element have the same number of
I electrons.
II protons.
III neutrons.
- A** II only
B I and II only
C II and III only
D I and III only
22. Which one of the following substances
(i) is an element;
(ii) consists of positive ions and delocalised electrons?
A carbon **C** calcium chloride
B calcium **D** iodine
23. The atoms $^{16}_8\text{O}$ and $^{16}_7\text{N}$ have the same
A proton number.
B nucleon number.
C number of electrons.
D number of neutrons.
24. Which one of the following substances conducts electricity by the movement of ions?
A potassium metal **C** molten potassium chloride
B solid sodium chloride **D** molten sulphur
25. Element **X** has an electronic configuration of 2,7. Element **Y** has an electronic configuration of 2,2. What is likely to form if **X** and **Y** combine?
A A covalent compound YX_2
B A covalent compound Y_2X
C An ionic compound YX_2
D An ionic compound Y_2X
26. The number of ions in a molecule of aluminium sulphate is
A 2. **C** 5
B 3. **D** 6.
27. Where are the most metallic elements in the Periodic Table to be found?
A bottom left **C** centre
B bottom right **D** top left

33. Which one of the following is true about the elements fluorine, chlorine, bromine and iodine?
- A They are in the same period in the Periodic Table.
 - B Their ions possess seven electrons in their outermost shells.
 - C They are all gases at room temperature and pressure.
 - D They all react with hydrogen to form gaseous products.
34. Which of the following statements is true of all acids in aqueous solution?
- I They react with carbonates to liberate carbon dioxide.
 - II They react with any metal to liberate hydrogen.
 - III They turn phenolphthalein pink.
- A I only
 - B I and II only
 - C II and III only
 - D I, II and III only
35. The compound which has the highest pH value in solution is
- A ammonia.
 - B hydrogen chloride.
 - C potassium hydroxide.
 - D sodium nitrate.
36. Which one of the following compounds is used to neutralize the acidity of soil?
- A ammonium nitrate
 - B calcium hydroxide
 - C magnesium sulphate
 - D copper (II) oxide
37. A piece of magnesium ribbon does **not** produce any visible reaction when put into a solution of hydrogen chloride in methylbenzene. Which of the following changes will cause a visible reaction to occur?
- A adding more magnesium ribbons.
 - B adding water and stirring.
 - C stirring the mixture vigorously.
 - D heat the mixture to 100 °C.
38. A tanker carrying hydrochloric acid met with a road accident and a large amount of hydrochloric acid was spilt into the lake beside the road. Which of the following reagents is most suitable for neutralising the acid in the lake without leaving behind an alkaline solution?
- A aqueous ammonia
 - B a large amount of water
 - C aqueous sodium hydroxide
 - D powdered calcium carbonate

39. Which of the following reactions does **not** represent a neutralisation reaction?

- A $\text{MgO}_{(s)} + \text{H}_2\text{SO}_{4(aq)} \rightarrow \text{MgSO}_{4(aq)} + \text{H}_2\text{O}_{(l)}$
- B $\text{PbO}_{(s)} + 2\text{HNO}_{3(aq)} \rightarrow \text{Pb}(\text{NO}_3)_{2(aq)} + \text{H}_2\text{O}_{(l)}$
- C $2\text{HCl}_{(aq)} + \text{ZnCO}_{3(aq)} \rightarrow 2\text{ZnCl}_{2(aq)} + \text{H}_2\text{O}_{(l)} + \text{CO}_{2(g)}$
- D $\text{CH}_3\text{COOH}_{(aq)} + \text{NaOH}_{(aq)} \rightarrow \text{CH}_3\text{COONa}_{(aq)} + \text{H}_2\text{O}_{(l)}$

40. Which of the following produces hydrogen ions when dissolved in water?

- A ammonia
- B nitrogen
- C oxygen
- D sulphur dioxide

~ The End ~

The Periodic Table of the Elements

		Group															
I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII						
7 Li Lithium 3	9 Be Beryllium 4											4 He Helium 2					
23 Na Sodium 11	24 Mg Magnesium 12	11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10	27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 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	101 Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 47	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	210 Po Polonium 84	210 At Astatine 85	222 Rn Radon 86
87 Fr Francium	88 Ra Radium	89 Ac Actinium											103 Lr Lawrencium				

* 58 – 71 Lanthanoid series
+ 90 – 103 Actinoid series

Key

a	X
b	

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	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	232 Pa Protactinium 91	238 U Uranium 92	238 Np Neptunium 93	238 Pu Plutonium 94	238 Am Americium 95	238 Cm Curium 96	238 Bk Berkelium 97	238 Cf Californium 98	238 Es Einsteinium 99	238 Fm Fermium 100	238 Md Mendelevium 101	238 No Nobelium 102	238 Lr Lawrencium 103

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.)