0052037

M. 53(a)

Examination Number

A

AN ROINN OIDEACHAIS

INTERMEDIATE CERTIFICATE EXAMINATION, 1990

SCIENCE — SYLLABUS A

TUESDAY, 12 JUNE — MORNING, 9.30 to 12.00

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.

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1. State *one* difference between mass and weight .....

.....

2. Underline, from the following list, the number of cubic centimetres (cm^3) in one cubic metre (m^3).

1×10^3 1×10^6 1×10^9

3. Given that 40 g of paraffin oil has a volume of 50 cm^3, calculate the density of paraffin oil.....

.....

4. State *two* physical changes that could occur when a solid is heated.

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

5. What property of a liquid enables certain small insects to walk on its surface?

.....

6. What is a lever?.....

.....

7. A certain mass of gas occupies a volume of 200 cm^3 at 30°C and at a pressure of one atmosphere. Calculate its volume at 30°C and at a pressure of two atmospheres

.....

8. Give an example to show that sound is a type of wave motion.....

.....

9. A body increases its velocity uniformly from 10 metres per second to 40 metres per second in 5 seconds. What is the acceleration of the body? .....

10. Heat may be transferred by radiation. Name *two* other methods of heat transfer.

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

11. Name *two* ways by which a magnet can be demagnetised.

(i) .....

(ii) .....

12. State *two* functions of a gold-leaf electroscope.

(i) .....

(ii) .....

13. State the law of conservation of matter.

.....

.....

14. How could you show that a mixture of inks is used in some felt-tip pens?

.....

15. $^{22}_{11}Na$ and $^{23}_{11}Na$ are ..... of the element sodium.

16. Why does anhydrous copper sulphate change in colour from white to blue on exposure to the air?

.....

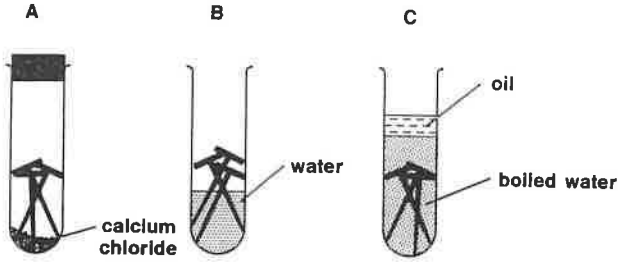
17. Name, giving reasons, the substance that is oxidised in the following reaction: $Cu^{++} + Fe \rightarrow Fe^{++} + Cu$

name .....

reason .....

18. A pupil set up three test tubes as shown below. After one week the iron nails had rusted only in test tube **B.** What does this experimental result tell about the conditions necessary for rusting?

.....



19. Give the formula and one chemical property of calcium carbonate.

formula .....

chemical property .....

20. Diamond and graphite are different physical forms of the element carbon.

They are known as .....of carbon.

21. Describe, in words or by means of a diagram, the shape of a methane molecule.

22. By means of a simple chemical test show how you could determine which of the following is the most acidic substance.

vinegar lemon juice sour milk

.....

.....

23. When concentrated sulphuric acid is dissolved in water a lot of heat is evolved. What term is used to describe this heat? .....

24. Complete and balance the following equation:

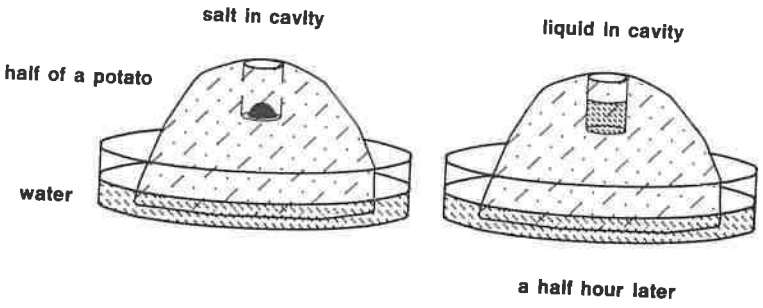
$$H_2SO_4 + NaOH \rightarrow Na_2SO_4 +$$

25. Give *one* example of competition in plants.

.....

26. State a function of dietary protein in the body. .....

27. A half of a potato was set up as shown in the diagram below. What process is being demonstrated in the experiment ?.....



28. Which of the following is the place where the exchange of materials between blood and other body tissues occurs?

capillaries veins arteries

Underline the correct term.

29. What is the term given to a plant's response to light?.....

30. State *one* example of asexual reproduction in a *named* plant.

example ..... named plant .....

31. What is meant by the term secretion?

.....

32. Give *two* functions of the lymphatic system.

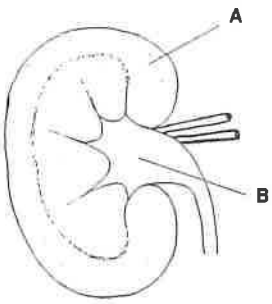
(i) .....

(ii) .....

33. State the action of *one* named digestive enzyme.

name ..... action .....

34. The diagram shows a section of a kidney.
Name **A** and give the function of **B**.



A .....

function of **B** .....

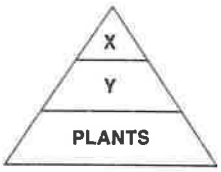
35. In eye colour, brown is dominant over blue.
A brown-eyed father (genotype BB) and a blue-eyed mother (genotype bb) have a family of four children.

How many of the children have brown eyes? .....

36. The diagram below shows a pyramid of numbers from an ecosystem.
Name one animal that might be found in level **X** and one animal that might be found in level **Y**.

level **X** .....

level **Y** .....



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INTERMEDIATE CERTIFICATE EXAMINATION, 1990

SCIENCE — SYLLABUS A

TUESDAY, 12 JUNE — MORNING, 9.30 to 12.00

A

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. (*a*) (i) Distinguish between heat and temperature.

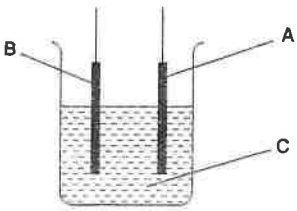
(ii) Describe how heat may be generated by mechanical work.

(iii) Define specific latent heat of fusion. Calculate the temperature rise of 500 g of copper whose specific heat capacity is 400 J kg^{-1} K^{-1} when it absorbs 2 kJ of heat.

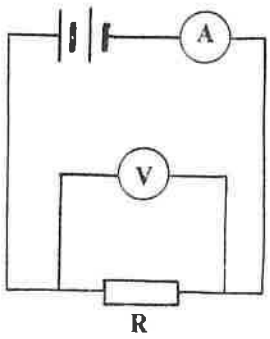
(*b*) (i) What is Brownian motion? Describe a simple experiment to demonstrate Brownian motion.

(ii) Using the knowledge that matter is composed of tiny particles explain why solids have a definite shape and volume while gases do not have any of these properties.

2. (*a*) Name the parts **A**, **B** and **C** of a simple electrical cell shown in diagram (i).



(i)



(ii)

If the ammeter **A** in the circuit diagram (ii) reads 2 amperes and the voltmeter **V** reads 6 volts, what is the resistance of **R**?

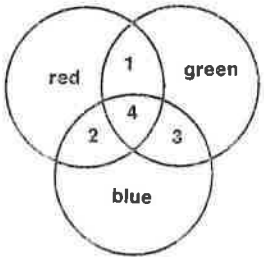
(*b*) List *three* effects of an electric current. Describe, with the aid of suitable diagrams, simple experiments to illustrate *each* of the effects you have listed.

(*c*) Calculate the cost of running a 2 kW electric heater for 10 hours if the cost of a unit of electricity is 8 p.

3. (*a*) Describe an experiment to show that light travels in straight lines.

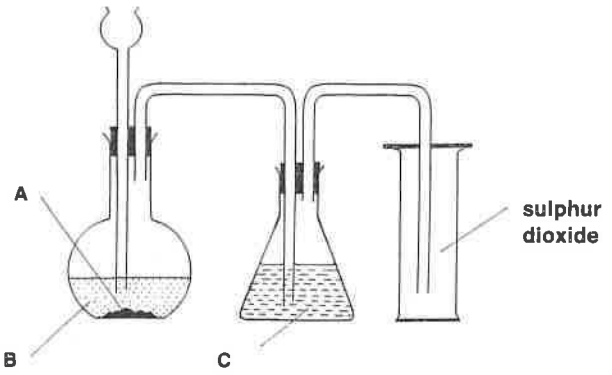
(*b*) Show, by means of a diagram. what happens when white light is passed through a prism indicating the correct positions of the red and of the violet ends of the spectrum.
Just beyond the red and the violet ends of the visible spectrum are invisible radiations. Name these radiations and show how the existence of these radiations may be detected.

(*c*) Red, green and blue are the three primary colours. The diagram shows the mixing of primary coloured lights to form the secondary colours and white light. What colours would be obtained in the areas 1, 2, 3 and 4 as indicated in the diagram?



SECTION C

4. (*a*) List *two* physical properties and *two* chemical properties of the element sulphur. Give a balanced equation for any *one* of the chemical properties listed.



(*b*) (i) Name the solid **A** and the liquids **B** and **C** in the labelled diagram of an apparatus used for the preparation of sulphur dioxide.

(ii) What is the function of **C**?

(iii) Suggest a precaution which should be taken when carrying out this experiment.

(iv) Write a balanced equation for the above preparation of sulphur dioxide.

(v) State *two* physical properties and *two* chemical properties of sulphur dioxide.

(vi) Name *one* effect of the release of sulphur dioxide into the atmosphere and indicate how this release might occur.

5. (*a*) Describe how magnesium reacts with (i) water and (ii) oxygen. Write a balanced equation for *one* of these reactions naming the compound of magnesium that has been formed.

(*b*) List the following metals in *decreasing* order of their chemical reactivity: copper, calcium, silver and potassium.

(*c*) Why are certain metals found in nature in the form of elements and other metals only found in the form of compounds?

(*d*) Give *two* reasons why lithium, sodium and potassium are classified in the same group of the Periodic Table.

(*e*) Draw a simple diagram (Bohr-type diagram) to show the arrangement of the electrons in an atom of potassium.

6. (*a*) What is meant by the atomic number of an element? How do protons, neutrons and electrons differ in terms of (i) mass, (ii) charge?

(*b*) Using a simple diagram describe the type of bonding that occurs in a molecule of chlorine. What is this type of bonding called?

(*c*) Sodium reacts with chlorine according to the equation

$$2Na + Cl_2 \rightarrow 2NaCl$$

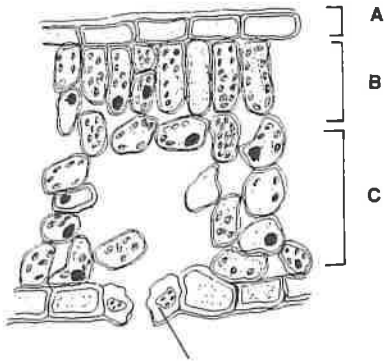
In terms of electron transfer show how a molecule of sodium chloride is formed. State the type of bonding present.

(*d*) Account, in simple terms, for the crystalline structure of sodium chloride.

SECTION D

7. (*a*) List *three* features of living organisms which distinguish them from non-living things. Give *two* differences between plant cells and animal cells.

(*b*) The diagram shows a vertical section through a leaf.



(i) Name the tissue layers **A**, **B** and **C**.

(ii) Name the process that takes place in layers **B** and **C** for which light is essential and write an equation for this process.

(iii) Suggest a reason why the cells in layer **B** are closely packed together. Why are the cells in layer **C** arranged with air spaces between them?

(iv) State the function of the guard cells.

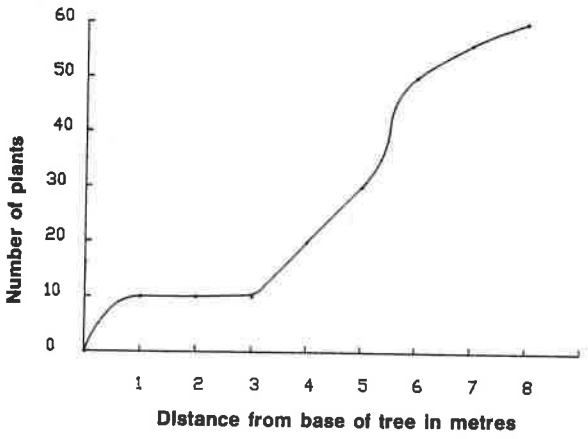
8. (*a*) (i) Explain the terms: reflex action, stimulus, response, in relation to the action of nerves.

(ii) Name one gland of the hormonal system.
State (i) its location in the body, (ii) the name of the hormone that is produced, (iii) the function of that hormone.
Compare briefly nervous action with hormonal action under the following headings:
(i) how quickly the action takes place,
(ii) how long the effect lasts.

(*b*) Draw a diagram of the reproductive system of the female mammal. Label the positions of the ovaries, the fallopian tubes and the uterus.
Indicate clearly on the diagram where the following occur (i) ovulation, (ii) fertilisation and (iii) insemination.

9. (*a*) Explain the terms: decomposer, saprophyte, parasite.
Outline a simple experiment to show the presence of micro-organisms in the environment (e.g. in soil).

(*b*) In a study of the area under a large tree in open ground the number of green plants at different distances from the base of the tree was recorded. The results were plotted on a graph as shown below.



(i) Comment on the change in the number of plants as distance from the base of the tree increases.

(ii) Suggest a reason for the change in the number of plants.

(c) Select *one* of the following and describe briefly how you would use it in the study of an ecosystem.
quadrat, transect, pooter, Tullgren (or Baermann) funnel.