3051/2

BGCSE

School Number	Candidate Number
Surname and Initials	

CHEMISTRY

PAPER 2 3051/2

Friday **30 MAY 2003** 1.50 – 3.20 P.M.

Additional material:
Periodic Table

MINISTRY OF EDUCATION
NATIONAL EXAMINATIONS

BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS AND INFORMATION TO CANDIDATES

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

Write your school number, candidate number, surname and initials in the spaces provided above.

Answer **ALL** questions on this paper.

Read each question carefully and make sure you know what you have been asked before starting your answer.

The instruction **NAME** . . . requires an answer in words not chemical symbols.

Show **ALL** your working when answering numerical questions.

Lines are provided on the question paper for your answers. You should write your answers on these lines only.

The mark for each part-question is given in brackets [ ].

ADDITIONAL INFORMATION

Volume of 1.0 mole of gas at r.t.p. 24,000 cm^3.

This question paper consists of 13 printed pages and [illegible] blank pages.

1. Use the list of household chemicals in List A to match the description in List B.

List A

aspirin	coffee	sodium chloride
vinegar	ammonia	detergent
perfume	ethanol	sodium hydrogencarbonate
glucose	methane	nylon
sodium chlorate(I)		

Each substance may be used once, more than once, or not at all.

List B

(a) an antacid medicine _____

(b) gives clothes a pleasant smell _____

(c) improves the wetting power of water and removes grease stains _____

(d) a bleach _____

(e) an alkaline gas _____

(f) a stimulant _____

(g) a gaseous fuel _____

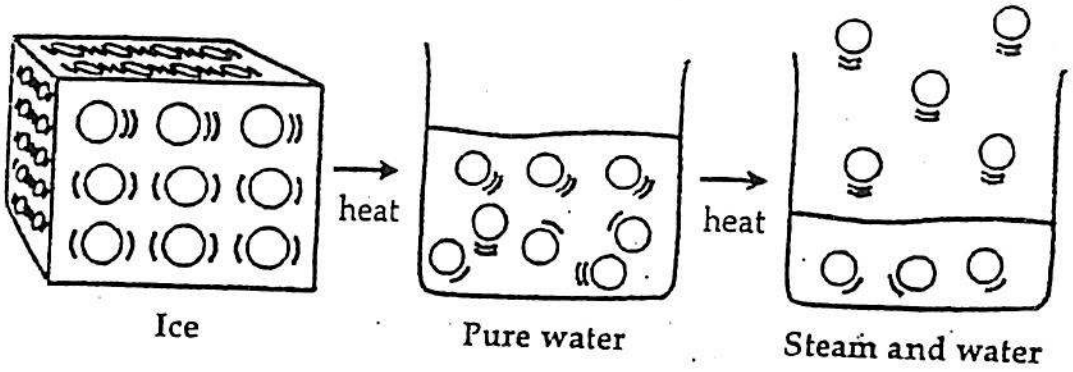
(h) a carbohydrate _____

(i) a neutral salt _____

(j) an analgesic _____

Total marks [10]

2. The diagrams show the molecules in ice, water and steam.



Using the terms **definite, fast, irregular, no, regular, slow** and **yes**, fill in the blanks in the table.

	arrangement of particles	shape	diffusion	compressibility
ice	regular		little	
water	irregular	not definite		no
steam		not definite		

[6]

(b) Explain in terms of the behaviour of molecules, what happens when

(i) ice is heated (but is **not** melted),

_____

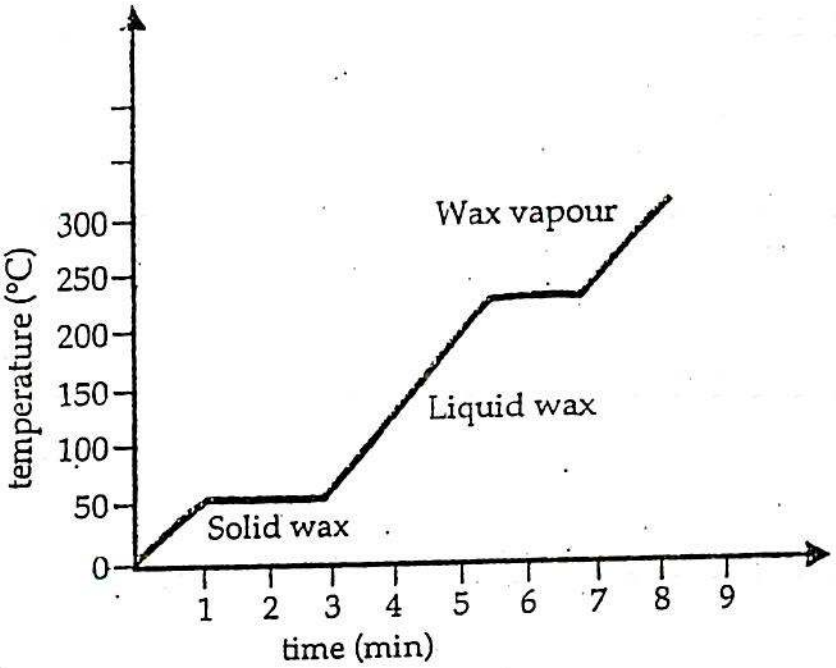
_____ [1]

(ii) water is heated (but is **not** boiled).

_____

_____ [1]

(c) The graph shows the heating curve of wax.



(i) From the graph write the state in which wax exists at 100 °C.

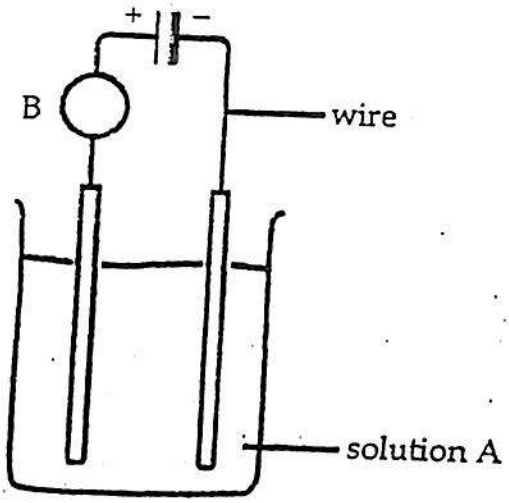
_____ [1]

(ii) If the wax vapour is cooled, at what temperature will it start to condense?
Show on the graph how you get this answer.

_____ [1]

Total marks [10]

5. The diagram shows the apparatus for the electrolysis of solution A.



(a) (i) Name the apparatus labelled B on the diagram, that will show that a current is flowing.

_____ [1]

(ii) State the term used to describe a solution through which an electric current can be passed.

_____ [1]

(b) Name the electrode connected to the

(i) positive terminal,

_____ [1]

(ii) negative terminal of the battery.

_____ [1]

(c) A metal spoon is to be electroplated, using silver nitrate as solution A. On the diagram, show with an arrow the movement of each of the following:

(i) the electrons in the wire,

_____ [1]

(ii) the silver ions in solution A.

_____

(d) In another experiment, aqueous sodium chloride is used as solution A. The electrodes are made of inert material.

(i) Write the formulae of four ions that are present in the solution.

1 _____

2 _____

3 _____

4 _____ [2]

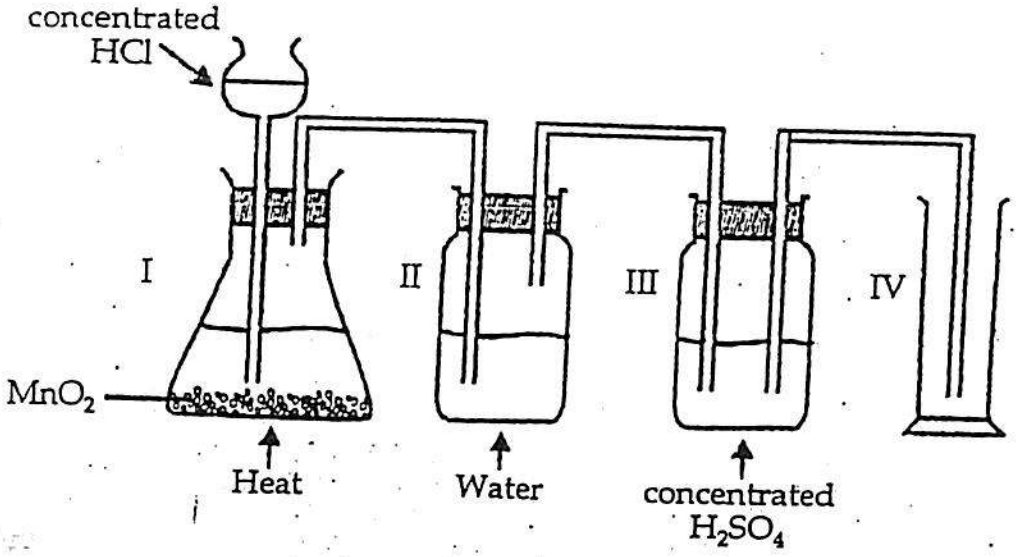
(ii) Explain why the solution becomes alkaline during electrolysis.

_____

_____ [2]

Total marks [10]

6. The diagram shows a laboratory preparation of chlorine gas.



(a) (i) Complete the equation

hydrochloric acid + manganese dioxide →

_____ + chlorine + _____ [2]

(ii) State the function of the

water in flask II,

_____

_____ [1]

concentrated sulphuric acid in flask III.

_____

_____ [1]

(iii) State why the chlorine is collected by downward delivery.

_____

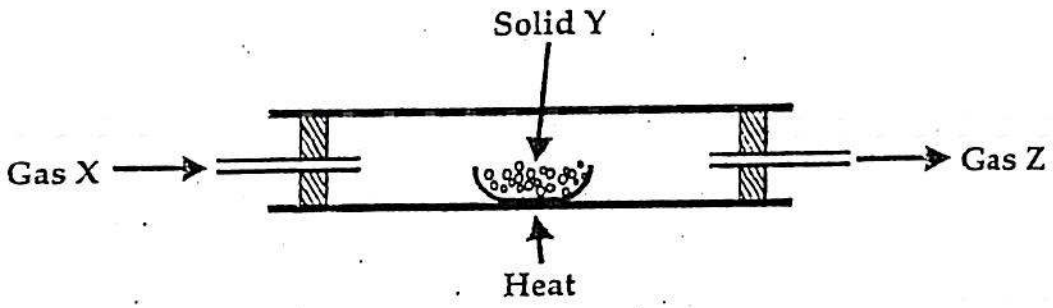
_____ [1]

(iv) Chlorine water turns blue litmus red and then white. What property of chlorine water causes

blue litmus to turn red, _____ [1]

blue litmus to turn white? _____ [1]

(b) The apparatus is used to prepare gas Z by reacting gas X with solid Y.



Gas Z turns limewater milky white.
Gas X is a poisonous, diatomic gas.
Solid Y is black and turns reddish-brown.

Identify gas X, gas Z and solid Y.

(i) gas X _____ [1]

(ii) gas Z _____ [1]

(iii) solid Y _____ [1]

Total marks [10]

7. Metals are extracted from ores that are dug out of the earth.

(a) Complete the table to show names of ores and the processes used to extract two metals.

name of metal	name of ore from which the metal is extracted	process used to extract the metal
aluminium		
iron		the blast furnace

[3]

(a) (i) In the extraction of aluminium, cryolite is added to alumina.

State the function of the cryolite.

_____

_____ [1]

(ii) Give one reason why the extraction of aluminium is expensive.

_____

_____ [1]

(c) In the blast furnace process, coke and limestone are added to the iron ore, and hot air is blown in. State the function of

(i) the hot air,

_____

_____ [1]

(ii) the limestone.

_____

_____ [1]

(d) The iron ore is reduced to iron.

(i) What is meant by the term *reduced*?

_____

_____ [1]

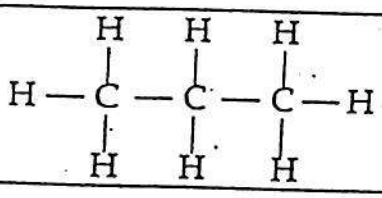
(ii) Name two substances, present in the reactions happening in the blast furnace, that act as reducing agents.

1 _____

2 _____ [1]

Total marks [10]

8. (a) Complete the table to show information about three organic compounds.

compound	structural formula	common use
propane		
methanol		
ethene		

[5]

(b) Draw a diagram to explain how a molecule of ethene undergoes an addition reaction with a molecule of water. Show all the chemical bonds in your diagram.

[2]

(c) (i) Write a balanced equation for the complete combustion of propane.

[2]

(ii) What is the volume of oxygen at r.t.p. used up in the complete combustion of 1 mole propane?

_____ [1]

Total marks [10]

The Periodic Table of the Elements

Group																	
I	II										III	IV	V	VI	VII	0
																4 He Helium 2
	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
	24 Mg Magnesium 12										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
	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
	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
	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
	226 Ra Radium 88	227 Ac Actinium 89 †															

* Lanthanoid series

† 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

a = relative atomic mass

X = atomic symbol

b = proton (atomic) number