S37A

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

EXAMINATION NUMBER

AN ROINN OIDEACHAIS

48672

JUNIOR CERTIFICATE EXAMINATION, 1994

SCIENCE – HIGHER LEVEL

TUESDAY, JUNE 14 – AFTERNOON 2.00 – 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 a planet of the solar system other than Earth and give one reason why the planet you have named is not able to support life as we know it.

Name _____ Reason _____

_____

(b) The table shows the densities of two solid objects A and B.

Solid	Density
A	0.8 g cm^{-3}
B	1.2 g cm^{-3}

State what would be observed when both objects are placed in a beaker of water

_____

_____

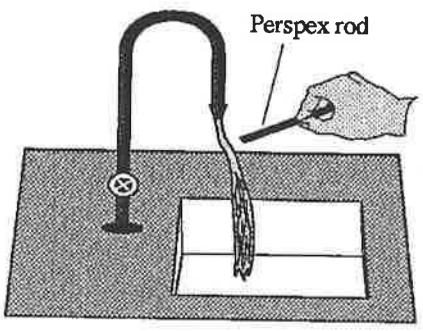
_____

(c) The perspex rod in the diagram was rubbed with a cloth. When the perspex rod was brought close to the stream of water, the stream was deflected as shown. Explain.

_____

_____

_____



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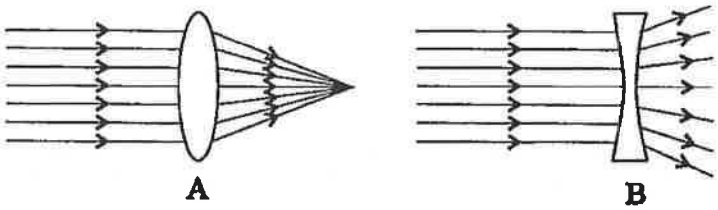
(d) The diagram shows the effect of two different lenses A and B on a beam of light. State the type of lens in each case.

A _____ B _____



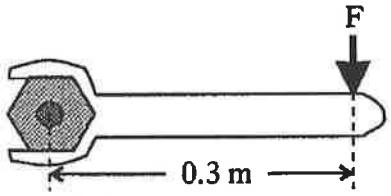
(e) Give a use commonly made of

(i) microwaves _____

(ii) X-rays _____

(f) When a force F is applied to the spanner as shown in the diagram the moment of the force is 4.5 N m. What is the value of F?

_____



(g) State one difference between an ordinary mercury thermometer and a clinical thermometer. Give a reason for the difference.

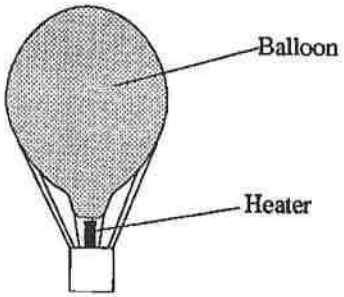
Difference _____

Reason _____

(h) The diagram shows a hot air balloon in flight. Why does the balloon descend when the heater is turned off? _____

_____

_____

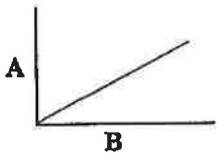


(i) The unit in which electrical energy is measured by the E.S.B. is the _____

A 2 kW electric heater operating for a time of 6 hours will use _____ units of electrical energy.

(j) The graph shown was obtained in an experiment to verify Ohm's law. What is represented by the axis labelled A and by the axis labelled B?

A _____ B _____



(8 x 6)

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

(a) What is meant by distillation? _____

State a mixture which may be separated by distillation _____

(b) What is meant by an endothermic reaction? _____

_____

Give an example of an endothermic reaction. _____

_____

(c) The Periodic Table was first compiled by the Russian scientist named _____

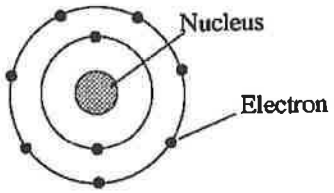
In 1869. He arranged the elements in order of increasing _____

(d) Name the group of elements to which argon belongs _____

Give a reason for filling electric light bulbs with argon rather than with air _____

_____

(e) The diagram shows the electronic structure of an atom of an element.



How many protons are there in the nucleus of this atom?

_____

Name the element _____

(f) State the purpose of chlorination in the treatment of water for home use _____

_____

State one other stage in the treatment of water for home use _____

(g) Complete and balance the following chemical equation

$$Na + H_2O \longrightarrow$$

(h) State (i) the substance reduced, (ii) the substance oxidised, in the reaction

$$CuO + H_2 \longrightarrow Cu + H_2O$$

(i) _____ (ii) _____

(I) State two effects which acid rain can have on the environment.

1. _____

2. _____

(J) Underline the metal in the following list which reacts with dilute hydrochloric acid.

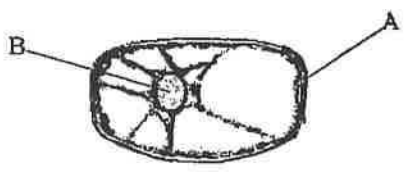
zinc copper mercury silver gold

Give the equation for the reaction of the metal with hydrochloric acid

_____

(8 x 6)

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



(a) The diagram shows a plant cell.

Name the parts labelled A and B.

A. _____ **B.** _____

(b) Name two types of tooth in the human adult.

1. _____ **2.** _____

(c) Name a hormone _____

Give the function of the hormone which you have named _____

_____

(d) Give two common sources of water pollution

1. _____

2. _____

(e) State how starch is converted to glucose in digestion in the human _____

_____

_____

(f) Name a substance which is excreted by the human body _____

Give the principal organ of excretion of the substance which you have named _____

(g) State two features of a flower which make it suitable for insect pollination.

(i) _____

(ii) _____

(h) Put a tick (√) in the box to indicate the weather conditions which favour the highest rate of transpiration in plants.

DULL, WET, CALM ☐ SUNNY, WET, CALM ☐ SUNNY, DRY, WINDY ☐

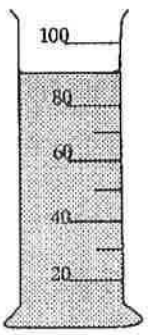
SUNNY, DRY, CALM ☐ DULL, DRY, WINDY ☐

(i) The release of an egg from the ovary in the human female menstrual cycle is called _____

If the egg is not fertilised then _____ will occur.

(j) 50 cm^3 of water was added to 50 cm^3 of soil in a graduated cylinder and the resulting mixture was shaken.

The result is shown in the diagram.



Circle the correct value for the percentage of air in the soil sample.

5 10 20 40 90 100

(8 x 6)

AN ROINN OIDEACHAIS

JUNIOR CERTIFICATE EXAMINATION, 1994

48312

SCIENCE – HIGHER LEVEL

(N.B. Not for Science - Local Studies candidates)

TUESDAY, JUNE 14 – AFTERNOON 2.00 – 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)** What is meant by pressure?
In what unit is pressure measured? (9)

Outline a simple experiment to show that the atmosphere exerts a pressure. (9)
The diagram shows a simple mercury barometer. Explain how it is used to measure atmospheric pressure.

What would be observed to happen if the barometer was moved to the top of a high mountain?

The boiling point of water on top of Mount Everest can be as low as 80 °C. Give the reason for this. (15)

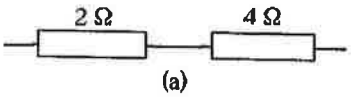
(b) State the unit in which heat is measured.

Name the **three** means by which heat is transferred.
Explain **one** of the means of heat transfer which you have named. (15)

5. What is meant by an electric current? Name (i) a good conductor, (ii) a good insulator. (9)
Outline experiments to show **two** of the following:

(i) the magnetic effect of a current,
(ii) the heating effect of a current,
(iii) the chemical effect of a current. (18)

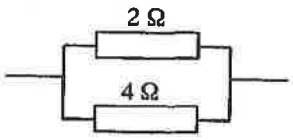
Give **one** everyday application of **each** of (i), (ii) and (iii) above. (9)



(a)

The diagrams show two arrangements of resistors.
Calculate the resistance of the arrangement of resistors in (a).

Sketch the circuit which you would use in an experiment to measure the resistance of the arrangement of resistors in (b). (12)



(b)

SECTION C - CHEMISTRY (48 marks)

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

6. (a) A solution is an example of a mixture.
Explain the underlined terms. (6)
Explain how you would make up (i) a dilute solution, (ii) a concentrated solution, in the laboratory. (12)

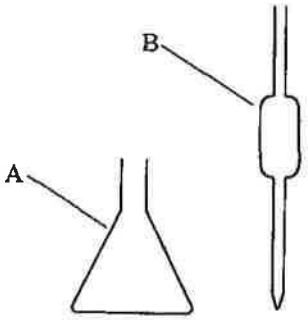
Name a substance which does not form a solution with water. Name a solvent with which it will form a solution. (6)

(b) Carbon dioxide is a compound containing two elements. Explain the underlined terms. (6)

Outline how you would prepare carbon dioxide in the laboratory. Give the chemical equation for the reaction.
How would you test for carbon dioxide?
Give one everyday use of carbon dioxide. (18)

7. (a) Explain the term "neutralisation". (6)

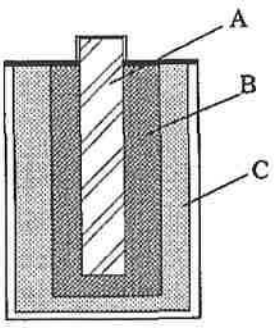
The diagram shows some of the apparatus which may be used in the laboratory to prepare a sample of the salt, sodium chloride.



Name the items labelled A and B.
Describe how the salt, sodium chloride, is prepared. (18)

(b) Describe, using a simple diagram, a laboratory experiment to compare the voltages produced by different combinations of metals in a suitable electrolyte. (12)

The diagram shows the structure of a dry cell.
Name the parts labelled A, B, C.
What is the advantage of a dry cell over a simple cell? (12)



SECTION D - BIOLOGY (48 marks)

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

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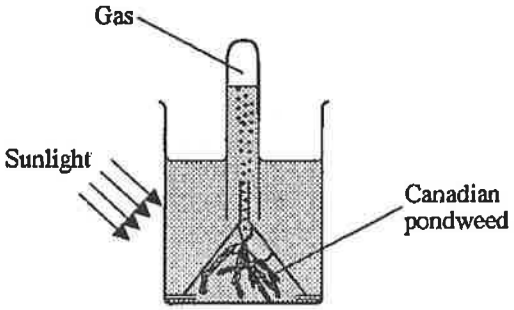
8. **(a)** Give the chemical equation for photosynthesis.

State the conditions necessary for photosynthesis to occur. (15)

Describe a laboratory experiment to demonstrate one of the conditions necessary for photosynthesis.

The diagram shows an experiment which was carried out in the laboratory.



What was the purpose of this experiment? (18)

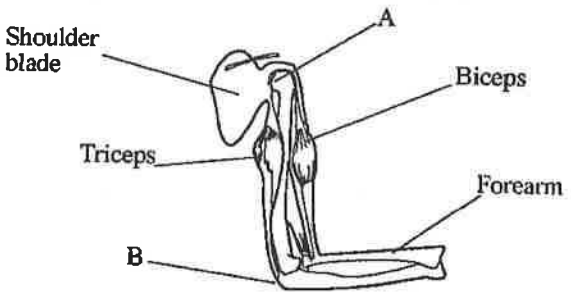
(b) Describe, with the aid of a labelled diagram, how you would show in the laboratory that nitrogen is necessary for healthy plant growth. (12)

Name one other mineral necessary for healthy plant growth. (3)

9. **(a)** State the function of (i) ligaments, (ii) tendons. (6)

The diagram shows the muscles which are responsible for the movement of the forearm.

Describe how the movement of the forearm is controlled by the muscles shown in the diagram. (6)



Name the type of joint

(i) at A,

(ii) at B.

State one other location on the human skeleton where a joint similar to that at A may be found. (9)

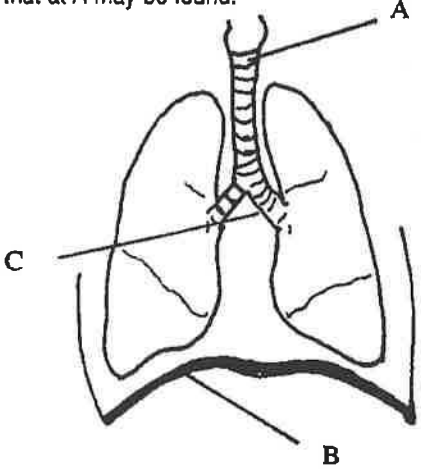
(b) Give a simple equation for respiration. (6)

The diagram shows part of the human breathing system. Name the parts labelled A and C. (6)

State the function of the part labelled B. (6)

Name the part of the lung where the exchange of gases takes place.

Explain how the exchange of gases takes place. (9)



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) The Moon is a satellite of the Earth.
Explain the underlined term.
Name any TWO phases of the Moon. (9)

In December 1992 a lunar eclipse was seen in many parts of Ireland.
Explain, with the aid of a diagram, how a lunar eclipse occurs. (9)

(b) State Boyle's law.
Outline an experiment to verify this law. (12)

The volume of a definite mass of gas is 400 cm^3 when the pressure is 2400 Pa. Calculate the volume of the gas when the pressure is reduced to 2000 Pa, without changing the temperature of the gas. (6)

(c) In meteorological stations throughout the country, the following information is recorded at regular intervals.

(i) Wind speed.
(ii) Rainfall amount.

Draw labelled diagrams of the instruments used to measure **each** of the above. (12)

Describe how you would set about keeping a record of rainfall amounts at a particular place over a period of time. (6)

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

(a) State the conditions necessary for germination. (6)

Describe how you would determine the percentage germination of a particular sample of seeds. (12)

(b) Describe, using a diagram, how you would carry out grafting. (9)

Explain how you would take a hardwood cutting.
Give an advantage which these methods of propagation have over growing from seed. (9)

(c) What is meant by a mulch?

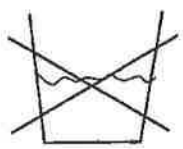
Write a note on the advantages and the disadvantages of mulches. (18)

12. **MATERIALS SCIENCE.** Answer **both** parts.

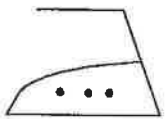
(a) What steps can be taken to protect metals from deterioration?

What causes timber to deteriorate? (9)

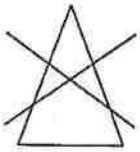
Explain the following care labels on clothing.



A



B



C

(9)

(b) Outline, with the aid of a diagram, **two** of the following experiments.

(i) To compare the absorbency of terylene and wool.

(ii) To extract a metal from its ore.

(iii) To compare polystyrene and polythene as insulators.

(iv) To compare the bending strengths of two different woods. (18)

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

(a) What is the role of fibre in our diet?

Name a food which is rich in fibre. (6)

A meal consists of: a pork chop, potatoes, peas, carrots and butter.

Identify the main source of (i) carbohydrate, (ii) protein, in this meal. (6)

Outline a laboratory experiment to test for the presence of starch in a food sample. (6)

(b) Give an advantage and a disadvantage of food additives. (6)
A cake on a supermarket shelf had the following numbers printed on the label,

E122, E200, E310 and E421.

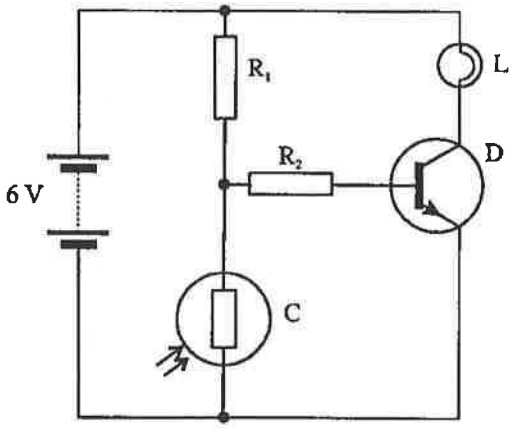
In the case of the above numbers, identify the type of food additive which each one represents. (12)

(c) Yoghurt is a source of calcium in the diet. Why is calcium needed in our diet?
Name another food which is rich in calcium. (6)

Describe how you would make yoghurt in the laboratory.
Why should yoghurt be stored at 4 °C? (12)

14. ELECTRONICS. Answer **both** parts.

(a) The diagram shows a circuit which controls a lamp, L.



Name the components labelled C and D. (6)

What happens to C when light is shone upon it? (6)

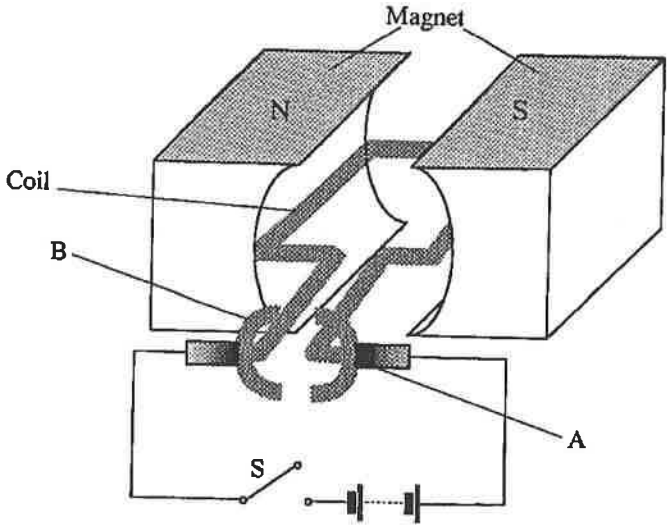
The lamp in the circuit could be replaced by an l.e.d. with a resistor in series with it. What is the function of the resistor? (6)

(b) What is the purpose of an electrical transducer? (6)

Name **two** electrical transducers. In each case state the function of the transducer you have named. (12)

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

(a) The diagram shows the structure of a simple electric motor.



Name the parts labelled A and B. (6)

Explain why the coil rotates when the switch S is closed. (9)

State **one** energy conversion which takes place in the electric motor. (3)

(b) Draw a labelled diagram of a simple transformer. (9)

What is the function of a transformer? (6)

Give an everyday example of the use of a transformer. (3)