Coimisiún na Scrúduithe Stáit  
State Examinations Commission  

JUNIOR CERTIFICATE EXAMINATION, 2005  

SCIENCE - ORDINARY LEVEL  

[N.B. Not for Science – Local Studies Candidates]  

THURSDAY, 16 JUNE – MORNING, 9.30 to 12.00  

INSTRUCTIONS  

1. Write your examination number in the box provided on this page.  
2. Answer SECTION A.  
3. Answer ANY THREE SECTIONS from SECTIONS B, C, D, E.  
4. Answer all questions in the spaces provided. If you require extra space, there are pages provided at the back of this booklet.  

For examiner use only  

Centre Number  
Examination Number  

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>MARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section A</td>
<td>Q.1</td>
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<tr>
<td></td>
<td>Q.2</td>
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<td>Q.3</td>
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<td>Q.4</td>
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<td>Section C</td>
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<td>Section D</td>
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<td>Q.13</td>
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<td>Q.14</td>
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<td></td>
<td>Q.15</td>
</tr>
<tr>
<td></td>
<td>Q.16</td>
</tr>
</tbody>
</table>

1. Total of end of page totals  
2. Aggregate total of all disallowed question(s)  
3. Total marks awarded (1 minus 2)  

TOTAL  
GRADE
SECTION A – CORE (144 MARKS)
Answer any 12 parts (a), (b), (c), etc. from this Section.

Question 1

(a) Name and give one use for the following pieces of equipment.

[Image of equipment]

NAME ___________________________                     _________________________
USE ___________________________       _________________________

(b) In each case choose the correct unit from the list on the right, for the measurement of each physical quantity stated below.

<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>cm³</td>
</tr>
<tr>
<td>Area</td>
<td>cm²</td>
</tr>
<tr>
<td>Mass</td>
<td>kg</td>
</tr>
<tr>
<td>Length</td>
<td>cm</td>
</tr>
</tbody>
</table>

(c) Energy has many different forms. Complete the statements below.

Energy cannot be created or destroyed. It can be ________________ from one form to another.

Energy is the ability to do ________________.

Energy released from the nucleus of an atom is called ________________ energy.

The energy stored in a battery is called ________________ energy.
(e) The ESB meter readings shown below record the number of units of electricity used in a home. Based on the readings in the table below, find how many **units** were used this period.

<table>
<thead>
<tr>
<th>Previous Reading (kWh)</th>
<th>Present Reading (kWh)</th>
<th>Number of units used this period</th>
</tr>
</thead>
<tbody>
<tr>
<td>18570</td>
<td>19820</td>
<td></td>
</tr>
</tbody>
</table>

If each unit costs 10 cent, find the **cost** of the electricity used.  

The unit used by the ESB for costing is the **kWh**. What do the letters **kWh** stand for?

Give one example of an electrical **appliance** in the home which has a **high power rating** (greater than 1 kW).

(f) Fill in the table below identifying each of the changes listed as a **chemical change** or as a **physical change**.

<table>
<thead>
<tr>
<th>Melting of ice</th>
<th>Boiling an egg</th>
<th>Burning of wood</th>
<th>Tearing of paper</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CHEMICAL CHANGE</strong></td>
<td><strong>PHYSICAL CHANGE</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(g) Metals have certain characteristics such as lustre, malleability, ductility and the ability to form alloys. In each case choose a **word** from the list on the right to match the statement below.

Metals are **shiny**.  

Metals can be **beaten** (hammered) into shape.  

Metals can be **stretched into wires**.  

The name given to a **mixture** of metals.
(i) **Fossil fuels** are used as a source of energy.

Name one fossil fuel. ______________________

Fossil fuels were **formed** from ______________________________________________.

Name a gas produced when a fossil fuel is burned in air.  __________________________

State whether fossil fuels are **renewable** or **non-renewable**. ______________________

(j) Complete the following table using a **word** from the list on the right in each case.

<table>
<thead>
<tr>
<th>Water</th>
<th>Compound</th>
<th>ELEMENT</th>
<th>COMPOUND</th>
<th>MIXTURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrogen</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Give one example of an element, not listed above, that is found in air. ______________________

(k) Animals and plants exhibit the **characteristics of living organisms**.

There are seven characteristics of living things. State **two** of them.

1 ___________________________________________  2 ___________________________________________

Name **one animal** that can carry diseases harmful to humans. ______________________

Plants are a source of beneficial drugs in medicine. Give one example.

____________________________________
(l) The diagram shows the human female reproductive system.

Name part A. _______________________________

Name part B. _______________________________

Mark with the letter X where fertilisation usually takes place.

Name one substance produced by A. __________________________

(m) The energy stored by plants can be consumed by animals. Choose a word from the list on the right to complete the first three statements below.

All the energy obtained by __________________________
comes from ______________________ and ultimately
from the ________________________.

Give one example of how plants depend on animals in a habitat.

_______________________________________________________________________

(n) In each case choose a word from the list on the right to complete the sentences below.

The process by which green plants make food is called

________________________.

The gas released when plants make food is called

________________________.

The chemical which gives leaves a green colour is

________________________.

Carbon dioxide and ______________________ are converted into food by green plants.

(o) Bacteria, fungi and viruses are micro-organisms which can be useful or harmful.

Give one use for bacteria. __________________________________________

Give one use for fungi. __________________________________________

Give one harmful effect of bacteria. __________________________________

Name a disease caused by a virus. ____________________________________
SECTION B – PHYSICS  (72 MARKS)

There are THREE questions in this Section. Answer any TWO of these questions.

Question 2

(a) A cyclist travels 100 metres in 20 seconds.

What is the unit of distance? ______________________  (3)

What is the unit of time? ______________________  (3)

What is the unit of speed? ______________________  (3)

What is the average speed of the cyclist? _______________________  (3)

(b) Diagram A, shows a ray of light hitting a surface and bouncing back.

What word describes the bouncing back of the ray of light?
_______________________________________________ (3)

The equipment shown in diagram B, is used in an experiment.

What would the person see when the three cards are set up as shown?_____________________________ (3)

What would the person see if the middle card were moved slightly?
_____________________________________________ (3)

What does this experiment tell us about light?
_____________________________________________ (3)

(c) Heat travels by conduction, convection and radiation. A student is supplied with a metal container filled with boiling water and three rods; one plastic, one glass and one copper as shown in the diagram. There is wax at the top of each rod.

By which method does heat travel along the rods?
_____________________________________________ (3)

Why should all the rods be the same length and the same thickness?
_____________________________________________ (3)

On which rod will the wax melt first?
_____________________________________________ (3)

What does this experiment tell us about this material?
_____________________________________________ (3)
Question 3

(a) Friction is an example of a force. It acts in many ways. The diagram shows a car. When a car is driven, friction can be both useful and not useful.

Give two examples of when friction is useful when a car is driven.
1_________________________________________________  (3)
2_________________________________________________  (3)

Give two examples of when friction is not useful when a car is driven.
1_________________________________________________  (3)
2_________________________________________________  (3)

(b) A bar magnet was hung freely as shown in the diagram.

What happens if the North pole of another magnet is brought close to the North pole of the hanging magnet? ____________________ (3)

What happens if a North pole is brought close to the South pole of the hanging magnet? ____________________ (3)

Draw the pattern made if iron filings are scattered around the bar magnet.       (6)

(c) Describe, with the aid of a labelled diagram, an experiment to show that the atmosphere exerts pressure. (12)

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

SECTION B
Question 4

(a) In each case choose a word from the list on the right to complete the sentences below.

Temperature is a measure of _____________________.  (3)
The upwards movement of air is caused by ________________.  (3)
The insulating quality of a duvet is shown by its ____________________.  (3)
Aeroboard is an example of a good _________________.  (3)

(b) The diagram shows the inside of a three-pin plug.

What colour is the live wire labelled A? ________________ (3)
What colour is the earth wire labelled B? ________________ (3)
What is the purpose of the fuse? _________________________ (3)
Give one reason why it is dangerous to handle a plug with wet hands.
______________________________ (3)

(c) The diagram shows an electric current passing through a coil of wire placed in a beaker of water.

What happens to the water when a current flows through the coil? ________________________________ (3)
What piece of apparatus is needed to measure this change? ________________________________ (3)
Why is the container surrounded with cotton wool? ________________________________ (3)
Name one household appliance that uses this effect of electricity.
______________________________ (3)

SECTION B
SECTION C – CHEMISTRY  (72 MARKS)

There are THREE questions in this Section. Answer any TWO of these questions.

Question 5

(a) Fill in the spaces A, B, C and D using the following words. (12)

FREEZING MELTING CONDENSATION BOILING

Ice → Water → Steam

A

Water → Ice

C

Steam → Water → Ice

D

(b) Water is treated in several ways to make it suitable for drinking. In each case match a treatment from the list on the right with a statement below.

Removes of large floating debris ______________________ (3)

Helps prevent tooth decay _______________________ (3)

Kills bacteria and germs ________________________ (3)

Allows large particles to sink to the bottom of a tank __________________________ (3)

CHLORINATION SETTLING FLUORIDATION SCREENING

(c) There are two types of water hardness, temporary and permanent.

How is temporary hardness removed from water? _______________________________ (3)

Give one advantage of hard water. ____________________________________________ (3)

Give one disadvantage of hard water. _________________________________________ (3)

The same volume of two water samples A and B were tested with soap solution to compare their hardness. The amount of soap solution needed to form a lather was measured and recorded in the table below.

<table>
<thead>
<tr>
<th>Water Sample</th>
<th>Soap Solution (cm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>18</td>
</tr>
</tbody>
</table>

Which sample A or B has the most hardness? ____________________________________ (3)
(a) In each case choose a word from the list on the right to complete the statements below.

The chemical symbol for _______________________ is S. (3)

The chemical symbol for _______________________ is Na. (3)

The gas in needed for burning is ________________. (3)

The gas released from the reaction of zinc with hydrochloric acid is _____________________________. (3)

(b) The apparatus shown in the diagram was set up to prepare and collect carbon dioxide.

Name the solid X. ______________________ (3)

Name the liquid Y. ______________________ (3)

Carbon dioxide turns _______________________ milky. (3)

State one use for carbon dioxide.

_____________________________________________________________________________________ (3)

(c) Describe, with the aid of a labelled diagram, an experiment to separate soil and water. (12)

Labelled diagram
Question 7

(a) In each case choose a word from the list on the right to complete the sentences below. (Note: one of the words is used twice).

_________________ are found outside the nucleus of an atom. (3)

Protons are found in the ____________ of an atom. (3)

These particles of an atom have no charge. ________________(3)

These particles are gained or lost when atoms become ions. _________________ (3)

(b) Litmus indicator is used to test for acids and bases.

What is the colour of litmus in an acid? __________________________ (3)

What is the colour of litmus in a base? __________________________ (3)

The table below shows the pH of four solutions including vinegar and an oven cleaner.

<table>
<thead>
<tr>
<th>Solution 1</th>
<th>Solution 2</th>
<th>Solution 3</th>
<th>Solution 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH = 1</td>
<td>pH = 4</td>
<td>pH = 8</td>
<td>pH = 14</td>
</tr>
</tbody>
</table>

Which solution is vinegar? ____________________________ (3)

Which solution is oven cleaner? ____________________________ (3)

(c) The diagram shows an experiment that can be carried out in the laboratory.

Name the process being investigated in the experiment.

_____________________________ (3)

What happens to the copper electrode?

_____________________________ (3)

What happens to the key?

_____________________________ (6)
SECTION D – BIOLOGY (72 MARKS)

There are THREE questions in this Section. Answer any TWO of these questions.

Question 8

(a) The diagram shows a set of human teeth.

Name the type of teeth labelled A. ___________________ (3)

Name the type of teeth labelled B. ___________________ (3)

Give one function of teeth A. ____________________________________________ (3)

Give one function of teeth B. ____________________________________________ (3)

(b) The diagram shows the human digestive system.

Name part A. ___________________________________ (3)

Name part B. ___________________________________ (3)

What is the main function of B? ___________________________________________ (3)

Name one type of chemical that helps break down food in the digestive system. _____________________________ (3)

(c) The diagram shows the human respiratory (breathing) system.

Name the parts labelled A, B and C.

A __________________________ (3)

B __________________________ (3)

C __________________________ (3)

What do the rings of cartilage do? __________________________________________ (3)
Question 9

(a) The diagram shows the structure of a flower.

Name part A. ____________________ (3)
Name part B. ____________________ (3)

What is produced by the **stamen**?
________________________________ (3)

What is produced by the **carpel**?
________________________________ (3)

(b) A **soil sample** was placed in water in a container, shaken and allowed to stand as shown in the diagram.

Name the soil particles found at A and B.

A ______________________________ (3)
B ______________________________ (3)

Name the soil particles still **suspended** in the water.
________________________________ (3)

Name the substance **floating** on the surface of the water.
________________________________ (3)

(c) Describe, with the aid of a labelled diagram, an experiment to show **that seeds need moisture to germinate**. (12)

[Labelled diagram]

SECTION D
Question 10

(a) The diagram shows a flowering plant.

Give two functions of the root of a plant.

1. _________________________________ (3)
2. _________________________________ (3)

Give two functions of the shoot of a plant.

1. _________________________________ (3)
2. _________________________________ (3)

(b) The diagram shows two pieces of equipment, A and B, which are used in the study of a habitat.

Name the piece of equipment labelled A.

_________________________________ (3)

Give one use for A.

_________________________________ (3)

Name the piece of equipment labelled B.

_________________________________ (3)

Give one use for B.

_________________________________ (3)

(c) The diagrams show an animal cell and a plant cell.

State which diagram, A or B, shows a plant cell.

_________________________________ (3)

State which diagram, A or B, shows an animal cell.

_________________________________ (3)

Name the part of the cells above labelled X.

_________________________________ (3)

Name the part of the cell above labelled Y.

_________________________________ (3)
SECTION E – APPLIED SCIENCE  (72 MARKS)
There are SIX questions in this Section. Answer any TWO of these questions.

Question 11 - Earth Science

(a) In each case choose a number of days from the list on the right to complete the sentences below.

The time taken for the earth to orbit the sun is ______________. (3)
The time taken for the moon to orbit the earth is ______________. (3)
The number of days in a leap year is ______________. (3)
The time taken for the earth to rotate on its own axis is ______________. (3)

(b) Various instruments are used in weather recording stations.

Name the instrument shown in the diagram. ____________________ (3)

Give one use for this instrument. _____________________________ (3)

Name the instrument used to measure atmospheric pressure. ____________________________ (3)

Name the instrument used to measure rainfall. _________________________________ (3)

(c) Describe, with the aid of a labelled diagram, an experiment to show the effect of wind on the rate of evaporation of water.

Labelled diagram

...
Question 12 - Horticulture

(a) Gardeners grow plants in compost or in soil.

What is a compost? _____________________________________________________ (3)

Give one advantage of using a compost?

_____________________________________________________________________ (3)

Give two activities of earthworms which increase the fertility of soils.
1 ____________________________  2 ________________________________ (6)

(b) Name a plant from which we get cut flowers. ______________________  (3)

What is the best time of the day to harvest cut flowers?

_____________________________________________________________________ (3)

Give two ways to keep cut flowers fresh.
1 ____________________________ (3)
2 ____________________________ (3)

(c) Name either of the two pests shown in the diagrams below.

Name ______________ or Name ____________________________ (3)

Name the garden plant on which the pest you have named feeds. ________________ (3)

Name any two stages of the lifecycle of the pest you have named.
1 ____________________________ (3)
2 ____________________________ (3)
(a) Match a **material** from the list on the right with each of the following uses:

<table>
<thead>
<tr>
<th>Use</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coins</td>
<td>___________________</td>
</tr>
<tr>
<td>Floorboards</td>
<td>___________________</td>
</tr>
<tr>
<td>Lunchbox</td>
<td>___________________</td>
</tr>
<tr>
<td>Shirt</td>
<td>___________________</td>
</tr>
</tbody>
</table>

(b) **Care label symbols** are displayed on garments to give information about their care.

(i) What is meant by the **care label symbol** shown?

![Care label symbol](image)

_____________________________ (3)

(ii) Draw the **symbol** you would expect to find on the label of a shirt that can be **tumble-dried**.

[(Image of symbol)](image)

(c) Answer ANY ONE of the questions **A (PLASTICS), B (TEXTILES), C (METALS), D (TIMBER)**, which are on the following two pages.
A - PLASTICS

Polythene is an example of a common plastic.

(i) What is polythene made from? _____________________________________________ (3)

(ii) Give one use for polythene in the home. ______________________________________ (3)

(iii) Describe, with the aid of a labelled diagram, an experiment to compare the flexibility of two plastics. (12)

_________________________________
_________________________________
_________________________________
_________________________________
_________________________________
_________________________________
_________________________________

B - TEXTILES

(i) Name two natural fibres used to make textiles.

1 ________________________________       2 ________________________________ (6)

(ii) Describe, with the aid of a labelled diagram, an experiment to compare the absorbency of two different textiles. (12)

_________________________________
_________________________________
_________________________________
_________________________________
_________________________________
C - METALS

(i) Name one metal that is mined in Ireland. _____________________________ (3)

(ii) Give one use for the metal you have named. _____________________________ (3)

(iii) Describe, with the aid of a labelled diagram, an experiment to compare the hardness of two metals. (12)

D - TIMBER

(i) Name a hardwood tree grown in Ireland. _________________________________ (3)

(ii) Name a softwood tree grown in Ireland. _________________________________ (3)

(iii) Describe, with the aid of a labelled diagram, an experiment to compare the bending strength of two different timbers. (12)
(a) In each case choose a food from the list on the right that is preserved by each method below.

<table>
<thead>
<tr>
<th>Method</th>
<th>Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salting</td>
<td>___________________________ (3)</td>
</tr>
<tr>
<td>Pasteurisation</td>
<td>___________________________ (3)</td>
</tr>
<tr>
<td>Freezing</td>
<td>___________________________ (3)</td>
</tr>
<tr>
<td>Dehydration</td>
<td>___________________________ (3)</td>
</tr>
</tbody>
</table>

(b) **Starch** is an example of a carbohydrate.

Name one food which is a good source of starch. ___________________________ (3)

Name the chemical used to test for the presence of starch.

____________________________________________________________________ (3)

Give one use for carbohydrates in the body. ___________________________ (3)

Name one other food type that should be part of a balanced diet.

____________________________________________________________________ (3)

(c) Describe, with the aid of a labelled diagram, a laboratory experiment to make butter. (12)

Labelled diagram

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________
(a) Study the circuit diagram shown.  

Name the device labelled A. ___________________   (3)  

Name the device labelled B. ___________________   (3)  

What will be observed if the switch D is closed?  

__________________________________________   (3)  

What is C called? ___________________________    (3)  

(b) The diagram shows an LDR.  

An LDR is a light ______________________ resistor. (3)  

Draw the circuit symbol for an LDR.   (3)  

Give one everyday use of an LDR. _______________________________________ (3)  

The resistance of an LDR increases in ______________________light. (3)  

(c) Draw a circuit diagram to show how the brightness of a bulb can be controlled by a variable resistor. (12)  

Circuit diagram
(a) Choose an energy conversion from the list on the right to describe the energy conversion taking place when

you rub your hands together _______________________ (3)
you pluck a guitar string _______________________ (3)
a candle is burning _______________________ (3)
an apple is falling _______________________ (3)

<table>
<thead>
<tr>
<th>CHEMICAL TO LIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINETIC TO HEAT</td>
</tr>
<tr>
<td>KINETIC TO SOUND</td>
</tr>
<tr>
<td>POTENTIAL TO KINETIC</td>
</tr>
</tbody>
</table>

(b) The diagram shows an experiment set up to show the effect of a magnetic field on a current-carrying conductor.

What happens to the aluminium strip when the switch is closed? _______________________ (3)

What would happen to the aluminium strip if the current direction was reversed? _______________________ (3)

Name a device that uses the effect seen in this experiment. _______________________ (6)

(c) The diagram shows the parts of an electromagnet.

Name the metal used to make the core. _______________________ (3)

How could you show that an electromagnet is formed when the switch is closed? _______________________ (3)

State one energy change which takes place in the circuit when the switch is closed. _______________________ (3)

Give one everyday use of an electromagnet. _______________________ (3)
EXTRA WORKSPACE

Indicate clearly the number of the question(s) you are answering.
EXTRA WORKSPACE

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