

WARNING

You must return this paper with your answerbook, otherwise marks will be lost.

EXAMINATION NUMBER

AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA**JUNIOR CERTIFICATE EXAMINATION, 1998****SCIENCE – HIGHER LEVEL****(N.B. Not for Science – Local Studies Candidates)**

TUESDAY, 16 JUNE – AFTERNOON, 2.00 to 4.30

SECTION A (144 marks) TO BE ANSWERED BY ALL CANDIDATES**(See separate sheet for Sections B, C, D and E.)**

Answer *each* of the questions, 1, 2 and 3. There are **TEN** parts in each question. Answer any **EIGHT** parts. All questions carry equal marks. Answer the questions in the spaces provided.

Return this Section of the examination paper. Enclose it in the answerbook you use in answering the other Sections.

1. Answer **eight** of the following, (a), (b), (c), etc.

(a) The unit of force is.....and the unit of pressure is.....

(b) Underline the non-renewable sources of energy in the following list.

WIND NATURAL GAS BIOMASS PEAT TIDE

(c) Give two advantages of friction.

(i)

(ii)

(d) Momentum is theof a body multiplied by its.....

(e) What is the weather likely to be on a summer's day in Ireland when

(i) the atmospheric pressure is high?.....

(ii) the atmospheric pressure is low?.....

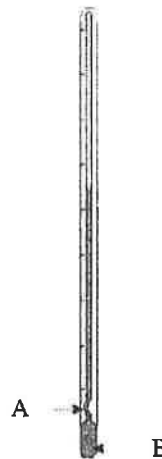
(f) Sublimation occurs when achanges directly to a
when it is heated.

(g) The diagram shows a clinical thermometer.

Name the parts labelled A and B.

A

B



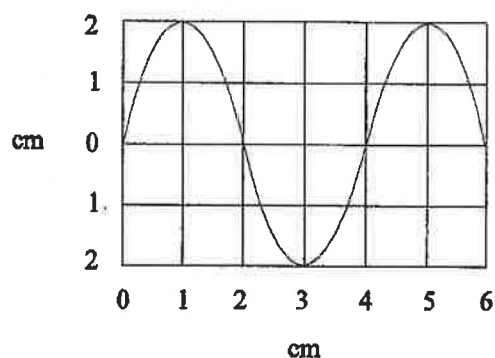
(h) The current flowing in the lamp of a battery-operated torch is called current but the current flowing in a bedside lamp is called current.

(i) The diagram shows a wave as seen on an oscilloscope screen.

Use the diagram to answer the following.

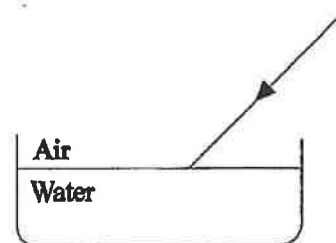
The wavelength =cm.

The amplitude =cm.



(j) The diagram shows a light ray entering water from air.

Show on the diagram the direction of the light ray after it enters the water.



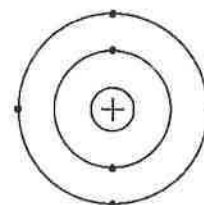
(8 × 6 marks)

2. Answer **eight** of the following, (a), (b), (c), etc.

(a) Name the atom shown in the diagram.

Name.....

Name another atom with the same number of electrons in the outer shell



(b) Underline the gases in the following list which normally exist as separate atoms.

HYDROGEN

HELIUM

NITROGEN

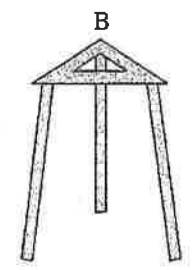
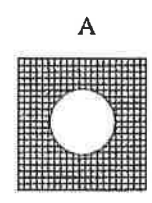
OXYGEN

NEON

(c) Balance the following chemical equation.



(d) Name the two pieces of apparatus, A and B, which are found in the laboratory.



A
B

(e) What type of fire extinguisher is suitable for extinguishing

- (i) burning oil?
- (ii) burning fabric or cloth?

(f) How would you show that a water sample was soft?

Give one disadvantage of hard water

(g) Arrange the following metals in order of their decreasing reactivity.

CALCIUM GOLD MAGNESIUM SODIUM

.....

Gold is often used as a filling for teeth because it looks attractive. Give another reason for using gold as a filling.

.....

(h) Name an indicator

What colour will this indicator be in sulphuric acid?

(i) Table salt and sugar both dissolve in water but only the salt solution conducts electricity.

Give a reason for this

(j) Name a group in the periodic table in which the elements have a valency of one.

..... **(8 × 6 marks)**

3. Answer **eight** of the following, (a), (b), (c), etc.

(a) Name the part of the living plant cell which

- (i) controls the cell's development
- (ii) protects the cell and gives it support

(b) Human nutrition occurs in five stages. Name the first and last stages.

First stage..... Last stage.....

(c) Two types of human tooth are shown in the diagram.

Name A and B.



A..... B.....

(d) Underline the number of beats per minute which would indicate the average heartbeat of an adult at rest.

32 54 72 98 108

(e) The following table shows two substances excreted by the human body. Complete the table by naming the organs responsible.

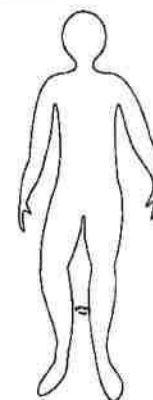
SUBSTANCE	ORGAN
Carbon dioxide	
Urea	

(f) The blood vessel which carries blood away from the heart is called the.....

The blood vessel which returns blood to the heart is called the

(g) The diagram shows an outline of the human body.

Name an endocrine gland in the body



.....
Use an X on the diagram to indicate the approximate location of the gland which you have named.

(h) Name two substances that pass from a mother to her baby during pregnancy.

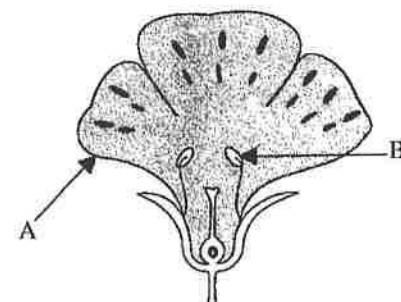
(i).....(ii).....

(i) The diagram shows a primrose flower.

Name the parts A and B.

A.....

B.....



(j) Give two sources of air pollution.

(i).....(ii).....

(8 × 6 marks)

AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA

JUNIOR CERTIFICATE EXAMINATION, 1998

45570

SCIENCE – HIGHER LEVEL

(N.B. Not for Science – Local Studies Candidates)

TUESDAY, 16 JUNE – AFTERNOON, 2.00 to 4.30

Section A is on a separate sheet which provides spaces for your answers. The completed sheet should be enclosed in your answer book.

SECTIONS B, C, D, E

These sections should be answered in your answer book.

Answer ONE question from each of the Sections B, C and D. All questions carry equal marks.

Answer TWO questions from Section E. All questions carry equal marks.

SECTION B – PHYSICS (48 marks)

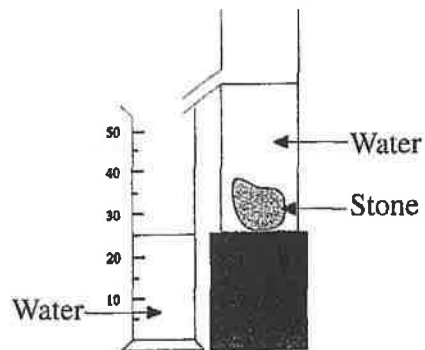
Answer either question 4 or question 5.

- 4. (a) Explain the terms (i) mass, (ii) density. (6)

Describe an experiment to measure the density of a liquid. (9)

The stone in the diagram has a mass of 100 g. What is the density of the stone? (6)

Is the stone more dense than water? Give a reason for your answer. (6)



- (b) The following table shows the time taken for a train to stop on a dry track when the brakes are applied at different speeds.

Table with 2 columns: SPEED OF TRAIN (metres per second) and TIME TAKEN TO STOP (seconds). Rows show speeds from 10 to 60 m/s and corresponding stopping times from 2 to 12 seconds.

Draw a graph on graph paper of SPEED (x-axis) against TIME (y-axis). (9)

Use the graph to find:

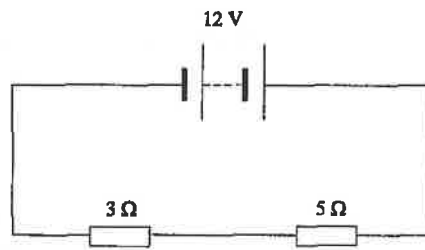
- (i) the time taken for the train to stop when it is travelling at 45 metres per second; (6)
- (ii) the speed of the train if it stops in 5 seconds. (6)

What difference would you expect in the time taken to stop if there were wet leaves on the track? Give a reason for your answer. (6)

5. (a) State Ohm's law. (6)

Draw a diagram of a circuit that you would use to verify Ohm's law. (6)

The diagram shows a circuit with two resistors and a 12 volt battery.



Calculate the value of the current which flows in the circuit. (9)

What term is used to describe materials which will not allow current to flow through them? (3)

(b) Explain how a magnetic compass works. (6)

Describe an experiment to plot the magnetic field around a wire which is carrying a current. (12)

Draw a diagram to show the magnetic field around a bar magnet. (6)

m/d

SECTION C – CHEMISTRY (48 marks)

Answer **either** question 6 or question 7.

6. (a) Give an example of a mixture which is a solution. (3)

Describe how you would make a dilute solution more concentrated. (6)

Many techniques are used, in the laboratory, to separate mixtures.
Name the most suitable method to separate each of the following mixtures.

(i) Sand and seawater.

(ii) Crude oil and seawater.

(iii) Pure water and salt. (9)

Describe, with the aid of a suitable diagram, how any ONE of the above separation techniques is carried out in the laboratory. (6)

- (b) Give two properties of oxygen. (6)

Describe an experiment to prepare oxygen in the laboratory. (12)

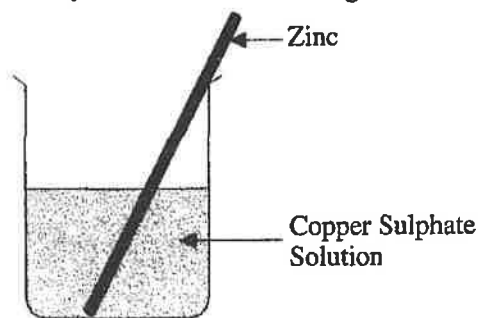
Name two gases, other than oxygen, which are found in clean air. (6)

7. (a) Explain what is meant by (i) oxidation, (ii) reduction. (6)

Name the substance oxidised and the substance reduced in the following equation.



A zinc rod is placed in a copper sulphate solution for a few days as shown in the diagram.



What will happen to the zinc rod? (3)

- (b) Explain what is meant by corrosion. (3)

Give one way in which this process may be slowed down. (3)

Describe, with the aid of a diagram, an experiment you would perform to show which of the metals IRON, ZINC and COPPER will corrode most quickly. (9)

- (c) Draw a labelled diagram of a simple cell and explain how it works. (12)

Give two differences between a dry cell and a simple cell. (6)

SECTION D – BIOLOGY (48 marks)

Answer **either** question 8 **or** question 9.

8. (a) What is a synovial joint? (3)

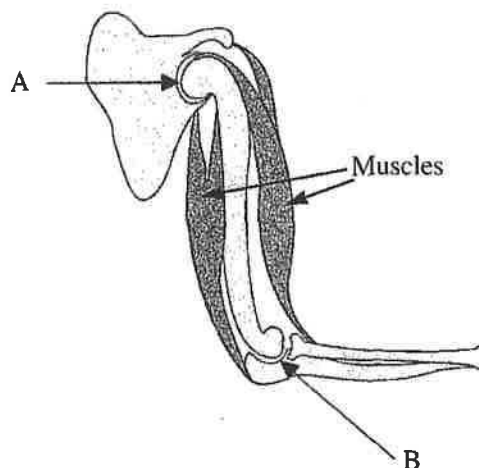
The diagram shows the human arm.

Name the types of synovial joint at A and at B. (6)

Explain how friction is reduced in a synovial joint. (6)

The muscles in the diagram are called “an antagonistic pair”.

Explain the role that these muscles play in the movement of the forearm. (9)



(b) What is respiration? (6)

Write an equation for respiration in a living organism. (6)

Describe, with the aid of a suitable diagram, an experiment to show that a named organism respire. (12)

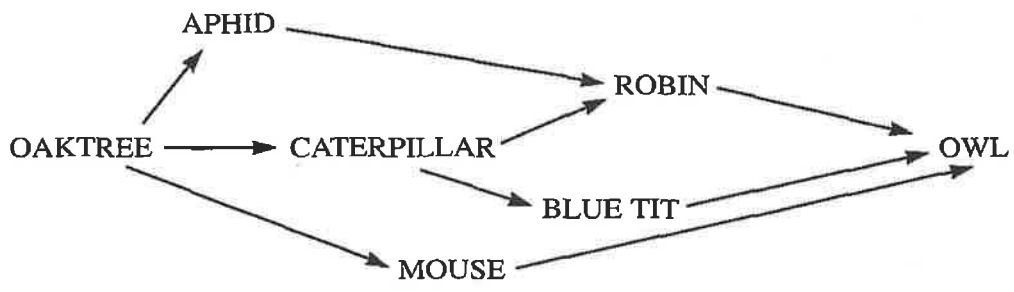
9. (a) Explain what is meant by photosynthesis. (6)

Describe an experiment you would carry out with a green plant in the school laboratory to show that light is necessary for photosynthesis to take place.
Use the following headings as a guide:

- (i) preparation of the plant for the experiment;
- (ii) allowing photosynthesis to take place;
- (iii) testing for the product of photosynthesis;
- (iv) results. (18)

Name another factor, apart from light, which is necessary for photosynthesis. (3)

(b) The diagram shows a food web for a common habitat.



- (i) Name the producer in this food web.
Write a food chain from this habitat.
To what trophic level does the robin belong? (9)

- (ii) From the fieldwork study of a habitat which you have carried out select one organism and explain how it has adapted to its habitat. (6)
Give an example of interdependence in this habitat. (6)

SECTION E – APPLIED SCIENCE (72 marks)

Answer any **two** questions from this section.

10. EARTH SCIENCE. Answer any **two** of the following, (a), (b), (c).

(a) What is the Solar System? (3)

Name a planet in the Solar System other than Earth and compare it to Earth under the following headings:

(i) distance from the Sun;

(ii) surface temperature. (6)

Give one reason that the planet you have named is unable to support life as we know it. (3)

Explain, using a diagram, how a solar eclipse occurs. (6)

(b) (i) Stars begin their life as clouds of dust and gas.
Describe the main stages in the life cycle of a star. (12)

(ii) What is fog?
Outline the conditions necessary for fog to form. (6)

(c) In meteorological stations the following are regularly measured:

(i) rainfall;

(ii) wind speed;

(iii) atmospheric pressure.

Name the instrument used to measure each of these quantities. (9)

Select ONE of the instruments which you have named and draw a labelled diagram of it.
Explain how the measurement is taken. (9)

11. **HORTICULTURE.** Answer any two of the following, (a), (b), (c).

(a) Many seeds require a period of dormancy before they will germinate. Explain the underlined terms. (6)

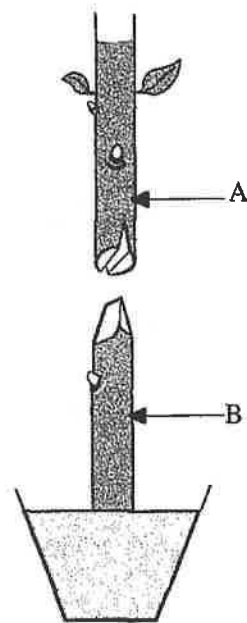
Describe an experiment to show a condition necessary for seeds, such as cress seeds, to germinate. (12)

(b) What is a garden mulch? Give two advantages of a named mulch. (9)

Name a common garden pest. Describe how the pest you have named may be controlled biologically. Why is this method of control preferred to a chemical method? (9)

(c) What is grafting? (3)

Name the parts A and B shown in the diagram. (6)



Describe the steps you would take for successful grafting. (9)

12. MATERIALS SCIENCE. Answer both parts.

(a) What is an alloy?

Give one example of an alloy and state a use that is made of it. (9)

Draw the symbol found on the care label of a shirt which indicates that the shirt:

(i) should be ironed with a warm iron;

(ii) should not be washed with bleach. (6)

(b) Answer **one** of the following.

(i) **PLASTICS**

Some plastics are “biodegradable”. What does this mean? (6)

Describe an experiment to compare two plastics for hardness. (15)

(ii) **METALS**

Name a metal and an ore from which it is extracted. (6)

Describe an experiment to compare the rates at which different metals conduct heat. (15)

(iii) **TEXTILES**

Name two natural textiles. (6)

Describe an experiment to compare the heat insulating properties of two fabrics. (15)

(iv) **TIMBER**

Name two hardwoods. (6)

Describe the process involved in the manufacture of plywood. (15)

13. **FOOD.** Answer any **two** of the following (a), (b), (c).

(a) What is meant by a balanced diet? (3)

Describe a dinner menu and explain how it would contribute to a balanced diet. (12)

Give one common source of vitamin C in the human diet. (3)

(b) The following information was printed on a packet of biscuits.

INGREDIENTS: Wheatflour, Sugar, Vegetable oil and hydrogenated vegetable oil,
Cocoa powder, Raising agent, Salt, E163, E471, Flavouring.

Which ingredient is present in the greatest quantity? (3)

What is an E number?

State the information that each of the two E numbers on the packet gives the consumer. (9)

Explain the role of antioxidants in food. (6)

(c) Fermentation is used in the brewing and baking industries.

Write a word equation for the fermentation of sugar. (6)

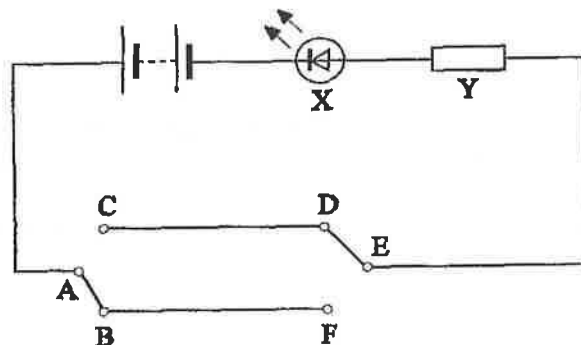
Describe, using a diagram, an experiment to show the fermentation of sugar. (12)

14. ELECTRONICS. Answer both parts.

(a) The diagram shows a circuit with a two-way switch.

Name the devices labelled X and Y.

(6)

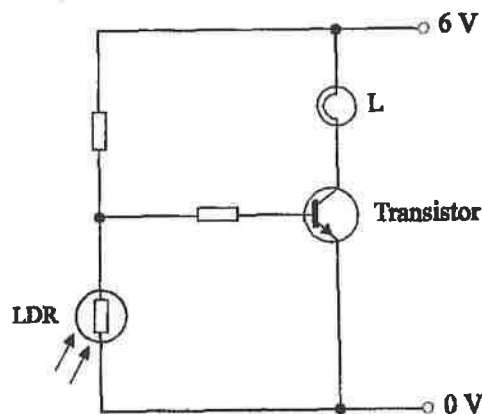


Using the letters in the circuit diagram explain how the two-way switch works.

Give one use for a two-way switch in the home.

(12)

(b) The diagram shows an LDR and a transistor in a circuit.



What do the letters LDR mean?

(3)

Name the terminal of the transistor which is connected to the lamp L.

(3)

The lamp L is off while light shines on the LDR.

Explain why the lamp L comes on when you cover the LDR with your hand.

(6)

Suggest a use that could be made of this circuit.

(6)

15. ENERGY CONVERSIONS. Answer **both** parts.

(a) What is the unit in which energy is measured? (3)

Give an everyday example of the following energy changes.

- (i) Chemical energy to heat energy.
- (ii) Light energy to electrical energy. (6)

Describe an experiment to show that energy is released from food. (9)

(b) You are supplied with a battery, a switch, a length of insulated wire and an iron nail.



Explain how you would construct an electromagnet. (9)

Describe how you would check that the electromagnet was working.

What energy change occurs when the electromagnet is switched on? (9)