Examination Number

AN ROINN OIDEACHAIS

INTERMEDIATE CERTIFICATE EXAMINATION, 1977

A

SCIENCE—SYLLABUS A

THURSDAY, 16 JUNE—AFTERNOON, 2 to 4.30

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. The velocity of a body increases uniformly from 10 metres per second to 30 metres per second in 5 seconds. What is the acceleration of the body? .....

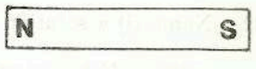
2. What do you understand by the moment of a force? .....
.....

3. What is meant by viscosity? .....
.....

4. The heat involved in a change of state of a substance is called.....heat.

5. Calculate the heat required to raise the temperature of 2 kg of copper from 20°C to 100°C, given that the specific heat capacity of copper is 390 J/kg °C. .....

6. Sketch the magnetic field around the bar magnet shown. Indicate by means of arrows the direction of the lines of force.



7. What is an electrolyte?.....
.....

8. When a polythene (or ebonite) rod is rubbed with fur, the rod becomes negatively charged and the fur positively charged. Explain what has happened in terms of electrons.....
.....

9. Calculate the resistance R if the current reading in A is 2 amperes and the potential difference reading in V is 10 volts.
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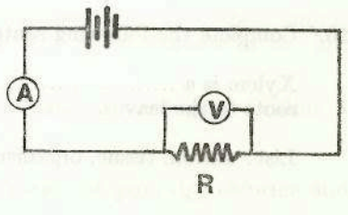

10. Calculate the cost of using a 100 watt bulb 10 hours a day, for 5 days, at 3p per kilowatt-hour.
.....

[P.T.O.

11. Name the radiation which lies just beyond the red end of the visible spectrum.....

12. What is meant by the frequency of waves?.....

.....

13. Give one example of a chemical change .....

.....

14. Name the products formed when calcium carbonate is heated strongly.

....

15. Name any catalyst and mention a reaction it catalyses.....

.....

16. What is meant by sublimation?.....

.....

17. Write the chemical equation for the reaction of sulphur dioxide with water.

.....

18 Underline the word in the following list that describes what happens to electrons when a covalent bond is being formed:

lost gained shared

Name a covalent compound.....

19. Complete the following: $NH_3 + HCl =$

20. What information does the atomic number give about the atoms of an element?.....

.....

21. What is meant by the conservation of matter?.....

.....

22. Name (i) a solution with a pH greater than 7 ..... (ii) a solution with a pH less than 7.....

23. Mention one method of removing permanent hardness from water.....

.....

24. What is meant by heat of neutralisation?.....

.....

25. Name the tiny openings in leaves that allow the movement of gases in and out.....

26. Complete the following sentences using words from the list supplied below.

Xylem is a ..... One of its functions is the transport of .....from the roots to the leaves.

List: starch, tissue, organism, bone, water, bacterium, lymph.

27. The diagram shows one of the following:
runner, corm, bulb, rhizome, tuber.
Underline the correct one.

State the function of the swollen structures labelled K.

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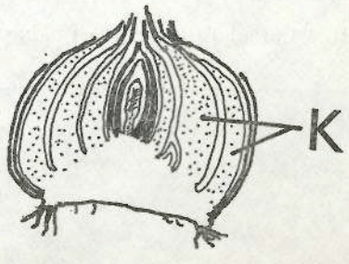


28. With regard to nutrition, what is the difference between a fungus and a flowering plant? .....

.....

29. Give one example of a tropism.....

.....

30. Name a plant that obtains its nitrogen supply with the aid of nitrogen-fixing bacteria living in its roots.

.....

31. Underline the word in the following list for the change from caterpillar to butterfly:

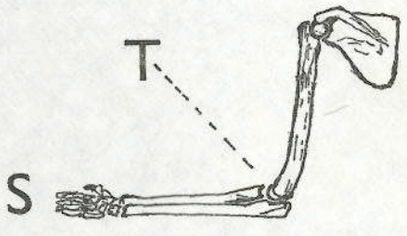
peristalsis metamorphosis mitosis fertilisation propagation

32. Name the female reproductive cell in mammals and name also the organs where these cells are produced.

....

33. Give one example of a fused joint.....

Insert on the diagram the muscle that raises the forearm from position S to position T.



34. Water is one of the waste products of respiration in man. Name the other waste product of respiration and name also the organ that excretes it.

....

35. Mention one function of blood.....

Name the part of the blood that carries out this function.....

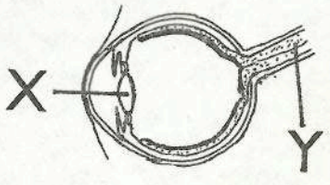
36. Name the part labelled Y in the diagram of an eye.

Y.....

State the function of the part labelled X.

.....

.....



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SCIENCE—SYLLABUS A

THURSDAY, 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

1. (*a*) What is meant by radiation of heat?
Heaters used in the central heating of houses, schools etc., are often called 'radiators'. Why is the word 'radiators' not a complete description of how the heaters work?
Outline a simple experiment to show that a black surface is a better radiator of heat than a white surface.

   (*b*) Describe, with the aid of a diagram, a simple experiment to show the generation of heat by electrical work.

2. State the relationship between the pressure and volume of a fixed mass of gas at constant temperature. Describe, with the aid of a diagram, an experiment to illustrate the relationship.
A fixed mass of gas has a volume of 500 cm^3 at a pressure of 770 mm of mercury. If the pressure is reduced to 700 mm of mercury, without changing the temperature, what will be the new volume of the gas?
What does Brownian movement tell us about the nature of gases?

3. (*a*) Define density. Describe an experiment to measure the density of a liquid.

   (*b*) How would you show by experiment the magnetic effect of an electric current?
Describe, with the aid of a labelled diagram, the electric bell and state how it works.

SECTION C

4. Compare the metals magnesium, silver, sodium, under the following headings: (i) reaction with oxygen, (ii) reaction with water, (iii) reaction with dilute acids, and name the products, if any, in each case. Arrange the above metals in decreasing order of chemical activity.
Write a balanced equation for each of the following reactions.

   (i) $Mg + O_2$ (ii) $Na + H_2O$ (iii) $Mg + HCl$

   Silver is sometimes found in nature as the free metal. Sodium is never found as the free metal. Suggest a reason for this.

5. (*a*) The two main constituents of atmospheric air are elements. Name these elements. Describe a simple experiment to show that one of these elements makes up about one-fifth of the volume of the air. Give *two* reasons why air is a mixture and not a compound.

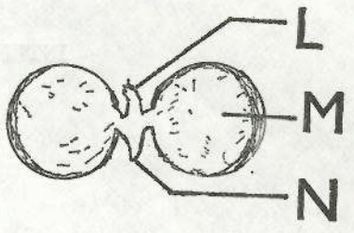
   (*b*) On returning from a picnic by the seaside you notice that there is some sand in the sugar. Outline a method of separating the sugar from the sand.

6. (*a*) Describe, with the aid of a labelled diagram, the preparation and collection of pure dry chlorine and list *six* of its properties.

   (*b*) Explain, in terms of electron transfer, what is meant by (i) oxidation, (ii) reduction, (iii) oxidising agent, (iv) reducing agent. Mention *one* common oxidising agent and *one* common reducing agent.

SECTION D

7. (i) What is a seed?
Name the parts labelled L, M, and N in the diagram of a dissected pea seed. State the function of M.
What is meant by germination? Describe an experiment to show that water is necessary for germination.



(ii) A red-flowered pea plant, genotype **AA**, is crossed with a white-flowered pea plant, genotype **aa**. What will be the genotype of the offspring?

8. (*a*) Proteins, fats and carbohydrates are important constituents of a normal diet. Answer the following questions for *each* of these types of food.

(i) Name one good source.

(ii) Name one region of the alimentary canal where it undergoes digestion.

(iii) Name one enzyme involved in its digestion.

(iv) Name one final product resulting from its digestion.

(*b*) In the case of any *one* of the three food substances mentioned above describe a simple test to detect its presence in a food sample.

(*c*) In the case of *one* of the enzymes you have named at (iii) above, describe a simple experiment to illustrate its action.

9. (*a*) Describe briefly how a named plant and a named animal are adapted to life in the ecosystem you have studied. (State the type of ecosystem.)

(*b*) What is meant by a saprophyte? What important role do saprophytes play in an ecosystem?

(*c*) Describe simple experiments, one in each case, to estimate (i) the weight of organic matter in a sample of soil, (ii) the volume of air in a sample of soil.