Junior Certificate Examinations, Year

Science – Ordinary Level

Sample Paper

DAY - DATE -TIME (2 hours)

INSTRUCTIONS

1. Write your examination number in the box provided on this page.

2. Answer all questions.

3. Answer questions in the spaces provided. If you require extra space, a page is provided at the back of this booklet.

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<td>5 (39)</td>
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<td>Grade</td>
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Biology

Question 1

(a) **Name** the piece of equipment drawn on the right.

Name ____________________

Give one **use** of this piece of equipment.

Use ____________________

(b) **Name** the bones of the human skeleton labelled A and B in the diagram on the right.

Name A ____________________

Name B ____________________

(c) The diagram shows the fruit and the seed of the dandelion.

How are dandelion seeds dispersed?

How? ____________________

Why is seed dispersal important?

Why? ____________________

(d) **Name** the parts of the eye labelled X and Y in the diagram.

Name of X ____________________

Name of Y ____________________
(e) Name the parts of the digestive system labelled A and B in the diagram on the right.

Name A ________________

Name B ________________

(f) Identify the type of tooth labelled X in the diagram on the right.

____________________

What is the main function of this type of tooth?

____________________

(g) A menu at a restaurant offers lean meat, fish, cheese and vegetables.

Which of these foods is the best source of carbohydrate?

____________________

What is the main function of carbohydrate in your diet?

____________________

(h) The seedlings in the flower pot drawn on the right were grown in a closed box which had a window to let light in at one of the points X, Y or Z.

Was the window at X, Y or Z?

____________________

Give a reason for your answer. ________________________________

____________________

Why is this growth response helpful to the plants? ________________________________

____________________

(7 × 6 + 1 × 10)
Question 2

(a) Blood consists of white blood cells, red blood cells and platelets in a liquid called plasma. Blood travels around the body in arteries, veins and capillaries.

Give two functions of blood. (6)

Function 1

Function 2

(b) The heart pumps blood around the body.

(i) Name the chamber of the heart labelled X in the diagram. (3)

Name

(ii) It is important to keep your heart healthy.

Give one thing you should do and one thing you should not do in order to keep your heart healthy. (6)

Thing you should do

Thing you should not do
(c) Excretion is important for the removal of cellular wastes from the body. The urinary system has an important role in excretion from the body.

(i) Name **two** substances excreted from the human body.  

Substance 1 ______________ Substance 2 ______________

(ii) Use the **names** in the table on the right to identify the parts of the urinary system labelled A, B and C in the diagram below.

Name of A ______________
Name of B ______________
Name of C ______________

(iii) Give **one** function of the part of the urinary system labelled A.

Function of A ____________________________________________
_______________________________________________________

(iv) Name a human organ of excretion other than an organ of the urinary system.

Name ______________
Question 3

(a) Plants make their own food through photosynthesis. Match each of the four words in the table on the right with a corresponding number in the equation for photosynthesis below.

\[
\text{(1)} \quad \text{(2)} \quad \text{(3)} \quad \text{(4)}
\]

\[\text{light} \rightarrow \text{FOOD} \]

(b) A number of identical small trees were planted in the same way at different distances from a very big tree. After a few years it was noticed that the trees close to the big tree did not grow as quickly as those further away. The diagram summarises the observations made.

A horticultural advisor said that the poor growth of the trees closer to the big tree was due to competition.

(i) List two things for which the trees must compete with each other.

1. _________________________
2. _________________________
(c) (i) In ecology what is meant by conservation? (3)

Certain animal and plant species are described as “threatened”.

(ii) Give an example of an Irish animal or plant species that is on the threatened list. (3)

(iii) Many species of plant are protected in National Parks. The manager of one of these parks is asked to measure the frequency with which a protected species occurs in a habitat within the park. Describe how this might be carried out. Include a diagram of any equipment that might be used. (12)

Labelled diagram
Chemistry

Question 4

(a) Name the piece of equipment drawn on the right.

Give one use of this piece of equipment.

Name
Use

(b) Hydrocarbons are important fuels.

Give an example of a fuel that is a hydrocarbon.

Carbon and what other element are always present in hydrocarbons?

(c) In each case choose one state of matter from the list on the right which matches the characteristics in the table below.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>State of matter</th>
</tr>
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<tbody>
<tr>
<td>Has definite shape</td>
<td>SOLID</td>
</tr>
<tr>
<td>Has definite volume</td>
<td>LIQUID</td>
</tr>
<tr>
<td>Is not easily compressed</td>
<td>GAS</td>
</tr>
<tr>
<td>Has no definite shape</td>
<td></td>
</tr>
<tr>
<td>Has no definite volume</td>
<td></td>
</tr>
<tr>
<td>Is easily compressed</td>
<td></td>
</tr>
</tbody>
</table>

(d) The diagram shows a test tube filled with ice. Water condenses from the air onto the walls of the test tube.

What test could you carry out on the liquid to show that the liquid is water?

What colour change is observed when carrying out this test?

Test

Colour change
(e) **Complete** the statements below using one of the words from the list on the right in each case.

Electrons are small ____________ charged particles.

Protons are found ____________ the nucleus of an atom.

(f) The treatment of water for domestic use is important. There are several stages involved.

Why is **fluoride** added to domestic water supplies in Ireland? ___________

How can water be treated to kill harmful bacteria? ________________

(g) Give one negative impact on the environment of the use of non-biodegradable plastics for packaging.

Negative impact _______________________

(h) A piece of magnesium burns very brightly in a gas jar of oxygen and produces a white powder.

What is observed when this white powder is added to water and litmus paper added?

What does this result tell you about the product?

Why does a piece of magnesium burn even **more brightly in oxygen** than it does in air? ______________________

\[(7 \times 6 + 1 \times 10)\]
Question 5

(a) Separation techniques are very important in chemistry.

(i) What is the **name** given to the separation technique shown in diagram A? (3)

   **Technique** ______________________

(ii) Name **two** substances which could be separated using this technique? (3)

   **Substances** ______________________

(iii) What is the **name** given to the separation technique shown in diagram B? (3)

   **Name** ______________________

(b) Give an example of an **alloy**. State **one use** that is made of this alloy. (6)

   **Example** ______________________

   **Use** ______________________
(c) A student investigated the hardness of a number of water samples by testing them with soap flakes. In each case the same volume of water was tested. The results are given in the table.

<table>
<thead>
<tr>
<th>Water sample</th>
<th>Number of soap flakes needed to give a lather</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>7</td>
</tr>
<tr>
<td>C</td>
<td>4</td>
</tr>
</tbody>
</table>

(i) Which of the three water samples had the softest water? _______  (3)

(ii) State one disadvantage of hard water  ______________________  (3)

(iii) State one way by which water hardness can be removed.

____________________________________________________  (3)

(d) When hydrochloric acid reacts with zinc a colourless gas is produced.

(i) Describe a test you could carry out on the gas to confirm that the gas is hydrogen.  (9)

**Test for hydrogen**

____________________________________________________

____________________________________________________

(ii) What is the name of the second product of this reaction?  (3)

Name  ____________________________

(iii) Is the pH of an acid in water higher than, lower than, or equal to 7?  (3)

pH  __________
Question 6

(a) Robert Boyle introduced the word *element* into the language of chemistry.

Complete the table below identifying each of the substances listed as an element or a compound.

An example is completed in the case of carbon dioxide.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Element</th>
<th>Compound</th>
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</thead>
<tbody>
<tr>
<td>Carbon dioxide</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon</td>
<td></td>
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</tbody>
</table>

(b) Carbon dioxide gas can be prepared in a school laboratory using the apparatus drawn on the right.

(i) Identify a liquid $X$ and a solid $Y$ that can be used in this preparation.

Liquid $X$ _____________________

Solid $Y$ _____________________

The diagram shows a lighting taper and a gas jar of carbon dioxide gas.

(ii) What happens to the lighting taper when it is placed into the gas jar?

What? _____________________ (3)

(iii) What does this tell us about carbon dioxide gas?

What? _____________________

(iv) Name one item commonly found in public buildings that contains carbon dioxide and makes use of the property demonstrated in the test described above.

__________________________________________________________

For examiner use only

(1) (2)
(c) Air is a mixture.
Describe, using a labelled diagram, how you might carry out an investigation/experiment to show that carbon dioxide is present in air. (12)

Labelled diagram
Physics

Question 7

(a) Find the volume of the block drawn on the right using the measurements given.

Volume __________________

In what units is the volume measured?

Units __________________

(b) Give two effects of a force.

Effect of a force 1 __________________________________________

________________________________________________________

Effect of a force 2 __________________________________________

________________________________________________________

(c) The diagram shows a ray of light striking a plane mirror.

Draw on the diagram the path you would expect the ray of light to travel after striking the mirror.

What name is given to the property of light demonstrated here?

Name __________________

(d) The diagram shows an electric bell ringing inside a bell-jar. A pump was used to remove the air from inside the bell-jar.

What change would you expect to notice in the sound coming from the bell when the air was removed from inside the bell-jar?

_____________________________________

What does this experiment tell you about sound?

_____________________________________

_____________________________________

For examiner use only

(1)    (2)
(e) The diagram shows a “freely-suspended” magnet.

What happens if the North pole of another magnet is brought close to the North pole of the hanging magnet?

What happens? ___________________________

Give one use for magnets.

Use ____________________________________

(f) The piece of equipment drawn on the right is used to measure temperature.

Name this piece of equipment.

Name __________________

This instrument may be used to measure the boiling point of water.

What effect has an increase in pressure on the boiling point of water?

Effect __________________________________

(g) Choose from the list on the right two non-renewable sources of energy.

Non-renewable source 1 __________________

Non-renewable source 2 __________________

(h) If you were visiting a factory and saw the sign shown in the diagram, what precaution should you take?

_______________________________________

What is the scale in which sound levels are measured?

_______________________________________

Sound levels in a house often arise from noises that come from outside the house. Mention one simple method of reducing the level of these noises inside the house.

_______________________________________
Question 8

(a) A student was given a stone and asked to measure its density.

(i) Complete the equation in the box below using two of the words on the right. (3)

\[
\text{Density} = \_\_\_\_\_\_\_\_\_\_\_
\]

(ii) What piece of equipment could the student have used to measure the mass of the stone? (6)

\[
\text{Piece of equipment} \quad \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
\]

(iii) Describe, using a labelled diagram, how the volume of the stone could have been measured. (9)

\[
\text{Labelled diagram}
\]

(iv) If the mass of the stone was 36 g and its volume was 12 cm³ what was the density of the stone? (6)

\[
\text{Density of stone} \quad \_\_\_\_\_\_\_\_\_\_\_\_.
\]
(b) Metals **expand** when heated.

(i) Describe, using a labelled diagram, an experiment you could carry out to demonstrate this. (12)

(ii) Give an example from everyday life where allowances are made for the fact that metals expand when heated. (3)

**Everyday example**

__________________________
Question 9

(a) The diagram shows a three-pin plug with the back removed.

(i) What is the correct colour coding for the cables labelled X and Y.

Colour of X ______________________ (3)
Colour of Y ______________________ (3)

(ii) What is the function of the part labelled Z? (3)

Function of Z ______________________________________
_________________________________________________________________________

(b) The ESB charges for electricity at a cost of 10 cent per kWh.

An electric kettle has a power rating of 2 kW.

How many units of electricity (kWh) are used when the kettle is switched on for a total 30 minutes during a day?

Number of units (kWh) ________________ (3)

What is the cost in cent of using the kettle for an average of 30 minutes each day for one week? (6)

Cost ________________ cent
(c)  
(i) Complete the circuit below inserting the symbols on the right to show where the ammeter and the voltmeter should be connected in the circuit in order to measure the current passing through the resistor and the potential difference (voltage) across it. (6)

(ii) Write the letter S beside the switch in the circuit diagram. (3)

(iii) What is the relationship between the current passing through a resistor and the potential difference (voltage) across it. (6)

(d) The diagram shows a car.
In dry weather you can sometimes get an electric shock when you get out of (or touch) a car.

What name is given to the type of electricity which gives rise to this problem? (3)

Type of electricity _______________________

How can this problem be prevented? (3)

How? __________________________________________
EXTRA WORK SPACE

Indicate clearly the number and part of the question(s) you are answering.

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