



THE PERIODIC TABLE

Period **1** **2** **3** **4** **5** **6** **7** **0**
 Group

Period

| | | |
|---|----------|---|
| 1 | H | 1 |
| | Hydrogen | |

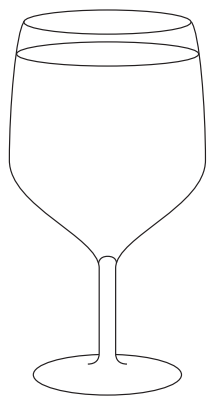
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|----------------------|-----------------------|-----------------------|----------------------|--------------------------|-----------------------|------------------------|-----------------------|----------------------|------------------------|---------------------|------------------------|---------------------|---------------------|-----------------------|-----------------------|----------------------|---------------------|----------------------|---------------------|---------------------|--------------------|---------------------|----------------------|------------------|---------------------|--------------------|-----------------|----------------------|-----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Li Lithium 3 | Be Beryllium 4 | | | | | He Helium 2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Na Sodium 11 | Mg Magnesium 12 | | | | | F Fluorine 9 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | K Potassium 19 | Ca Calcium 20 | | | | | Ne Neon 10 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Rb Rubidium 37 | Sr Strontium 38 | Y Yttrium 39 | Sc Scandium 45 | Ti Titanium 48 | V Vanadium 51 | Cr Chromium 52 | Mn Manganese 55 | Fe Iron 56 | Co Cobalt 59 | Ni Nickel 59 | Cu Copper 63.5 | Zn Zinc 65 | Ga Gallium 70 | Ge Germanium 73 | As Arsenic 75 | Se Selenium 79 | Br Bromine 80 | Kr Krypton 84 | | | | | | | | | | | | | |
| 5 | Cs Caesium 55 | Ba Barium 56 | La Lanthanum 57 | Ce Cerium 58 | Pr Praseodymium 59 | Nd Neodymium 60 | Pm Promethium 61 | Sm Samarium 62 | Eu Europium 63 | Gd Gadolinium 64 | Tb Terbium 65 | Dy Dysprosium 66 | Ho Holmium 67 | Er Erbium 68 | Tm Thulium 69 | Yb Ytterbium 70 | Lu Lutetium 71 | Hf Hafnium 72 | Ta Tantalum 73 | W Tungsten 74 | Re Rhenium 75 | Os Osmium 76 | Ir Iridium 77 | Pt Platinum 78 | Au Gold 79 | Hg Mercury 80 | In Indium 81 | Sn Tin 82 | Sb Antimony 83 | Te Tellurium 84 | I Iodine 85 | Xe Xenon 86 |
| 6 | Fr Francium 87 | Ra Radium 88 | Ac Actinium 89 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Fr Francium 87 | Ra Radium 88 | Ac Actinium 89 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Key

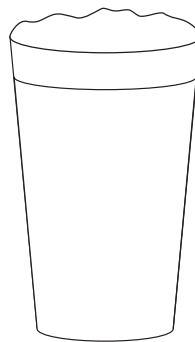
| |
|----------------------|
| Relative atomic mass |
| Symbol |
| Name |
| Atomic number |

Answer ALL the questions. Write your answers in the spaces provided.

1. Two alcoholic drinks are shown.



large glass of red wine
250 cm³



half a pint of beer
285 cm³

(a) These two drinks have approximately the same volume but the large glass of red wine contains twice as much ethanol as the half pint of beer.

Explain why.

.....
..... (1)

(b) Much research has been carried out into the effects of alcoholic drinks.

Where is information on recent research likely to be found.

..... (1)

(c) Alcoholic drinks contain ethanol, C₂H₅OH.

Name the **two** compounds produced when ethanol burns completely in air.

..... and (2)

(d) If wine is left open to the air it slowly turns to vinegar. This is caused by the formation of ethanoic acid, CH₃COOH, in the wine.

Explain how the ethanoic acid forms.

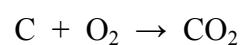
.....
..... (2)

(Total 6 marks)

Q1



2. (a) Two raw materials used in the blast furnace are coke and air. Oxygen from the air reacts with the coke to form carbon dioxide.



Explain why it is important that this reaction is exothermic.

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.....
.....

(1)

- (b) Another raw material used in the blast furnace is limestone. This is also a source of carbon dioxide.

Write the balanced equation to show limestone forming carbon dioxide.

.....

(2)

- (c) (i) Describe how iron from the blast furnace is changed into mild steel?

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.....
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(2)

- (ii) Why is steel more useful than iron from the blast furnace?

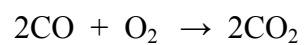
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(1)



Leave
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(d) During the production of steel, carbon monoxide is converted into carbon dioxide.



Calculate the volume of oxygen required to react completely with 3000 dm³ carbon monoxide.

.....
.....
.....
..... dm³
(2)

Q2

(Total 8 marks)

3. (a) Draw the structure of ethanoic acid, CH₃COOH, showing all bonds.

(1)

(b) Ethanoic acid reacts with methanol to form an ester.

Give the name of this ester.

.....
(1)

(c) Ethanoic acid also reacts with sodium hydroxide solution.

Write the balanced equation for this reaction.


.....
(2)

Q3

(Total 4 marks)

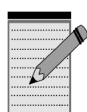


4. The diagram shows the label from a bottle of mineral water.

| | | |
|---|--------------------------|-----------------------------------|
|  | OFFICIAL ANALYSIS | |
| | mg in one litre | |
| | Ca ²⁺ 55 | HCO ₃ ⁻ 248 |
| | Mg ²⁺ 19 | Cl ⁻ 42 |
| | K ⁺ 1 | SO ₄ ²⁻ 23 |
| Na ⁺ 24 | | |

(a) This water is hard.

Describe what you would see if a sample of this water was shaken with soap solution.



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(3)

(b) Describe a test that John can carry out to confirm the presence of chloride ions in the water.

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(2)

(c) John evaporated some of the water and obtained the dissolved salts as a solid residue. He attempted to identify the metal ions using a flame test on the residue.

Explain why the metal ions cannot be identified in this way.

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(1)

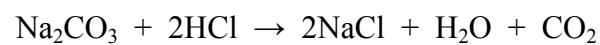
(Total 6 marks)

Q4



5. A class of students was finding the concentration of a hydrochloric acid solution.

They titrated 20.00 cm³ portions of 0.250 mol dm⁻³ sodium carbonate solution, Na₂CO₃, with the acid.



(a) One student's results are shown in the table.

| titration | 1 | 2 | 3 |
|---|-------|-------|-------|
| burette reading (final) (cm ³) | 27.50 | 46.55 | 27.15 |
| burette reading (start) (cm ³) | 0.00 | 21.50 | 2.00 |
| volume of hydrochloric acid used (cm ³) | 27.50 | 25.05 | 25.15 |

(i) Suggest why the student carried out the third titration.

.....

 (1)

(ii) What volume of hydrochloric acid should the student use in her calculation?

.....
 (2)



Leave
blank

(b) Another student found that exactly 25.00 cm^3 of the hydrochloric acid was required to neutralise 20.00 cm^3 of $0.250 \text{ mol dm}^{-3}$ sodium carbonate solution, Na_2CO_3 .

Use this information to calculate the concentration of the hydrochloric acid solution, HCl, in mol dm^{-3} .

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(3)

Q5

(Total 6 marks)

TOTAL FOR PAPER: 30 MARKS

END

