

Examination Number

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AN ROINN OIDEACHAIS

INTERMEDIATE CERTIFICATE EXAMINATION, 1979

SCIENCE—SYLLABUS A

**A**

FRIDAY, 15 JUNE - MORNING, 9.30 to 12

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

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

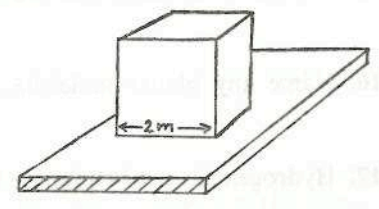
Write your answers in the spaces provided.

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. A body increases its velocity uniformly from 3 metres per second to 15 metres per second in 6 seconds. What is the acceleration of the body?.....

2. A cube of weight 100 newtons and of side 2 metres rests on a bench as shown. Calculate the pressure exerted by the block on the bench.....



3. What does Brownian movement demonstrate?  
.....

4. Name two colours of light that may be combined to give white light.  
.....

5. Define specific latent heat of fusion.  
.....  
.....

6. X is a liquid often found in thermometers but never found in barometers. X is .....

7. (i) The unit of electrical resistance is the .....

(ii) The unit of potential difference is the.....

8. Complete the statement:  
A positively charged body has lost.....

9. Mention an example from common experience to show that light travels faster than sound.  
.....  
.....

10. If the mass of the electron is  $1.9 \times 10^{-28}$  grams, write down, in a similar form, its mass in kilograms.  
 .....
11. Mention any *two* uses of a gold-leaf electroscope.  
 (i) .....  
 (ii) .....
12. State *two* differences between the transfer of heat by convection and the transfer of heat by radiation.  
 (i) .....  
 (ii) .....
13. Name *two* gases that are less dense than air.  
 (i) .....  
 (ii) .....
14. Write the chemical formula for a molecule of each of the following:  
 (i) Oxygen .....
- (ii) Hydrogen chloride .....
15. Name *one* substance that causes permanent hardness in water.....
16. Name any planar molecule.....
17. Hydrogen gas can be prepared in the laboratory by the action of dilute .....  
 on.....
18. Atoms of the same element having different numbers of neutrons in their nuclei are called.....
19. What is a Brønsted-Lowry base?.....  
 .....
20. In the electrolysis of acidulated water using inert electrodes 20 cm<sup>3</sup> of hydrogen were collected at the cathode. Name the gas produced at the anode and state its volume.  
 Name ..... Volume .....
21. Complete the following equation:  

$$\text{CO}_2 + \text{H}_2\text{O} =$$
22. Give *two* properties of ammonia gas.  
 (i) .....  
 (ii) .....
23. (i) Name an acid-base indicator.....  
 (ii) State its colour in acid solution .....

24. Underline the *two* allotropes of carbon in the following list:

methane                  diamond                  starch                  carbon dioxide                  graphite

25. State any *two* functions of the leaf in plants.

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

26. Underline your answer to each of the following.

- (i) Enzymes are                  sugars                  biological catalysts                  minerals                  fatty acids
- (ii) Proteins are composed of one of the following groups of elements:  
C, H, O                  C, H, O, Br                  C, N                  C, H, O, N

27. Give the term for the response of roots to gravity.....

28. Place each of the organisms: earthworm, mushroom in its correct group in the following list:

- Arthropoda .....
- Fungi .....
- Annelida.....
- Chordata .....
- Bryophyta .....

29. The part of the seed that develops into the shoot is called the .....

30. Mention *two* ways in which insects are useful to man.

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

31. A brown-eyed husband has the genotype **BB** and his blue-eyed wife has the genotype **bb**. Write down the genotype of their children.....

- 32. (i) Muscles are attached to bones by.....
- (ii) An example of a fused joint is.....

33. State any *two* functions of the skin in man.

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

34. Name a hormone and state its function in the body.

Name .....

Function.....

.....

35. The ..... controls the amount of light entering the eye.

36. Mention any *two* protective functions of the skeleton in man.

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

## AN ROINN OIDEACHAIS

## INTERMEDIATE CERTIFICATE EXAMINATION, 1979

## SCIENCE—SYLLABUS A

**A**

FRIDAY, 15 JUNE - MORNING, 9.30 to 12

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

1. Explain the terms: elasticity, elastic limit.

Describe a simple experiment to investigate the relationship between the extension of a spiral spring and the load (force) producing it. What is this relationship?

State the Principle of Archimedes.

A stone when attached to the end of a taut spiral spring extends the spring 10 cm. The stone is then completely immersed in water and the extension of the spring is then 6 cm. Calculate the density of the stone.

2. (a) Describe simple experiments, one in each case, to show that solids, liquids and gases expand when heated.  
 (b) For a definite mass of gas, state the relationship:  
 (i) between the volume and the pressure at constant temperature,  
 (ii) between the volume and the temperature at constant pressure,  
 (iii) between the volume, the pressure and the temperature.

The volume of a definite mass of gas at a pressure of 600 mm of mercury is 500 cm<sup>3</sup>. If the pressure is increased to 750 mm of mercury without changing the temperature, what will be the new volume of the gas?

3. Mention any *three* properties of magnets.

Explain the terms: line of force, magnetic field.

Describe how you would plot the magnetic field around a bar magnet, and draw a diagram to show the result you would expect to obtain.

Draw a labelled diagram of the electric bell and describe how it works.

## SECTION C

4. Describe, with the aid of a labelled diagram, how you would prepare and collect oxygen.

Magnesium and sulphur burn readily in oxygen. Write balanced chemical equations for each reaction and give the names of the products. State the effect (if any) of each product on moist litmus paper.

In reacting with oxygen, both magnesium and sulphur are oxidised and the oxygen itself is reduced. Explain, in terms of electrons, the meaning of the underlined words.

[P.T.O.]

5. Draw simple diagrams to show the structures of the following atoms:  ${}^{20}_{10}\text{Ne}$   ${}^{23}_{11}\text{Na}$   ${}^{35}_{17}\text{Cl}$   ${}^{40}_{18}\text{Ar}$

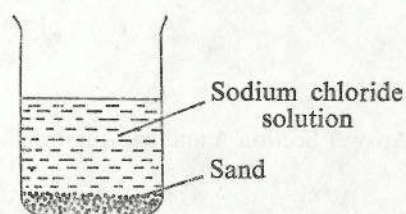
Suggest why neon and argon are chemically unreactive and why sodium and chlorine are very reactive.

Describe, in terms of electrons, what happens when sodium reacts with chlorine to form sodium chloride. Name the type of bond present in sodium chloride and draw a diagram of the sodium chloride crystal lattice.

Name the type of bond between the two chlorine atoms in a chlorine molecule and mention *one* difference between it and the type of bond in sodium chloride.

6. (a) The beaker shown in the diagram contains a mixture of sand, sodium chloride and water. Describe, with the aid of suitable diagrams, how you would get from the mixture a reasonably pure sample of each of the following:

- (i) sand,
- (ii) water,
- (iii) sodium chloride.



- (b) What is meant by the pH scale? Name (i) a solution with a pH less than 7, (ii) a solution with a pH greater than 7.

#### SECTION D

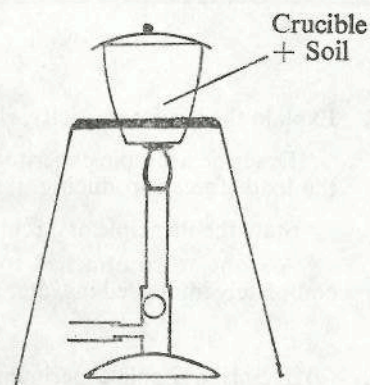
7. (a) Answer the following.

- (i) Give *two* examples of the ways in which plants depend on animals.
- (ii) Give *two* examples of the ways in which animals depend on plants.
- (iii) Give *two* reasons why it is difficult to make an exact study of all the animals in an ecosystem.
- (iv) State what is meant by pollution and give an example.

- (b) A weighed sample of fresh soil is burnt strongly in a crucible set up as shown in the diagram. As a result the soil is found to have lost weight.

Suggest an explanation for the loss in weight of the soil during burning.

What part of the soil remains in the crucible after the period of burning? What is the origin of this part of the soil?

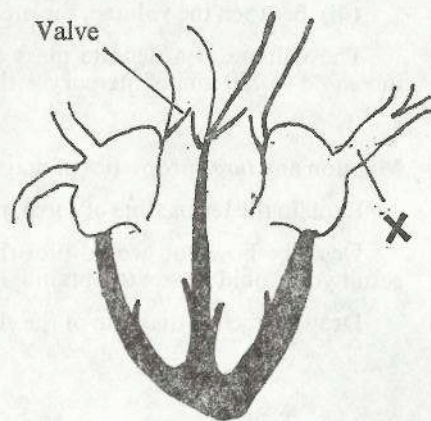


8. (a) Name *three* components of human blood and give *one* function of each component named.

The diagram shows the heart and major blood vessels.

- (i) Is the blood in X oxygenated or de-oxygenated?
- (ii) Why is the muscular wall of the left ventricle thicker than the wall of the right ventricle?
- (iii) State the function of the valve labelled in the diagram.

- (b) You are given a leafy shoot of a plant and a beaker of water with a dye (e.g. red ink) in it. How would you show the water-transporting tissue in the shoot? Name the tissue and give a simple diagram to show where it is to be found in the shoot.



9. What is meant by (i) insemination, (ii) pollination?

Describe what happens after insemination up to the time fertilization takes place.

Explain why there are only a few days in the human menstrual cycle when fertilization can occur.

Given that the menstrual cycle is 28 days, on what days of the cycle should fertilization be possible?

State briefly what happens when an ovum is not fertilized.