

INTERMEDIATE CERTIFICATE EXAMINATION, 1985

SCIENCE—SYLLABUS A

A

TUESDAY, 18 JUNE — MORNING, 9.30 to 12.00

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

Examination Number

Empty box for Examination Number

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.

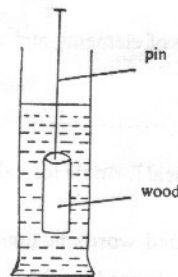
1. A body increases its velocity uniformly from 9 metres per second to 30 metres per second in 7 seconds. What is the acceleration of the body?

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

(i) Force ..... (ii) Energy .....

3. Mercury is a liquid commonly used in barometers. Name a type of barometer that does not contain a liquid.

4. A floating cylinder of wood displaces 8 cm³ of water. When pushed below the surface of the water with a pin (see diagram), the wood displaces 10 cm³ of water. What is the density of the wood?



5. When a glass rod is rubbed with silk, the rod becomes positively charged and the silk becomes negatively charged. Explain what has happened in terms of electrons.

6. Give one example of capillarity.

7. The mass of the carbon atom is  $1.99 \times 10^{-23}$  grams. What is its mass in kilograms?

8. What will happen to the volume of a fixed mass of gas at constant pressure if the temperature, measured in degrees kelvin, is doubled?

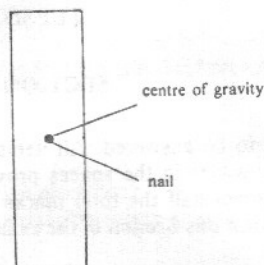
9. When the blackened bulb of a thermometer is moved along the visible spectrum of white light, a rise in temperature is noticed just beyond one end of this spectrum. Why is this?

10. What is the wavelength in air of a note of frequency 170 vibrations per second if the velocity of sound in air is 340 metres per second?

11. Name *one* other substance with magnetic properties similar to those found in iron and steel.

.....

12. What is the state of equilibrium of a rectangular piece of wood supported by a nail at its centre of gravity as shown in the diagram?



.....

13. Carbon exists as diamond and graphite, and these forms are known as ..... of carbon.

14. A shared pair of electrons forms a ..... bond between two atoms.

15. What is meant by an exothermic reaction?

.....

16. What is a planar molecule?

.....

Underline the planar molecule in the following list.

water      ammonia      methane

17. Air is a mixture of elements and compounds. Name *one* element and *one* compound commonly found in clean air.

Element ..... Compound .....

18. Write the chemical formula for calcium hydroxide .....

19. Insert the omitted words in the following statement.

In a negatively-charged ion the number of ..... orbiting the nucleus is always greater than the number of ..... in the nucleus.

20. Name the elements represented by the symbols P and K.

P ..... K .....

21. Complete and balance the following equation.



22. In the Brønsted-Lowry theory what is the term for a substance that can accept a proton?

.....

23. The atomic number of nitrogen is 7. What *two* items of information does this give you about the nitrogen atom?

(i) .....

(ii) .....

24. Select from the list below the most likely pH of (i) a solution of hydrochloric acid, (ii) a solution of sodium hydroxide, assuming that neither of the two solutions is very dilute.

1      5      7      9      14

(i) Hydrochloric acid .....

(ii) Sodium hydroxide .....

25. Name any *two* substances transported in solution by the plasma of the blood.

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

26. Oxygen is produced by green plants in the process called ..... and is used by green plants and other living organisms in the process called .....

27. State where the male gametes (the male reproductive cells) are produced

- (i) in flowering plants .....  
 (ii) in mammals .....

28. Underline in the following list the food which is *not* a source of protein.  
 milk    sugar    eggs    fish

29. In peas the gene tall (T) is dominant over the gene dwarf (t). Write down the genotype of a dwarf pea plant.

.....

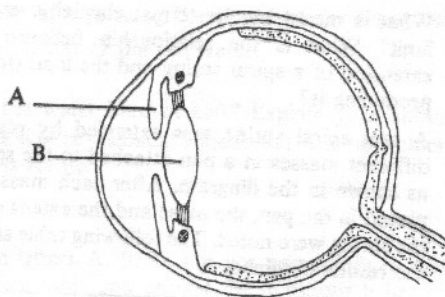
30. Name the part labelled A in the diagram.

.....

State the function of the part labelled B.

.....

.....



31. What type of joint is found at the hip?

.....

32. What organism would you expect to find in the root nodules of a clover plant?

.....

33. Name *two* substances excreted in urine.

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

34. In only one of the following groups do all three organisms belong to the same phylum. Put the symbol  $\checkmark$  in the box opposite this group.

- |                         |                          |
|-------------------------|--------------------------|
| grass, fern, moss       | <input type="checkbox"/> |
| bee, earthworm, snail   | <input type="checkbox"/> |
| robin, cat, frog        | <input type="checkbox"/> |
| mussel, crab, jellyfish | <input type="checkbox"/> |

35. The shoots of green plants bend towards light. What is the advantage of this behaviour?

.....

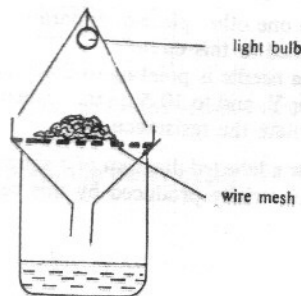
.....

36. The diagram shows a Tullgren funnel. State briefly what it is used for.

.....

.....

.....



## INTERMEDIATE CERTIFICATE EXAMINATION, 1985

## SCIENCE—SYLLABUS A

**A**

TUESDAY, 18 JUNE — MORNING, 9.30 to 12.00

Answer Section A and one question from each of 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**

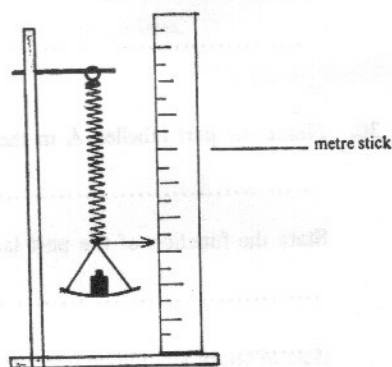
The questions from these sections should be answered in your answer-book.

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

**SECTION B**

1. (a) What is meant by the terms: elasticity, elastic limit? What is the relationship between the extension of a spiral spring and the load (force) producing it?

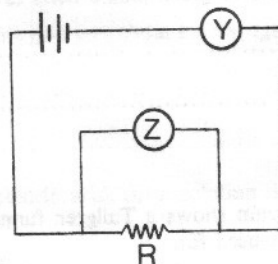
A taut spiral spring was extended by placing different masses in a pan attached to the spring as shown in the diagram. After each mass was placed in the pan, the mass and the extension of the spring were noted. The following table shows the results obtained.



Mass (grams)	10	20	30	40	50	60
Extension (centimetres)	2	4	6	8	10	12

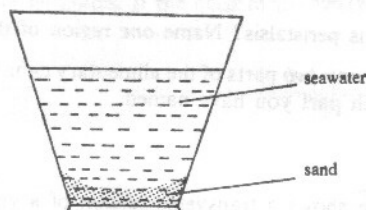
Draw a graph of the results, putting mass on the horizontal axis (x-axis) and extension on the vertical axis (y-axis).

- (i) On the graph mark the extension for a 45 gram mass.  
 (ii) A small stone produces an extension of 5 centimetres. Mark on the graph the mass of the stone.
- (b) What is meant by a lever? Define moment of a force. The mass of the stone in (ii) above may also be found using a metre stick as a lever and using a known mass. Outline briefly how you would carry out this experiment.
2. (a) Define specific heat capacity. A solid copper cylinder of mass 1 kilogram was heated from 16°C to 44°C. If the amount of heat required was 10,920 joules, calculate the specific heat capacity of copper. When heat is supplied to a substance, usually its temperature rises, but it is possible to supply heat to a substance without raising its temperature. Give two examples of this.
- (b) Describe an experiment to show that liquids (e.g. water) are poor conductors of heat. Name the method by which heat is transferred in liquids and state briefly how it differs from conduction.
3. (a) Name the units of electric current, potential difference and resistance. What is the relationship between them? The diagram shows the circuit used to find the resistance of R. Name (i) the meter Y, (ii) the meter Z. State one other piece of apparatus that could be included in this circuit. If the needle is pointing to 3 on the scale of the meter Y, and to 10.5 on the scale of the meter Z, calculate the resistance of R.
- (b) Draw a labelled diagram of a simple cell for the production of electric current. Give one difference between the electricity produced by this cell and the electricity normally supplied to the home.



## SECTION C

4. Describe, with the aid of a diagram, the preparation of oxygen. Give any *three* physical properties of oxygen.
- Magnesium burns readily in oxygen. Write a balanced equation for the reaction. Describe the appearance of the product, and state its effect on moist litmus paper.
  - Describe, with the aid of a diagram, how you would burn sulphur in a jar of oxygen. Write a balanced equation for the reaction, and state the effect of the product on moist litmus paper. Mention any *three* other properties of the product.
  - Name the different classes of oxides.  
To which class of oxides does the product in (i) belong? To which class of oxides does the product in (ii) belong?



5. A bucket of sea water was collected at the water's edge on a sandy beach. There was some sand in the water and this was allowed to settle (see diagram). The water was then separated from the sand by *decanting*. Finally the water was purified by *distillation*.
- What is meant by decanting? Suggest another method of separating the sand and the sea water.
  - Describe, with the aid of a labelled diagram, the distillation of the sea water.
  - What is hard water?  
Was the water obtained as a result of distilling the sea water hard or soft? Explain your answer.
  - The main salt in sea water is sodium chloride. Name the type of chemical bond found in sodium chloride and explain briefly, in terms of electrons, how the bond is formed.

6. The metals silver, sodium and zinc are represented by the letters A, B, C, but not necessarily in that order. Consider the information about A, B and C in the following table and answer the questions below.

	Reaction with water	Reaction with dilute hydrochloric acid or dilute sulphuric acid
A	No reaction	No reaction
B	When heated, it reacts with steam, giving off X	It reacts readily, giving off X
C	It reacts with cold water, giving off X	It reacts violently, giving off X

- Identify A, B and C.
- Arrange the metals in decreasing order of chemical activity.
- What is the gas X? Mention any *two* of its properties.
- Name the other product of the reaction between metal C and water and write a balanced equation for the reaction.
- Name the salt formed when B reacts with dilute sulphuric acid and write a balanced equation for the reaction.
- Which of the three metals would be most likely to be found free in nature? Explain your answer.

## SECTION D

7. (a) Give *one* example of the dispersal of seeds by animals and mention *two* other methods by which seeds are commonly dispersed. Suggest *one* reason why seed dispersal is important.  
An experiment was carried out to investigate the changes in the dry mass (i.e. the mass after all water had been removed) of broad bean seeds from the time the seeds were planted and at weekly intervals up to the end of the first six weeks of growth. The results are shown in the following table.

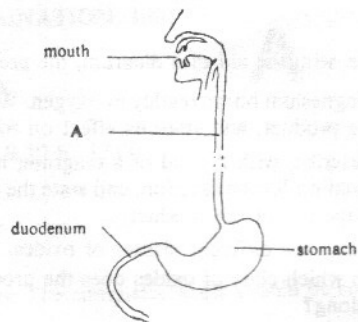
Time (weeks)	0	1	2	3	4	5	6
Mass (grams)	10	8	6	5	7	16	30

Suggest a reason (i) for the drop in mass during the first three weeks, (ii) for the increase in mass during the second three weeks.

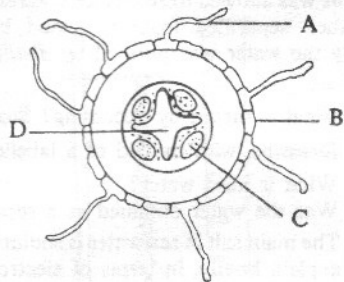
- (b) What are decomposers? State *two* ways in which they are important in the ecosystem you have studied. Give a simple outline of the carbon cycle.

8. The diagram shows the upper part of the human alimentary canal.

- (i) State any *two* ways in which the mouth helps in the digestion of food.
- (ii) Name the part labelled A.
- (iii) Give any *two* functions of the stomach.
- (iv) Ducts from two important glands join the alimentary canal at the duodenum. Name the two glands and, in the case of either one of them, name the secretion (juice) it passes into the duodenum. State *one* way in which this secretion helps in the process of digestion.
- (v) What is peristalsis? Name *one* region of the alimentary canal where it occurs.
- (vi) Name any *two* parts of the alimentary canal other than those mentioned or shown above. State *one* function of each part you have named.



9. The diagram shows a transverse section of a young root. Name the parts labelled A, B, C, D, and give *one* function of each part.



Transpiration is the process by which water passes out of the plant through the leaves. List *three* conditions that can *increase* the rate of water loss by transpiration. Describe an experiment to demonstrate transpiration. Give the name of *one* other substance that can pass in or out of leaves.