

Examination Number

AN ROINN OIDEACHAIS

INTERMEDIATE CERTIFICATE EXAMINATION, 1976

SCIENCE—SYLLABUS A

WEDNESDAY, 16 JUNE—AFTERNOON, 2 to 4.30

SECTION A (See separate sheet for Sections B, C, D.)

**A**

Thirty items to be answered. All items carry the same marks.

Write your answers in the spaces provided.

Section A carries half the total marks for the paper.

Be sure to return this Section of the examination paper; enclose it in the answer-book you use in answering Sections B, C, D.

1. Write down the units in which each of the following is measured.

(i) velocity ..... (ii) acceleration .....

2. Mention any *two* effects of a force on a body.

(i).....

(ii).....

3. The masses of the proton, the electron and the carbon atom are  $1.66 \times 10^{-27}$ ,  $1.99 \times 10^{-26}$ , and  $9.12 \times 10^{-31}$  kilograms but not in that order. Which is the mass of the carbon atom?.....

4. Give an example of light as a form of energy.

.....

5. Name the primary colours .....

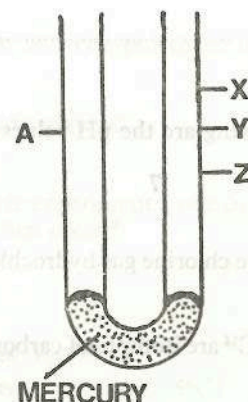
What is the colour of the light obtained when blue and yellow lights are mixed?.....

6. Give any *two* differences between a liquid and a gas.

(i).....

(ii).....

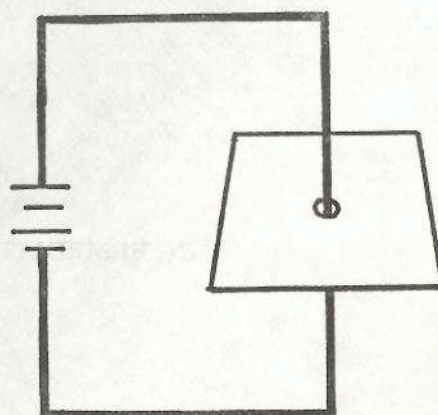
7. The sketch shows a U-tube containing balancing columns of alcohol and water. 'A' marks the top of the water column. Which of the three levels, X, Y or Z, marks the top of the alcohol column? (Relative density of alcohol = 0.8)



[P.T.O.→]



8. A straight piece of thick insulated copper wire is passed vertically through a sheet of cardboard as shown in the diagram. An electric current is then passed through the wire. Illustrate the magnetic lines of force on the sheet of cardboard due to the current in the wire.



9. What is the cost of running a 200 watt bulb for 5 hours at 1.5p per kilowatt-hour?  
.....
10. During a storm at sea the velocity of the waves was 30 metres per second and the wavelength was 510 metres. What was the frequency? .....
11. Say what you understand by centre of gravity.  
.....
12. After a heavy snowfall, the snow disappeared quickly from the roof of house A while the roof of house B, next door, kept its blanket of snow for quite some time. Assuming that the heating system in each of the two houses produces the same quantity of heat during the same time which house would you prefer to live in?  
.....  
Give a reason for your preference. ....  
.....
13. Complete the following:  $\text{NaOH} + \text{HCl} =$
14. Name any *two* allotropes of sulphur.  
(i)..... (ii) .....
15. Place an X after each *chemical* change in the following list.  
The burning of coal in air .....  
The dissolving of sugar in water .....  
The melting of ice .....  
The digesting of food .....
16. What is meant by heat of solution?  
.....
17. The following are the pH values for a number of solutions. *Underline* those that are acid.  
2                      7                      13                      5                      9
18. To prepare chlorine gas hydrochloric acid (conc.) is added to .....
19.  ${}^6\text{C}^{12}$  and  ${}^6\text{C}^{14}$  are isotopes of carbon. In terms of atomic structure state how these isotopes differ from each other.  
.....



20. Sodium and chlorine combine to form sodium chloride. Mark X after each correct statement in the following list.

Each sodium atom gains one electron. ....

Each sodium atom loses one electron. ....

The sodium is reduced. ....

The chlorine is reduced. ....

The sodium and chlorine atoms share electrons.....

21. Name and give the chemical formula of any compound containing the element nitrogen.

.....

22. What is meant by the valence of an element?

.....

23. A metallic element X burns in oxygen with a dazzling white flame to form a white powder which is slightly soluble in water giving an alkaline solution.

What element is X? .....

Name the white powder. ....

24. What happens when the iron blade of a penknife is left for some time in copper sulphate (bluestone) solution?

.....

25. Place each of the following organisms butterfly, buttercup in its correct group in the list below:

Angiosperms .....

Chordates .....

Molluscs .....

Arthropods .....

Fungi .....

26. List any *two* conditions necessary for the germination of seeds.

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

27. Ptyalin is an enzyme.

It is secreted by glands in the .....

It functions in the breakdown of.....

28. The term used for the loss of water from the leaves of plants is included in the following list. *Underline it.*

inspiration      perspiration      transpiration      expiration.

29. Which of the following mineral elements

Mn, Ca, Zn, Na, Ag, Fe,

(i) is an important element in the composition of bone? .....

(ii) is an important element in the composition of red blood cells?.....



30. For what purpose are antibiotics used?

.....

31. Where are sperms produced in the mammal?.....

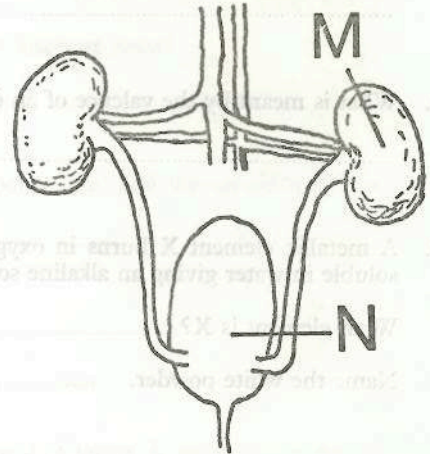
32. Most human body cells contain twenty-three pairs of thread-like structures in the nucleus. Underline the name of these structures in the following list.

chromosomes      ribosomes      lysosomes.

33. The diagram shows one of the main excretory systems of the human body.

Name M .....

What is the function of N? .....



34. Insert the omitted terms below.

The gas carbon dioxide is produced by living organisms in the process called..... and used by green plants in the process called .....

35. Most insects go through four stages of development: (i) egg, (ii) X, (iii) pupa, (iv) the adult form of the insect.

What is stage X called? .....

36. Bones are held together at the joints by strong binding tissues called.....

Name a hinge joint in the human body. ....



## AN ROINN OIDEACHAIS

A

## INTERMEDIATE CERTIFICATE EXAMINATION, 1976

## SCIENCE—SYLLABUS A

WEDNESDAY, 16 JUNE—AFTERNOON, 2 to 4.30

Answer Section A and one question from each of the Sections B, C, D.

## 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

The questions from these sections should be answered in your answer-book.

Answer one question from each Section. All questions carry the same marks.

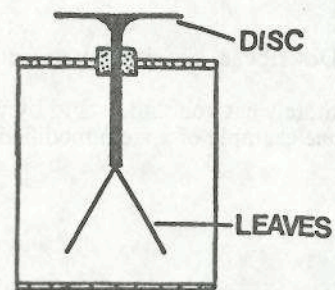
## SECTION B

- (a) For what purpose is a hydrometer used? Describe an experiment to test the principle (law) on which the hydrometer depends.

(b) Describe, with the aid of a diagram, how you would construct a simple mercury barometer and explain how you would use it to measure the pressure of the atmosphere.

On a certain day, the barometer reading was very high all over Ireland. What do you think the weather was like on that day?
- (a) When a polythene (or ebonite) rod is rubbed with fur, the polythene becomes negatively charged and the fur becomes positively charged. Explain what has happened in terms of electrons.

What will happen to the leaves of a positively charged gold-leaf electroscope (as shown in the diagram) in each of the following cases?



- The negatively-charged polythene rod is held *close to* the disc.
- The positively-charged fur is held *close to* the disc.
- An uncharged polythene rod is held *against* the disc.
- A copper rod is held *against* the disc.

The results obtained in (iii) and (iv) illustrate an important difference between polythene and copper. What is this difference?

- Give a labelled diagram of a simple cell for the production of electric current.
- (a) Expansion is one of the effects of heat on a body. Describe simple experiments, one in each case, to show that solids, liquids and gases expand when heated and contract when cooled. Mention *one* example of expansion from everyday life.

(b) What is meant by specific heat capacity? How would you measure the specific heat capacity of a metal such as copper? How much heat is required to raise the temperature of 0.1 kilograms of copper  $5^{\circ}\text{C}$ ? (The specific heat capacity of copper is  $400\text{J/kg}^{\circ}\text{C}$ ).

P.T.O.→



4. An electric current was passed through water, to which a few drops of sulphuric acid had been added. The products of the electrolysis were collected and identified by simple tests.
- Draw a labelled diagram of the apparatus used in the experiment.
  - How was the current carried through the solution?
  - Name the two products of the electrolysis and describe simple tests to identify them.
  - Give two physical properties and two chemical properties of *either one* of the products.
  - What information does the electrolysis give about the composition of water by volume?

5. What is meant by (i) an electrovalent (ionic) bond, (ii) a covalent bond. Give an example in each case. Mention any *two* properties you would expect electrovalent compounds to have and any *two* properties you would expect covalent compounds to have.

Describe, using simple diagrams, (i) the structure of the sodium chloride crystal, (ii) the shape of the methane molecule.

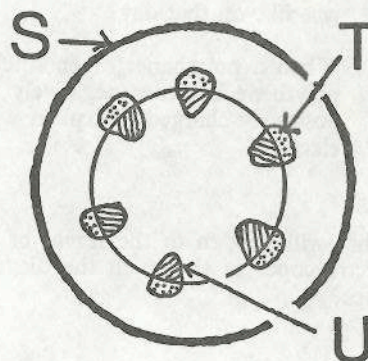
6. (a) You are given a mixture of alcohol and water. Describe, with the aid of a labelled diagram, how you would obtain a reasonably pure sample of alcohol. Name the process.
- (b) Carbon dioxide and sulphur dioxide are classified as acidic oxides. Why? Name the substances you would use to prepare each of these oxides in the laboratory. Give any *one* chemical test to distinguish between the two oxides.

## SECTION D

7. (a) Distinguish between the terms in each of the following pairs, giving examples from an ecosystem you have studied.
- Competition and interdependence.
  - Food chain and food web.
  - Parasite and saprophyte.
- (b) How would you demonstrate the non-living components of a sample of soil?

8. (a) List any *two* functions of the stem in plants.

The diagram shows a transverse section of the stem of a dicotyledonous plant. Name the parts labelled S, T, and U. Which of these parts forms wood in trees?

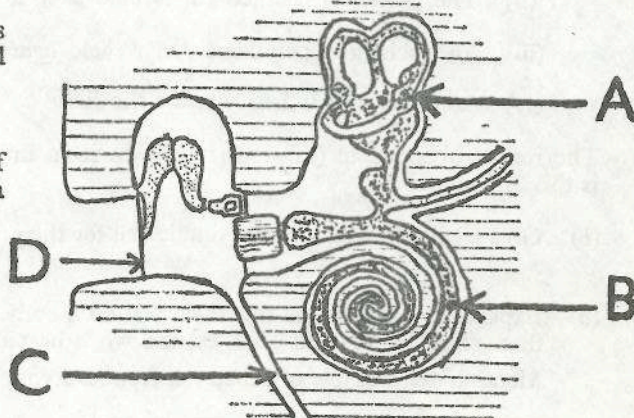


- (b) What is meant by phototropism?

Describe a simple experiment to illustrate phototropism.

- (c) State what you understand by vegetative propagation and give *one* example of a stem modified for this purpose.

9. (a) The diagram shows some of the main structures of the human ear. Name the parts labelled A, B, C and D and describe briefly the functions of any *two* of them.



- (b) Co-ordination in the body is under the control of nerves and hormones. Compare nerve action with hormone action under the headings:

- the quickness of the response,
- how long the effect lasts.

- (c) Name *two* good sources of protein in a normal diet. Where are proteins broken down in the digestive system and what is formed as a result of this breakdown?

Outline a simple laboratory test for protein.