WARNING

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

Candidate's Examination Number

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45143

AN ROINN OIDEACHAIS **S37A**

JUNIOR CERTIFICATE EXAMINATION, 1993

SCIENCE - HIGHER LEVEL

TUESDAY, 15 JUNE - AFTERNOON

TIME: 2.00 - 4.30 pm.

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 to measure

(i) the diameter of a metal cylinder .....

(ii) the length of a curved line .....

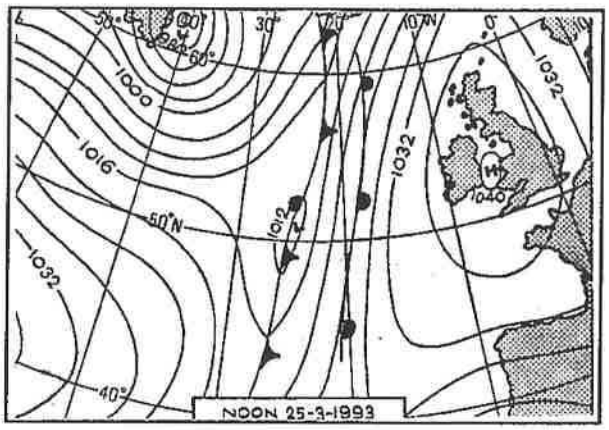
(b) Sublimation is .....

.....

(c) The diagram shows the weather forecast chart for a certain day.
What type of weather would you have expected in Ireland on that day?

.....

.....

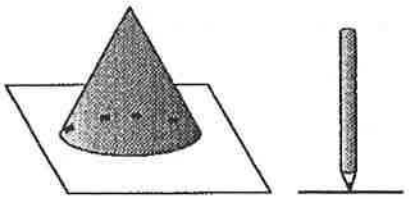


(d) The heat taken in by ice at 0 °C in changing to water at 0 °C is called ..... heat.

OVER→

(e) The cone in the diagram is in ..... equilibrium.

The pencil in the diagram is in ..... equilibrium.



cone on a flat surface pencil on tip

(f) Heat can be transferred by conduction, by ..... and by .....

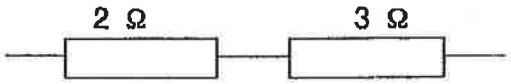
(g) Give two examples of heat insulation in the home.

(i) .....

(ii) .....

(h) The resistors in the diagram are in .....

Calculate the effective resistance of the arrangement of resistors shown in the diagram.



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(i) Name the unit of energy .....

(j) The cost of running a 2 kW electric heater for 4 hours at 8 p per unit is

.....

(8 x 6)

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

(a) Name the apparatus shown in the diagram.

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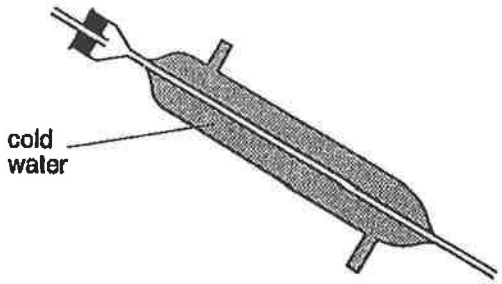


Show on the diagram the part of the apparatus which is usually connected to the tap.

(b) The electron has a .....charge and the proton has a ..... charge.

(c) Salt and water may be separated by .....

.....

(d) What type of fire extinguisher is suitable for extinguishing burning oil ?

.....

(e) Name two gases which dissolve in rainwater to form acid rain.

(i) .....

(ii) .....

(f) Ionic substances usually ..... in water.

An example of an ionic substance is .....

(g) Name an indicator .....

State the colour of this indicator in a basic solution .....

(h) Name two of the steps in the treatment of water for use in the home.

(i) .....

(ii) .....

(i) Why are fluorine and chlorine in the same group in the Periodic Table ?

.....

.....

(j) A chemical reaction in which heat is given out is called an ..... reaction.

(8 x 6)

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

(a) State two differences between plant cells and animal cells.

(i) .....

(ii) .....

(b) What is tissue? .....

.....

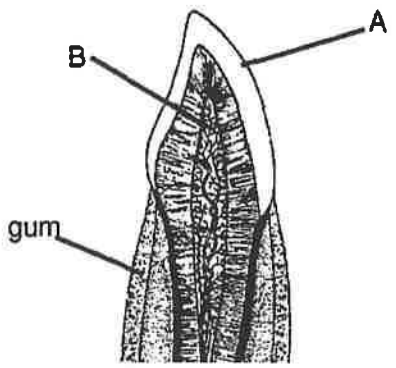
Give an example of a tissue .....

(c) The diagram shows a section through a tooth.

Name the parts labelled A, B.

A.....

B.....



(d) Give two functions of the root of a plant.

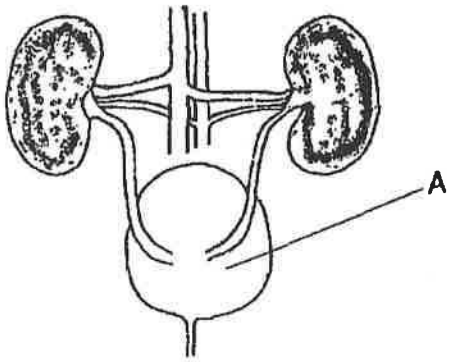
(i) .....

(ii) .....

(e) The biceps and the triceps are antagonistic muscles. Explain.

.....

(f) The diagram shows the structure of the urinary system.



Name the part labelled A.

.....

What is the function of the part labelled A?

.....

(g) State what is meant by the term pregnancy .....

.....

How long does pregnancy in the human last? .....

(h) Name two types of organism found in soil.

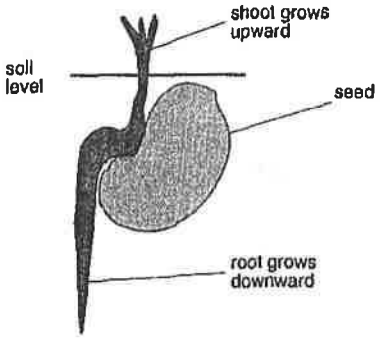
(i) .....

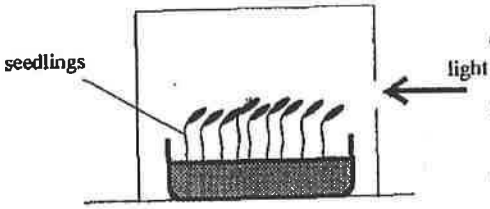
(ii) .....

(i) The diagrams show two of the growth responses of plants. The terms used to describe these responses are

(i) .....

(ii) .....





(j) The ..... on the chromosomes in a cell carry the instructions to form a new organism.

(8 x 6)

AN ROINN OIDEACHAIS S37

JUNIOR CERTIFICATE EXAMINATION, 1993

SCIENCE - HIGHER LEVEL

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

SECTION A

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

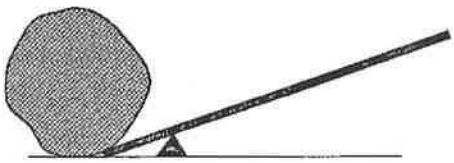
SECTIONS B, C, D, E

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)

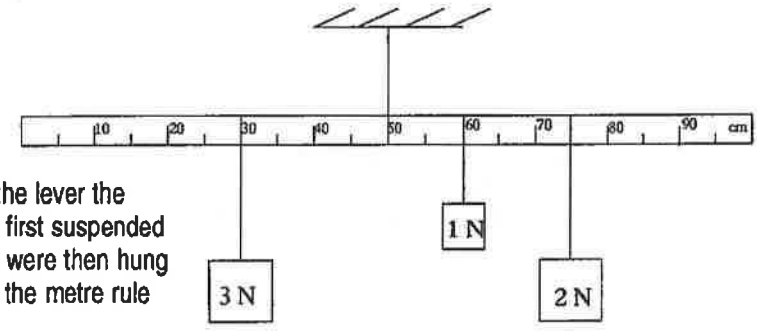
Answer **either** question 4 **or** question 5.

4. **(a)** What is meant by force? **(6)**
Explain the term moment of a force. **(6)**



The diagram shows a crowbar being used to move a rock.

Copy the diagram and show two of the forces acting on the crowbar. **(6)**



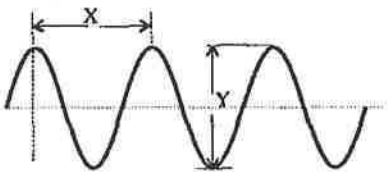
In an experiment to verify the law of the lever the metre rule shown in the diagram was first suspended at its centre of gravity. Three weights were then hung from the metre rule as shown so that the metre rule was again balanced.

Show how the information in the diagram illustrates the law of the lever. **(12)**

(b) Name a material that can be magnetised. **(3)**

Describe an experiment to plot the magnetic field due to a current in a straight wire. **(15)**

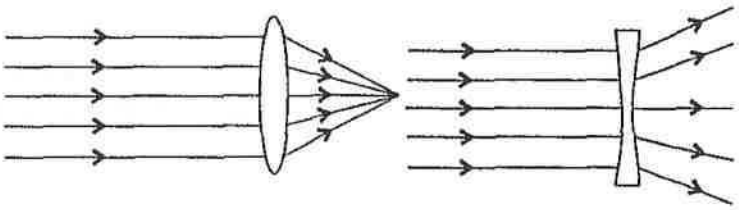
5. (a) The diagram shows a waveform.
What does (i) X, (ii) Y, represent? (6)



Light and sound are both wave motions.
Give two differences between light waves and sound waves. (6)

(b) What is meant by the refraction of light? (6)

The diagram shows the effect of two different lenses on a beam of light.
Name lens A and lens B. (6)



A B

(c) How would you demonstrate in the laboratory, (i) reflection of sound, (ii) that sound is a wave motion ? (18)

A tuning fork emits sound waves of frequency 256 Hz. Calculate the wavelength of the sound waves if the velocity of sound in air is 340 m s^{-1}. (6)

SECTION C - CHEMISTRY (48 marks)

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

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6. (a) Explain the statement. "Water is a compound and air is a mixture." (9)
Describe how you would separate water into its elements. (12)
Give a test for one of the gases in air. (3)

(b) State a cause of hardness in water. (6)
State the difference between temporary hardness and permanent hardness. (6)
Explain how water samples may be tested for hardness. (12)

7. (a) List the following metals in order of increasing reactivity,

zinc, copper, potassium, calcium. (6)

Answer the following.
(i) Give the chemical equation for the reaction of calcium with water. (6)
(ii) Give the chemical equation for the reaction of copper with oxygen. (6)
(iii) What is observed when dilute sulphuric acid is added to zinc? (6)

(b) What is meant by (i) oxidation, (ii) reduction? (6)

State the substance oxidised, and the substance reduced, in the following chemical reaction.

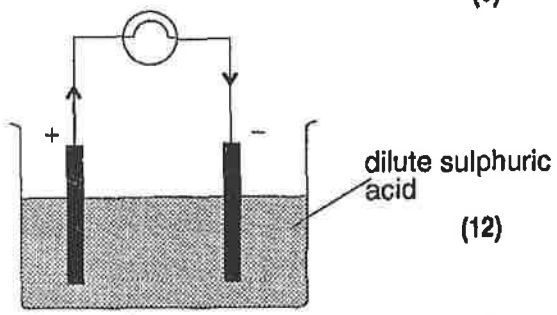
$$2Na + Cl_2 \longrightarrow 2NaCl$$ (6)

The diagram shows a simple cell.

What is the function of a simple cell?

Name two metals which could be used in the simple cell.

What term is used for the dilute sulphuric acid in the cell ? (12)



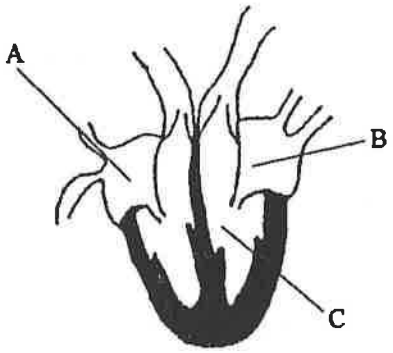
SECTION D - BIOLOGY (48 marks)

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

8. **(a)** State the function of the heart. **(6)**

Name the parts labelled A, B, C, in the diagram of the human heart. **(9)**

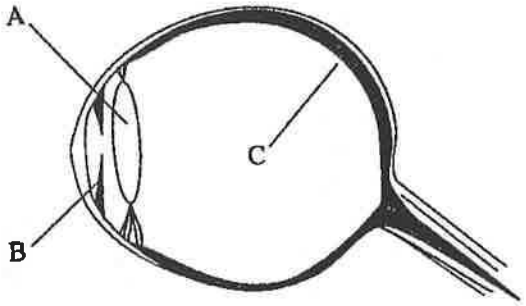
Give three means by which heart disease may be prevented. **(9)**



(b) Name the parts labelled A, B, C, in the diagram of the human eye. **(9)**

State the function of each of the parts labelled. **(9)**

Name two other human sense organs. **(6)**



9. **(a)** What is meant by transpiration? **(6)**

Describe an experiment to demonstrate transpiration. **(12)**

State two factors which affect the rate of transpiration of a plant. **(6)**

(b) Name a habitat which you have studied.

State two non-living features present in the habitat which you studied. **(6)**

Describe, using a diagram, a method which you used to collect animals in the habitat you studied. **(9)**

Select three organisms from the habitat which form part of a food chain and place them in their correct order in the food chain. State the trophic level occupied by each of the organisms. **(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) Earth, Mars, Pluto, Jupiter, Saturn, Neptune, Mercury, Venus, Uranus, are the planets of the solar system.

(i) Which are the two largest planets? **(6)**

(ii) Name the two planets which are nearest to Earth? **(6)**

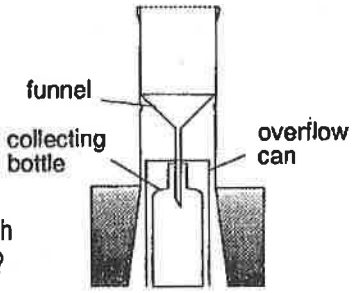
(iii) Name a planet other than Earth which has a planetary moon. **(3)**

(iv) Which planet is farthest from the sun? **(3)**

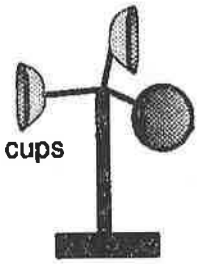
(b) The diagram shows three instruments used in weather recording.

Name each of the instruments A, B, C. **(9)**

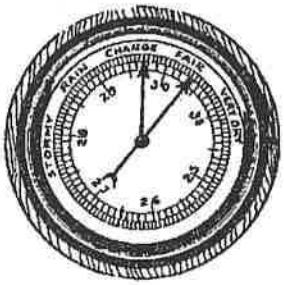
For what purpose is each of the instruments used? **(9)**



A



B



C

(c) "Day and night, summer and winter, are caused by the movement of the earth relative to the sun."

Explain the above statement. **(12)**

What is the cause of an eclipse of the sun? **(6)**

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

(a) Nitrogen, phosphorus and potassium are essential for healthy plant growth. Describe an experiment to examine the effect of a deficiency of one of these elements on the growth of a plant. **(12)**

Name two other elements which are necessary for healthy plant growth. **(6)**

(b) Plants may be propagated by taking cuttings.

(i) Name a plant which is commonly propagated from a woody cutting. **(3)**
(ii) State the steps involved in propagating the plant which you have named. **(9)**
(iii) State two other methods used to propagate plants. **(6)**

(c) Outline the life cycle of an aphid or of the cabbage white butterfly. **(12)**
Indicate how the pest which you have chosen may be controlled. **(6)**

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

(a) Plastics, textiles, metals and timber are different types of material. Name two other materials and give a typical use of each material. **(6)**

The diagram shows two hazard symbols A, B. State what hazard is described by each symbol. **(6)**

A

B

State two causes of the deterioration of materials and in each case give the best way of preventing the deterioration. **(6)**

(b) Answer **one** of A, B, C and D.

A. Name two plastics. **(6)**

Explain how you would compare the heat insulating properties of two different plastics. **(12)**

B. What is meant by the term textile? **(6)**

Explain how you would examine the resistance to wear of different fabrics. **(12)**

C. Name two metals which are mined in Ireland. **(6)**

Describe an experiment to compare the densities of two metals. **(12)**

D. State the difference between hardwoods and softwoods. **(6)**
Name **(i)** a softwood, **(ii)** a hardwood. State a use commonly made of each type of wood which you have named. State a property of each wood which makes it suitable for the use you have stated. **(12)**

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

(a) State the main functions of protein in the body. **(6)**

Describe, with the aid of a diagram, an experiment to test for the presence of protein in a food sample. **(12)**

(b) What is pasteurisation?

Why is it desirable to pasteurise milk and fruit juices? **(9)**

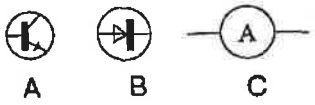
Outline how cheese is produced from pasteurised milk. **(9)**

(c) Name two types of food additive. What information is given by the E-number of an additive? **(9)**

Give one advantage and one disadvantage of using food additives. **(9)**

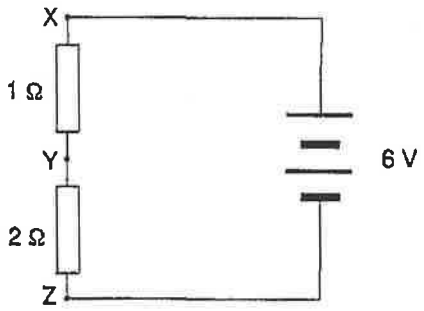
14. ELECTRONICS.

Name the components labelled A, B, C in the diagram. **(9)**

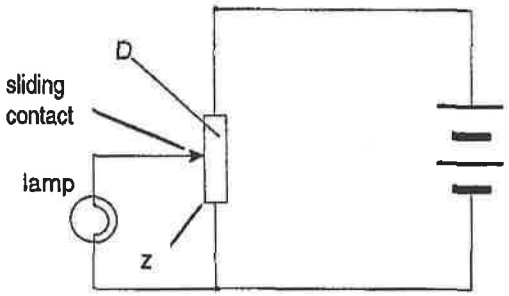


Use the information in the circuit diagram to calculate

(i) the potential difference between X and Y,
(ii) the potential difference between Y and Z. **(9)**



What will happen to the lamp shown in the diagram as the sliding contact on D is moved towards z ? Explain your answer. **(6)**



What is a light dependent resistor (LDR)? Draw a simple circuit to show the use of a light dependent resistor. **(12)**

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

(a) What is meant by potential energy? **(6)**

Give one example of each of the following energy changes:

(i) light energy to electrical energy to kinetic energy,

(ii) chemical energy to electrical energy to light energy. **(12)**

(b) Describe a simple experiment to show the production of a voltage by the movement of a conductor through a magnetic field. **(12)**
Name the device which is based on this principle.
What is the use made of this device? **(6)**