

IF LOCAL STUDIES OPTION IS BEING TAKEN PLEASE PUT A TICK IN BOX

Candidate's Examination Number

AN ROINN OIDEACHAIS

JUNIOR CERTIFICATE EXAMINATION, 1992

SCIENCE — HIGHER LEVEL

45542

TUESDAY, 16 JUNE — AFTERNOON

TIME: CANDIDATES TAKING LOCAL STUDIES: 2.00 – 4.00

OTHER CANDIDATES: 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.

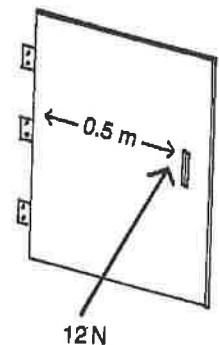
(a) Name two planets in the solar system which are further from the Sun than the Earth is.

(i) _____ (ii) _____

(b) Two renewable sources of energy are:

(i) _____ (ii) _____

(c) When a force of 12 N is applied at right angles to a door at a distance of 0.5 m from the hinge the moment of the force about the hinge is



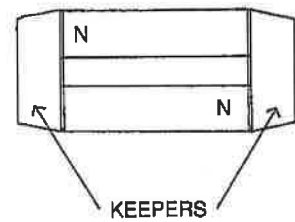
(d) A car of mass 1000 kg has a weight of

(e) What is meant by the tog value of a material?

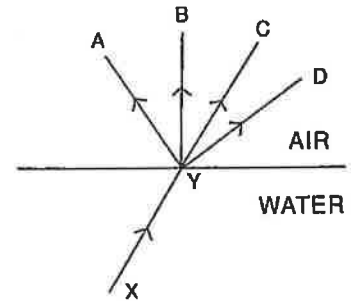
(f) Why is ice at 0°C more effective in cooling a drink than the same mass of water at 0°C?

(g) Name one effect of an electric current.

(h) The diagram shows two bar magnets with keepers attached. Draw one magnetic field line passing through each keeper.



(i) The diagram shows a ray of light XY reaching the surface of water from underneath. The direction of the ray in air is given by _____



(j) The pitch of a musical note depends on the _____ of the sound wave.

(8 x 6)

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

(a) An element is _____

(b) The symbol for the chloride ion is _____

The number of electrons in the chloride ion is _____

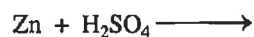
(c) Why are the noble gases unreactive? _____

(d) Reduction is the _____ of electrons.

Name the substance reduced in the following reaction.



(e) Complete and balance the following equation:



(f) What is an exothermic reaction? _____

(g) Two steps involved in the treatment of a water supply are:

(i) _____

(ii) _____

OVER →

(h) Give two disadvantages of hard water.

(i) _____

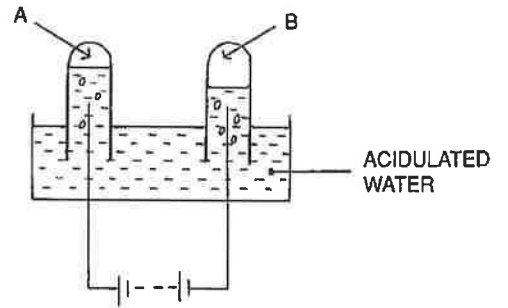
(ii) _____

(i) What chemical change takes place in iron when it corrodes in air? _____

(j) An apparatus for the electrolysis of water is shown in the diagram.
The gases produced are:

A _____

B _____



(8 x 6)

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

(a) What is a sperm? _____

Sperm is produced in the _____ in the human male.

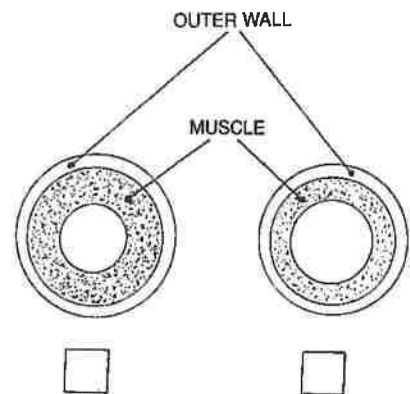
(b) What is meant by tissue? _____

An example of tissue is _____

(c) What are alveoli? _____

(d) The diagram shows transverse sections through an artery and a vein. Put a tick in the box below the artery.

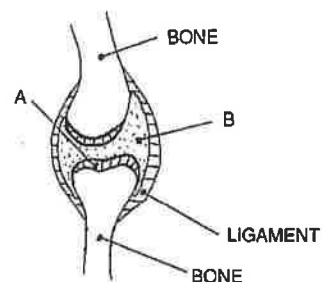
The blood vessels which connect an artery and a vein are called



(e) In the diagram of a movable joint,

A is _____

and B is _____



OVER →

(f) Give the name of a hormone found in the human body.

Give *one* function of the hormone you have named.

(g) Where in the cell are the chromosomes found?

(h) "Born in Austria in 1822, he did experimental work on peas and discovered that genetic characteristics are inherited in definite ratios." His name was

(i) What is meant by the term transpiration stream?

(j) Name one substance which may be used in an experiment to show the presence of micro-organisms in a soil sample.

(8 x 6)

43471

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JUNIOR CERTIFICATE EXAMINATION, 1992

SCIENCE — HIGHER LEVEL

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

These sections should be answered in your answer-book. Answer ONE question from each section. All questions carry equal marks.

SECTION E

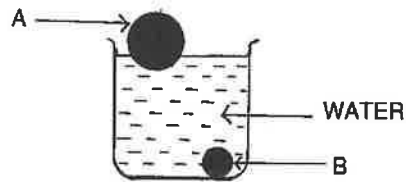
Answer TWO questions from this Section. All questions carry equal marks. (Candidates taking the Local Studies option are NOT to answer SECTION E.)

SECTION B - PHYSICS (48 marks)

Answer either question 4 or question 5.

- 4. (a) Define density. (6)
- Describe an experiment to find the density of a solid. (12)

Two solid spheres, A and B, are placed in a beaker of water as shown in the diagram. From their positions in the water what can you tell about the material in sphere A compared with the material in sphere B? (6)



- (b) What is meant by velocity? (6)

The table below shows the distance walked in a straight line by a person during a six second period.

Time/second	0	1	2	3	4	5	6
Distance/metre	0	2	4	6	8	10	12

Plot a graph, on graph paper, of distance against time, with time on the horizontal axis (x-axis). (12)

Use the graph to find:

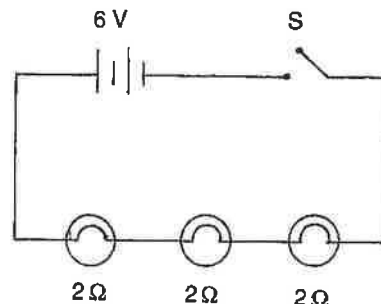
- (i) the time taken to walk 7 metres;
- (ii) the distance walked in 2.5 seconds. (6)

OVER →

5. (a) Describe an experiment which shows that liquids expand when heated. (9)
Name *two* liquids which are suitable for use in thermometers and give an advantage of using *one* of these liquids. (9)
- (b) The following is part of a student's account of an experiment to demonstrate Ohm's law.
"I found that, by increasing the voltage across a resistor, the current flowing through the resistor also increased."
(i) Draw the circuit you would use for this experiment. (6)
(ii) Describe how you would carry out the experiment. (12)

The diagram shows three lamps connected to a 6 volt battery in a circuit. Calculate:

- (i) the total resistance of the three lamps;
(ii) the current flowing through the lamps. (12)



SECTION C - CHEMISTRY (48 marks)

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

6. (a) Explain the terms: (i) pH scale; (ii) indicator. (12)
Describe how you would find the pH of a solution. If the pH is around 10 how would you describe the solution? (12)
- (b) Acid rain has been identified as being harmful to the environment.
State *two* ways in which acid rain affects the environment. (6)
Name *two* acids present in acid rain. (6)
Explain how these acids are formed. (12)
7. (a) The observations in the table were recorded by students during a teacher demonstration in the laboratory.

ELEMENT	BEHAVIOUR	REACTION WITH COLD WATER	REACTION WITH DILUTE HYDROCHLORIC ACID
A	sinks	fast reaction gas released white solid formed	dissolves rapidly gas released
B	floats	vigorous reaction violet flame	not attempted
C	sinks	none observed	dissolves gas released
D	floats	fast reaction hissing sound yellow sparks	not attempted

Given that the four elements used in the demonstration were magnesium, potassium, sodium and calcium identify A, B, C and D and place them in order in an activity series. (18)

Write a balanced equation for (i) the reaction of A with cold water, (ii) the reaction of C with dilute hydrochloric acid. (12)

- (b) Salt and sugar both dissolve readily in water, but only the salt solution conducts electricity. Explain why. (6)
Draw a labelled diagram of a dry cell. (12)

OVER →

SECTION D - BIOLOGY (48 marks)

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

8. (a) Human nutrition occurs in the following five stages but not in this order.

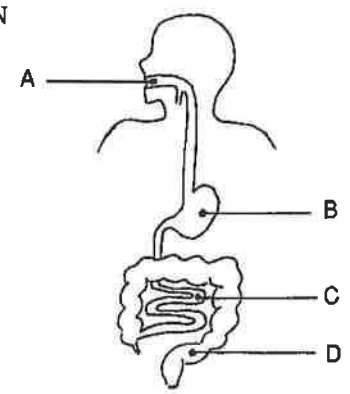
ASSIMILATION DIGESTION EGESTION INGESTION ABSORPTION

Give these stages in the order in which they occur. (6)

Name *two* of the parts labelled A, B, C and D in the diagram. (6)

Using the letters from the diagram state where (i) ingestion, (ii) absorption, occur. (6)

Explain what happens at the assimilation stage. (6)



(b) The following table shows the main food types present in a loaf of bread.

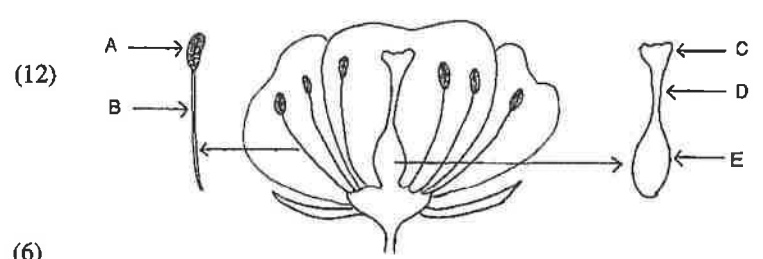
FOOD TYPE
CARBOHYDRATE
PROTEIN
FAT

For each of the three food types shown name a source, other than bread, which is known to be rich in that food type. Which food type has the greatest energy value per gramme? (12)

Enzymes have an important function during digestion. What is this function? Describe an experiment to show the action of an enzyme. (12)

9. (a) (i) Name *four* of the parts A, B, C, D and E of the flower shown in the diagram. (12)

(ii) Explain the term pollination. Refer in your answer to the labelled parts of the flower in the diagram. (6)



- (b) For the habitat which you have studied:
 - (i) give the names of *two* plants and *two* animals present; (12)
 - (ii) name a piece of equipment you used in the collection of animals and explain how you used the equipment; (9)
 - (iii) describe a food chain occurring. (9)

OVER →

SECTION E - APPLIED SCIENCE (72 marks)

CANDIDATES TAKING LOCAL STUDIES SHOULD NOT ANSWER THIS SECTION.

Answer **TWO** questions from this Section.

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

- (a) Explain briefly how a star is formed. (6)
What is meant by the stable state of a star? (6)
At the end of its stable state a star gradually becomes fainter and eventually dies. Why does this happen? (6)
- (b) Frost and fog commonly occur in winter. What is meant by each of the underlined terms? (6)
What is meant by the Greenhouse effect? Explain how this effect occurs. (12)
- (c) The following instruments may be used by meteorologists when preparing a weather report:
(i) a barometer; (ii) an anemometer; (iii) a rain gauge. State clearly what is measured by each of these instruments. (9)
Draw a labelled diagram of a barometer *or* a rain gauge. (9)

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

- (a) Describe, with the aid of a labelled diagram, a procedure used in grafting plants. (12)
Give *one* advantage of grafting as a method of propagation. (6)
- (b) (i) A lawn seed mixture may contain seeds of the following grasses:
- | | | |
|--------|------|----------|
| FESCUE | BENT | RYEGRASS |
|--------|------|----------|
- Choose *two* of the above grasses and give *one* characteristic of each.
Which of the above grasses would be most suitable for seeding a hard-wearing surface, e.g. a football pitch? (9)
- (ii) What is a mulch? Give *one* advantage and *one* disadvantage of using mulches. (9)
- (c) Outline the life cycle of the aphid *or* the cabbage white butterfly. (12)
Name a biological method of control used for the insect you have selected. (6)

12. MATERIALS SCIENCE. Answer both parts.

- (a) "When materials are mixed the resulting mixture may have improved properties."
Give an example to support this statement and state the improvement produced. (9)
Explain what is meant by a biodegradable material. (6)
Name *one* biodegradable material and *one* non-biodegradable material used for packaging. (6)
- (b) Write a short account of *one* of the following.
- (i) The production of a plastic from crude oil.
 - (ii) The production of a textile from raw material.
 - (iii) The extraction of a metal from its ore.
 - (iv) The manufacture of *either* hardboard *or* chipboard *or* plywood *or* blockboard. (15)

OVER →

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

(a) A well-balanced diet should include vitamins and minerals.

State a function of Vitamin D in the human body and give *one* source of this vitamin. (9)

Give *two* minerals which we need in our diet and name a food which is rich in *one* of these minerals. (9)

(b) What is silage?

Describe, with the aid of a diagram, an experiment to investigate the making of silage in the laboratory. (12)

State what is meant by the term biotechnology and give *one* process in which it is used. (6)

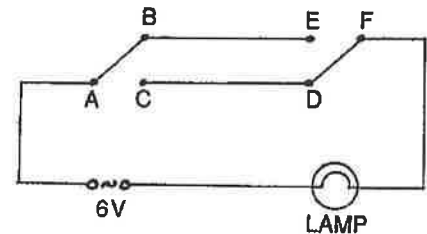
(c) Name *two* types of food additive. (6)

What are E-numbers? (6)

Give *one* advantage and *one* disadvantage of using food additives. (6)

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

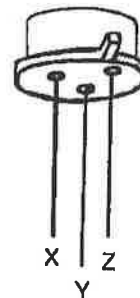
(a) The diagram shows a circuit containing two two-way switches connected to a lamp and a 6V power supply. Explain, using the letters in the diagram, how the switches may be used to switch the lamp on and off.



Where in your home or school would you expect to find a two-way switch? (12)

Draw a diagram of a circuit containing a battery, a lamp and two switches arranged in such a way that the lamp will light only if both switches are on. (6)

(b) Identify the terminals X, Y and Z of the transistor shown in the diagram. (9)



Name *two* components, apart from a transistor, which you would need to construct a simple burglar alarm. Give the purpose of *one* of the components. (9)

15. ENERGY CONVERSIONS. Answer both parts.

(a) Write down the energy changes which take place in each of the following devices:

(i) microphone;

(ii) battery;

(iii) solar cell.

(9)

Describe a simple experiment to show the conversion of electrical energy to kinetic energy.

(9)

(b) The diagram shows a coil of wire connected to a meter. State what would be observed if the magnet were dropped into the coil. Name *one* device which is based on the effect illustrated by this experiment.

(9)

Draw a labelled diagram of a transformer.

(9)

