

WARNING

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

Examination Number

47960

AN ROINN OIDEACHAIS**JUNIOR CERTIFICATE EXAMINATION, 1995****SCIENCE – HIGHER LEVEL****TUESDAY, 13 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, 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 answer-book you use in answering the other Sections.

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

(a) Name an instrument which may be used

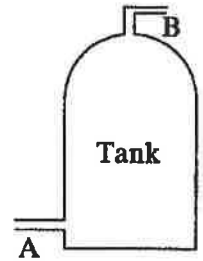
(i) to measure the external diameter of a small pipe.

(ii) to measure the distance by road between two places from a map.

(b) The diagram shows a hot water tank used in the home.

Which of the two pipes A or B should be connected to the hot water tap?

Give a reason for your choice.



(c) Atmospheric pressure varies with height above sea level. Give an everyday use made of this variation.

(d) Name one **renewable** source of energy.

Give an advantage of renewable sources of energy.

(e) Give an example of a body in

(i) stable equilibrium.

(ii) unstable equilibrium.

(f) What is meant by sublimation?

- (g) State one method by which friction between two surfaces may be reduced.

- (h) The three pins of an electric plug are marked N, L and E.

What colour wire should be connected to

- (i) the pin marked N?

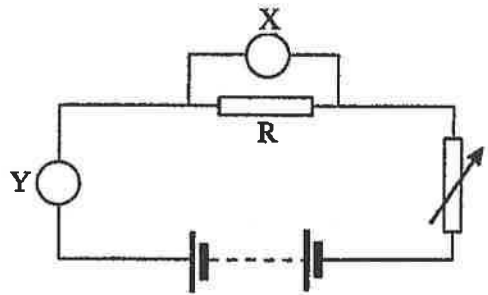
- (ii) the pin marked L?

- (i) The circuit shown in the diagram was used in an experiment to measure the resistance of R.

Name each of the meters shown in the diagram.

X _____

Y _____



- (j) Give a use commonly made of radioactive substances.

(8 × 6 marks)

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

(a) Name the piece of glassware shown in the diagram.

What is the function of the piece of glassware?



(b) Underline the non-metals in the following list

COPPER MAGNESIUM CARBON CALCIUM CHLORINE

(c) What is meant by the term alloy?

Give an example of an alloy. _____

(d) What is meant by the mass number of an atom?

(e) Give two properties of the halogens.

(i) _____

(ii) _____

(f) In a negatively charged ion the number of _____ is greater than the number of _____.

(g) Complete the following equation.



(h) Name the stages labelled X and Y in the treatment of water.



X _____

Y _____

(i) Oxygen may be prepared in the laboratory by adding _____
to _____.

(j) When a voltage is applied to water to which a little sulphuric acid has been added an electric current passes. This process is called _____.

At the electrodes _____ and _____ are released.

(8 × 6 marks)

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

(a) Give **two** differences between a plant cell and an animal cell.

(i) _____

(ii) _____

(b) What is a tissue?

Give **one** example of an animal tissue _____

(c) State **two** characteristics of living things.

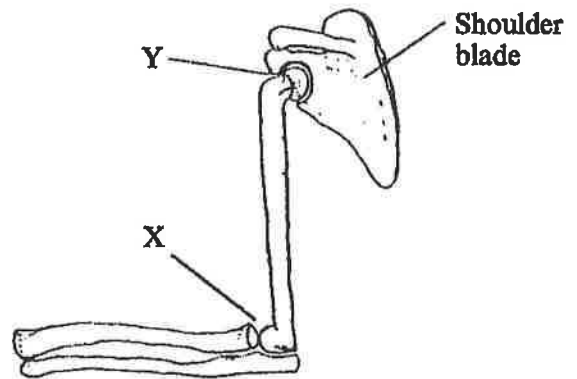
(i) _____

(ii) _____

(d) Name the type of joint at X and at Y in the diagram.

X _____

Y _____

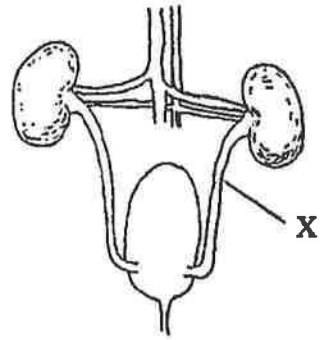


(e) Imagine that seeds were **not** dispersed. Give a consequence of this.

(f) The diagram shows the urinary system.

Name the tube X.

What is the function of the kidney?

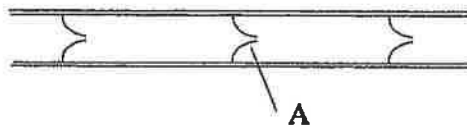


(g) What is meant by asexual reproduction?

(h) Phototropism is the response of a plant to _____

How does the plant benefit from phototropism?

(i) The diagram is a section through a blood vessel. Name this type of blood vessel.



Name _____

What is the function of A?

(j) Some athletes train at high altitude in order to increase the number of red corpuscles in their blood. Explain why this increase may help them to improve their performance.

(8 × 6 marks)

AN ROINN OIDEACHAIS

S37

JUNIOR CERTIFICATE EXAMINATION, 1995

SCIENCE – HIGHER LEVEL
(N.B. Not for Science – Local Studies candidates)

TUESDAY, 13 JUNE – AFTERNOON, 2.00 to 4.30

SECTION A

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) Describe how you would plot the magnetic field of a bar magnet. (9)

Show how you would determine which is the north pole and which is the south pole of a magnet. (6)

Explain how you would magnetise a piece of iron. (6)

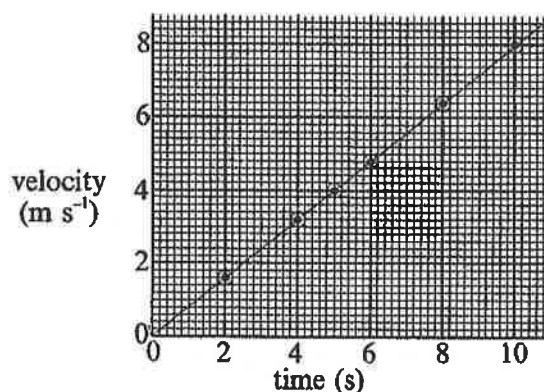
Give an everyday use of magnets. (3)

- (b) What is meant by acceleration? State the unit in which acceleration is measured. (9)

A car is travelling in a particular direction along a straight road. The graph shows the velocity of the car over the first 10 seconds of the journey.

Use the information on the graph to obtain

- (i) the velocity of the car after 7.5 seconds;
 (ii) the time taken by the car to reach a velocity of 5 metres per second;
 (iii) the acceleration of the car. (15)



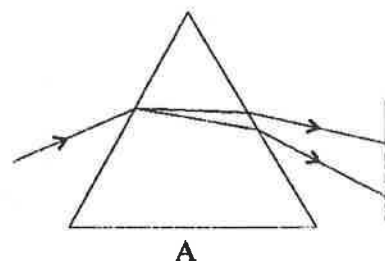
5. (a) Define density.

Why do icebergs float? (9)

Describe, using a labelled diagram, how you would measure the density of a liquid in the laboratory. (9)

An object of mass 12 g has a volume of 6 cm³. Calculate its density. [6]

- (b) Describe an experiment to show that light travels in a straight line. Sketch a labelled diagram to show the reflection of light. (12)



The diagram shows a narrow beam of white light which has been caused by an object A to break up into a number of colours. Name this phenomenon. What is the object A? (6)

If waves in water have a speed of 1 m s⁻¹ and a wavelength of 10 m, calculate the frequency of the waves. (6)

SECTION C – CHEMISTRY (48 marks)

Answer either question 6 or question 7.

6. (a) Give two differences between a mixture and a compound. (6)

On a visit to the seashore a jar of seawater containing different salts was collected. When the jar of seawater was examined in the laboratory it was found to have sand at the bottom.

Describe with the aid of diagrams how you would get

- (i) a pure sample of sand;
 (ii) a pure sample of the mixture of salts in the seawater. (12)

Give the name and chemical formula of a salt present in seawater. (6)

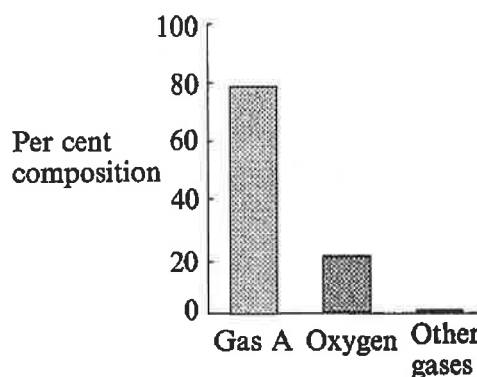
- (b) The bar chart shows the main constituents of air.

What is gas A?

Draw the electron arrangement for an atom of oxygen.

Name one other gas present in air. (12)

Describe, using a diagram, an experiment to show that the percentage of oxygen shown on the bar chart is correct. (12)



7. (a) Lithium, sodium and potassium belong to the same group in the periodic table. What is the name of this group? How are these elements stored in the laboratory? Describe what you would observe when a small piece of sodium is placed in a beaker of water containing red litmus paper. (12)

Write a balanced chemical equation for the reaction of sodium with water. (6)

- (b) Give an advantage and a disadvantage of either (i) hard water or of (ii) soft water. (6)

In what sort of area is hard water usually found? (3)

In an experiment to test for hardness in water, three test tubes were prepared as follows.

Test Tube	Contents
A	Deionised water
B	Deionised water and calcium hydrogen carbonate
C	Deionised water and calcium sulphate

Describe how you would test each of the water samples for hardness.

What results would you expect to obtain? (15)

Explain how you would remove permanent hardness from water. (6)

SECTION D – BIOLOGY (48 marks)

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

8. (a) The apparatus shown was set up in an experiment to investigate the action of the enzyme in saliva on starch.

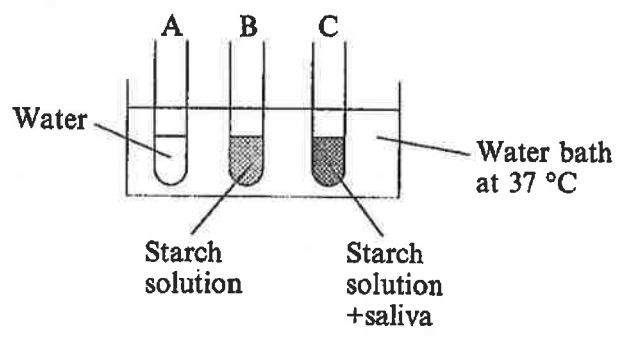
Name a food which is rich in starch. (3)

Name the enzyme present in saliva. (3)

Why are the test tubes kept at 37 °C? (3)

Describe how you would test for the presence of starch. (6)

State clearly the result you would expect to obtain for a starch test on the contents of **each** of the test tubes A, B and C at the end of the experiment. What can you conclude from these results? (9)

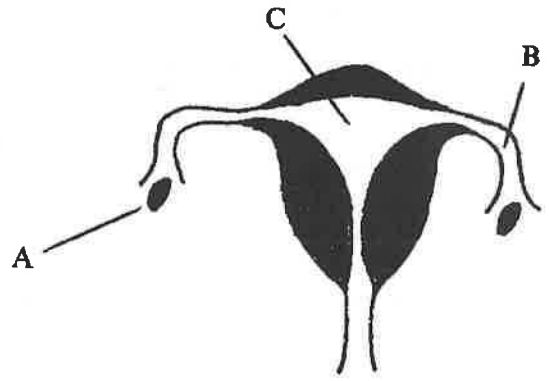


(b) The diagram shows the female reproductive system.

Name the parts A, B and C. (9)

What is meant by implantation? Where does implantation occur? (9)

What is meant by the menstrual cycle? (6)



9. (a) Why is transpiration necessary for a plant? (3)

State **two** factors which affect the rate of transpiration. In the case of one of the factors, state how it affects the rate of transpiration. (9)

Describe, using a labelled diagram, an experiment to show that a green plant undergoes transpiration. (12)

- (b) During a habitat study of a field, a group of students recorded the number of plants of a certain species at measured distances from the base of a tree.

Their results are shown in the following table.

Distance from tree/m	0	2	4	6	8	10	12
Number of plants/unit area	0	12	23	42	82	105	105

- (i) Name an apparatus which the students could have used in order to estimate the plant numbers per unit area. Explain how the apparatus is used. (6)
- (ii) How many plants per unit area would you expect to find at a distance of 14 metres from the tree? (3)
- (iii) Suggest an explanation for the variation in the number of plants as shown in the table. (6)

The following are some of the organisms observed during the habitat study.

oak tree, aphid, caterpillar, spider, blackbird, owl.

Construct a food web involving all of these organisms. (6)

What name is given to the trophic level which contains the oak tree? (3)

SECTION E – APPLIED SCIENCE (72 marks)

Answer **two** questions from this Section.

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

(a) What is the solar system? (6)

Explain, using diagrams, how each of the following occurs.

(i) Summer and winter.

(ii) An eclipse of the sun. (12)

(b) What is meant by humidity? (3)

Describe how you would measure humidity. (9)

Explain how frost is formed. (6)

(c) State Boyle's law. (6)

Describe a laboratory experiment to demonstrate Boyle's law. (12)

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

- (a) Name a medium other than soil which can be used to grow plants. Give an advantage which this medium has over soil. (6)

Name **two** nutrients which must be present in a soil to ensure the healthy growth of a plant.

Explain how you would measure the pH of a soil sample. (12)

- (b) Why is dormancy important for a seed? (6)

Explain the terms (i) biennial plant, (ii) perennial plant. (6)

Describe how you would grow a plant such as lettuce from seed. (6)

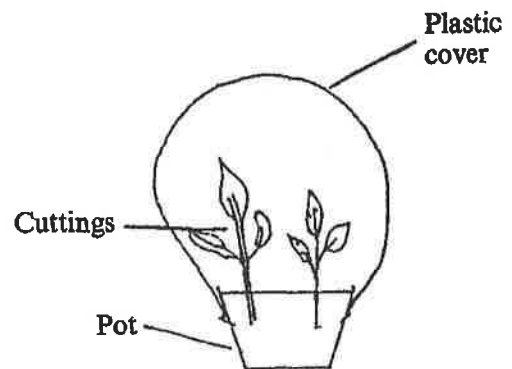
- (c) The diagram shows some softwood cuttings which have just been potted.

(i) Describe how the cuttings were taken. (6)

(ii) Explain why the plastic cover should be transparent. (3)

(iii) How would you prepare the pot for the cuttings? (3)

(iv) Where should the cuttings be kept after potting up? (3)



Name **one** method of vegetative plant propagation other than taking a cutting. (3)

12. MATERIALS SCIENCE. Answer both parts.

(a) Choose a material which is suitable for **each** of the following and in **each case** give a reason for your choice.

(i) A handle for a cooking utensil.

(ii) A duvet for your bed.

(iii) Reinforcing a concrete slab.

(9)

State what each of the following hazard symbols signifies.

(9)



(b) Give an account of any **two** of the following.

(i) Extraction of a metal from its ore.

(ii) Production of yarn from textile fibres.

(iii) Production of a plastic from oil.

(iv) Manufacture of chipboard.

(18)

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

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

The following foods

milk, carrots, potatoes, meat, fruit

may all be part of a lunch in a balanced diet.

Give one food in each case from the above list which is

(i) rich in carbohydrates,

(ii) rich in protein. (6)

Describe a laboratory experiment to test for the presence of protein. (9)

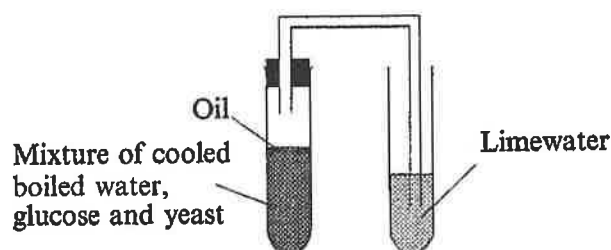
(b) In an experiment to produce alcohol from sugar, the apparatus shown below was placed in a warm room.

Why is it necessary

(i) to boil the water and

(ii) to cool the water, before using it?

What is the function of the thin layer of oil?



Describe what you would observe after about 30 minutes. Explain your observation. (15)

Name **one** industry other than brewing which depends on fermentation. (3)

(c) Why is it necessary to preserve food? (3)

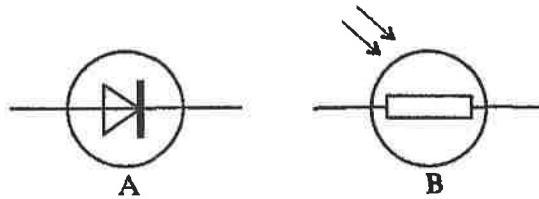
Some foods are preserved by storing in a sugar syrup. Name a food which is preserved in this way. Explain how the syrup preserves the food. (9)

Name **two** other methods of food preservation. (6)

14. ELECTRONICS. Answer both parts.

(a) Identify A and B in the diagram.

(6)



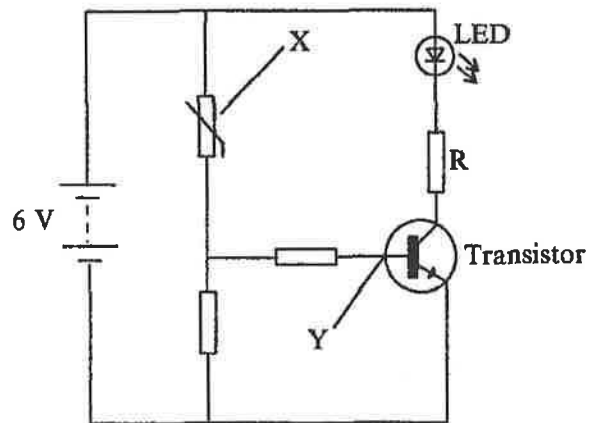
Draw two circuits consisting of a 6 volt battery, a lamp and two switches so that:

- (i) the lamp will light when **either** switch is closed;
- (ii) the lamp will only light when **both** switches are closed.

(12)

(b) The diagram shows a transistor circuit containing a thermistor X. When the thermistor is heated the LED lights up.

- (i) What is the terminal of the transistor labelled Y called? (3)
- (ii) What is the function of a thermistor? (3)
- (iii) Explain why the LED lights when the thermistor is heated. (6)
- (iv) Why does the LED have a resistor R connected in series with it? (3)
- (v) Suggest a use for this circuit. (3)



15. ENERGY CONVERSIONS.

What is meant by kinetic energy? Describe an experiment to show the conversion of kinetic energy to electrical energy. (12)

The diagram shows a simple electric bell.

Explain how the electric bell works. (18)

State two energy conversions that occur in the electric bell. (6)

