

Name : \_\_\_\_\_ (     )     Class : \_\_\_\_\_



# GreenRidge Secondary School

## End-of-Year Re-Examination 2001

**Subject : Science (Chemistry)**  
**Syllabus 5152**  
**Secondary Three Express**

Date : 15 Nov 2001

Duration : 45 mins

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### INSTRUCTIONS TO CANDIDATES

Write your name, index number and class in the spaces at the top of this page and on all separate answer paper used.

**HAND UP YOUR ANSWERS TO EACH SECTION SEPARATELY.**  
**DO NOT STAPLE THEM TOGETHER.**

Answer **all** questions. Write your answers in the spaces provided on the question paper.

### INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.  
A copy of the Periodic Table is printed on page 6.

*This paper consists 6 printed pages, including this page.*

Answer **ALL** questions in the spaces provided.

**Question B1 [9 mks]**

One of the isotopes of an element M has the symbol:  ${}_{19}^{41}\text{M}$

- (a) What is meant by the term isotopes? [1]

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- (b) Complete the table about the atom of. [4]

|                      |  |
|----------------------|--|
| number of protons    |  |
| number of neutrons   |  |
| number of electrons  |  |
| electronic structure |  |

- (c) Draw a full atomic structure of an atom of M, showing all electrons. [2]

- (c) To which Group of the Periodic Table does element M belong? [1]

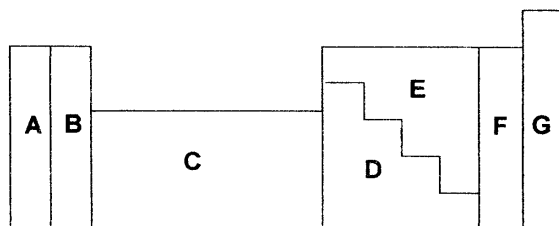
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- (d) M reacts with chlorine to form a white crystalline solid.  
What is the formula for the white crystalline solid? [1]

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**Question B2 [5 mks]**

Seven sections of the Periodic Table are shown below.



Name the section where the following elements are.

- (a) halogens [1]
- (b) most reactive metals [1]
- (c) elements with two valency electrons [1]
- (d) noble gases [1]
- (e) forms coloured compounds [1]

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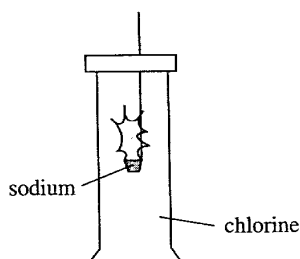
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**Question B3 [8 mks]**

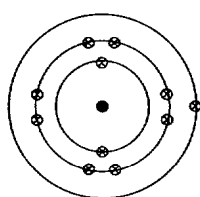
When sodium burns in chlorine, sodium chloride is formed.



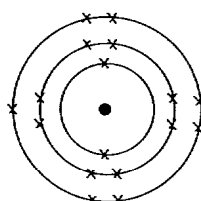
- (a) Write an equation for the reaction. [1]

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These diagrams show atoms of sodium and chlorine



sodium



chlorine

- (b) Draw similar diagrams to show the arrangement of electrons and the charges on the ions present in sodium chloride. [2]

- (c) Explain why the bonding in sodium chloride gives rise to the following properties. [2]
- (i) A very high melting point.

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- (ii) High electrical conductivity when molten but not in solid state. [3]

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**Question B4 [10 mks]**

A sample of copper(II)carbonate was heated in a hard glass tube and it decomposes according to the equation



(a) What do the symbols (g) and (s) mean?

(i) (g) means \_\_\_\_\_ [1]

(ii) (s) means \_\_\_\_\_ [1]

(b) Describe the colour changes that took place in the hard glass tube. [1]

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(c) Describe a test to identify the carbon dioxide produced. [2]

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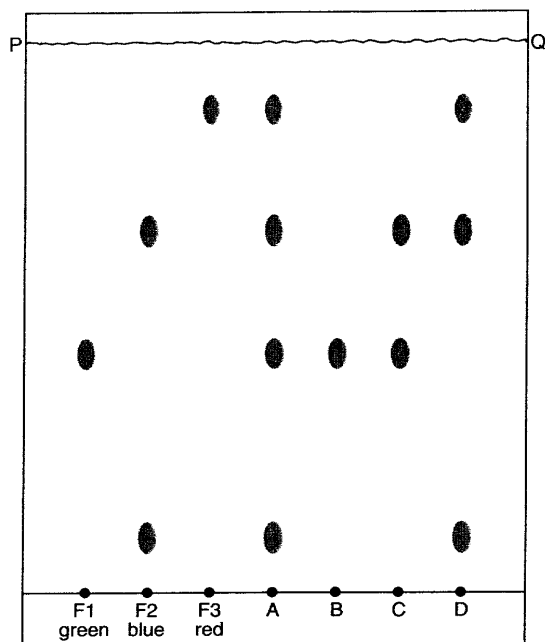
(d) Calculate the mass of one mole of copper(II) carbonate. [1]

(e) Calculate the mass of copper(II)oxide formed when 6.2g of copper(II)carbonate is heated. [2]

(f) What is the volume of carbon dioxide produced when 6.2g of copper(II) carbonate is heated? [2]

**Question B5 [8 mks]**

The figure below shows a chromatogram obtained using three different dyes F1 (green), F2 (blue) and F3 (red) and four solutions A, B, C and D.



- (a) Which solution, A, B, C or D,
- (i) contains one dye only? [1]  
\_\_\_\_\_
  - (ii) contains all of the three dyes, F1, F2 and F3? [1]  
\_\_\_\_\_
  - (iii) is purple in colour? [1]  
\_\_\_\_\_
  - (iv) is a pure substance? [1]  
\_\_\_\_\_

- (b) Explain your answer to
- (i) part (a)(ii) [1]

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- (ii) part (a)(iv). [1]

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- (c) (i) Name the line PQ shown on the chromatogram. [1]

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- (ii) Why should this line be near the top of the paper? [1]

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# The Periodic Table of the Elements

| Group                      |                             |                              |                             |                             |                              |                              |                            |                              |                           |                            |                             |                           |                             |                              |                            |                           |                              |
|----------------------------|-----------------------------|------------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|----------------------------|------------------------------|---------------------------|----------------------------|-----------------------------|---------------------------|-----------------------------|------------------------------|----------------------------|---------------------------|------------------------------|
| I                          | II                          | III                          | IV                          | V                           | VI                           | VII                          | 0                          |                              |                           |                            |                             |                           |                             |                              |                            |                           |                              |
|                            |                             | I<br>H<br>Hydrogen<br>1      |                             |                             |                              |                              |                            |                              |                           |                            |                             |                           |                             |                              |                            |                           | 4<br>He<br>Helium<br>2       |
| 7<br>Li<br>Lithium<br>3    | 9<br>Be<br>Beryllium<br>4   |                              |                             |                             |                              |                              |                            |                              |                           |                            |                             |                           |                             |                              |                            |                           | 20<br>Ne<br>Neon<br>10       |
| 23<br>Na<br>Sodium<br>11   | 24<br>Mg<br>Magnesium<br>12 |                              |                             |                             |                              |                              |                            |                              |                           |                            |                             |                           |                             |                              |                            |                           | 35.5<br>Cl<br>Chlorine<br>17 |
| 39<br>K<br>Potassium<br>19 | 40<br>Ca<br>Calcium<br>20   | 45<br>Sc<br>Scandium<br>21   | 48<br>Ti<br>Titanium<br>22  | 51<br>V<br>Vanadium<br>23   | 52<br>Cr<br>Chromium<br>24   | 55<br>Mn<br>Manganese<br>25  | 56<br>Fe<br>Iron<br>26     | 59<br>Co<br>Cobalt<br>27     | 59<br>Ni<br>Nickel<br>27  | 64<br>Cu<br>Copper<br>29   | 65<br>Zn<br>Zinc<br>30      | 73<br>Ga<br>Gallium<br>31 | 75<br>As<br>Arsenic<br>33   | 79<br>Se<br>Selenium<br>34   | 80<br>Br<br>Bromine<br>35  | 84<br>Kr<br>Krypton<br>36 |                              |
| 85<br>Rb<br>Rubidium<br>37 | 88<br>Sr<br>Strontium<br>38 | 89<br>Y<br>Yttrium<br>39     | 91<br>Zr<br>Zirconium<br>40 | 93<br>Nb<br>Niobium<br>41   | 96<br>Mo<br>Molybdenum<br>42 | 101<br>Ru<br>Ruthenium<br>44 | 103<br>Rh<br>Rhodium<br>45 | 106<br>Pd<br>Palladium<br>47 | 108<br>Ag<br>Silver<br>47 | 112<br>Cd<br>Cadmium<br>48 | 115<br>In<br>Indium<br>49   | 119<br>Sn<br>Tin<br>50    | 122<br>Sb<br>Antimony<br>51 | 128<br>Te<br>Tellurium<br>52 | 127<br>I<br>Iodine<br>53   | 131<br>Xe<br>Xenon<br>54  |                              |
| 133<br>Cs<br>Caesium<br>55 | 137<br>Ba<br>Barium<br>56   | 139<br>La<br>Lanthanum<br>57 | 178<br>Hf<br>Hafnium<br>72  | 181<br>Ta<br>Tantalum<br>73 | 184<br>W<br>Tungsten<br>74   | 190<br>Os<br>Osmium<br>76    | 192<br>Ir<br>Iridium<br>77 | 195<br>Pt<br>Platinum<br>78  | 197<br>Au<br>Gold<br>79   | 201<br>Hg<br>Mercury<br>80 | 204<br>Tl<br>Thallium<br>81 | 207<br>Pb<br>Lead<br>82   | 209<br>Bi<br>Bismuth<br>83  | 84<br>Po<br>Polonium<br>84   | 85<br>At<br>Astatine<br>85 | 86<br>Rn<br>Radon<br>86   |                              |
| 87<br>Fr<br>Francium       | 226<br>Ra<br>Radium         | 227<br>Ac<br>Actinium        |                             |                             |                              |                              |                            |                              |                           |                            |                             |                           |                             |                              |                            |                           |                              |

|                             |                            |                                 |                              |                             |                             |                               |                             |                               |                               |                             |                                 |                              |                                |
|-----------------------------|----------------------------|---------------------------------|------------------------------|-----------------------------|-----------------------------|-------------------------------|-----------------------------|-------------------------------|-------------------------------|-----------------------------|---------------------------------|------------------------------|--------------------------------|
| * 58 – 71 Lanthanoid series | 140<br>Ce<br>Cerium<br>58  | 141<br>Pr<br>Praseodymium<br>59 | 144<br>Nd<br>Neodymium<br>60 | 150<br>Sm<br>Samarium<br>62 | 152<br>Eu<br>Europium<br>63 | 157<br>Gd<br>Gadolinium<br>64 | 159<br>Tb<br>Terbium<br>65  | 162<br>Dy<br>Dysprosium<br>66 | 165<br>Ho<br>Holmium<br>67    | 167<br>Er<br>Erbium<br>68   | 169<br>Tm<br>Thulium<br>69      | 173<br>Yb<br>Ytterbium<br>70 | 175<br>Lu<br>Lutetium<br>71    |
| + 90 – 103 Actinoid series  | 232<br>Th<br>Thorium<br>90 | 238<br>Pa<br>Protactinium<br>91 | 238<br>U<br>Uranium<br>92    | 94<br>Pu<br>Plutonium<br>94 | 95<br>Am<br>Americium<br>95 | 96<br>Cm<br>Curium<br>96      | 97<br>Bk<br>Berkelium<br>97 | 98<br>Cf<br>Californium<br>98 | 99<br>Es<br>Einsteinium<br>99 | 100<br>Fm<br>Fermium<br>100 | 101<br>Md<br>Mendelevium<br>101 | 102<br>No<br>Nobelium<br>102 | 103<br>Lr<br>Lawrencium<br>103 |

|   |   |   |
|---|---|---|
| a | X | b |
|---|---|---|

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

The volume of one mole of any gas is 24 dm<sup>3</sup> at room temperature and pressure (r.t.p.)