



Examination Number

AN ROINN OIDEACHAIS

INTERMEDIATE CERTIFICATE EXAMINATION, 1984

SCIENCE—SYLLABUS A

A

THURSDAY, 14 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.

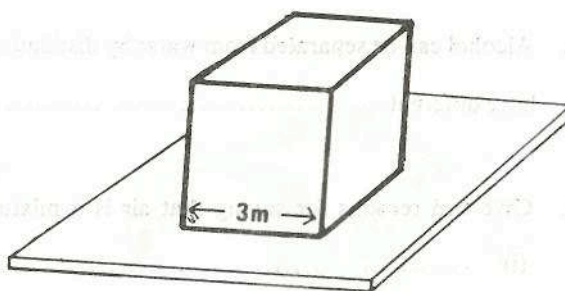
1. Define centre of gravity

.....

2. A body accelerates uniformly from rest at 3 metres per second². What is the velocity of the body after 4 seconds?

.....

3. A cube of side 3 metres, resting on a table-top as shown in the diagram, exerts a force of 45 newtons. Calculate the pressure of the cube on the table-top.



.....

.....

4. The random movement of smoke particles in air *or* of pollen grains in water is called Brownian movement.

What causes this random movement?

.....

5. What is meant by viscosity?

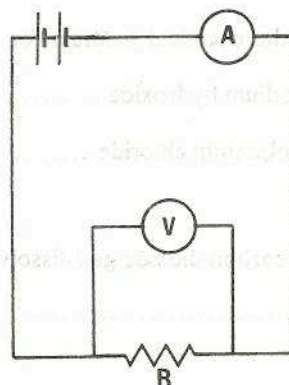
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6. A 20 gram mass produces an extension of 30 millimetres in a taut spiral spring. If a stone produces an extension of 75 millimetres, what is the mass of the stone?

.....

7. If the ammeter A in the circuit diagram reads 1.5 amperes and the voltmeter V reads 4.5 volts, what is the resistance of R?

.....



8. State any *one* use of a gold-leaf electroscope.

.....

9. Underline in the following list the mass of the hydrogen atom.

4.2×10^2 kg 1.2×10^{25} kg 1.7×10^{-27} kg

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

(i) (ii)

11. Calculate the heat lost by 2 kilograms of water when cooled from 20°C to 15°C given that the specific heat capacity of water is 4,200 J/kg/°C.

.....

12. What is the cost of using a 2 kW electric fire for 5 hours at 7.0 p per kilowatt-hour?

.....

13. What is a compound?

.....

14. Carbon dioxide can be prepared in the laboratory by the action of dilute
on

15. Alcohol can be separated from water by distillation because the liquids
have different

16. Give *two* reasons for saying that air is a mixture.

(i)

(ii)

17. Complete the following equation:



18. Underline the element in the following list that is never found free in nature and give a reason for your choice.

gold sodium silver copper

Reason

19. Write the chemical formula for each of the following:

(i) sodium hydroxide

(ii) potassium chloride

20. When carbon dioxide gas dissolves in water is the pH of the solution less than 7, equal to 7, or greater than 7?

.....

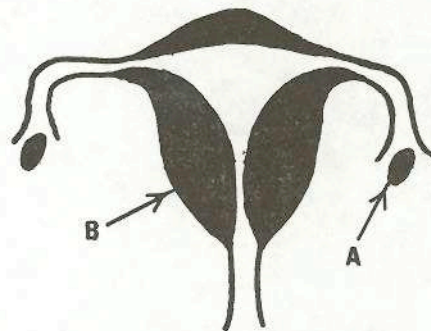
21. What word is used to describe a chemical reaction in which heat is absorbed in the reaction?

22. Mixtures of coloured substances can sometimes be separated by allowing a solvent (e.g. water) to carry them along a sheet of blotting paper or filter paper.
 What term is given to this method of separation?
23. Mention an advantage and a disadvantage of hard water.
 (i) Advantage
- (ii) Disadvantage
24. What is an acid in terms of the Brønsted-Lowry theory?

25. A deficiency of vitamin D in humans causes
 pellagra nightblindness scurvy rickets
 Underline the correct answer.
26. Give *two* differences between plant and animal cells.
 (i)
- (ii)
27. In the genes for eye colour in man, brown(B) is dominant over blue(b). Write down the two possible genotypes that result in a person having brown eyes.
 (i) (ii)

28. The diagram shows the female reproductive system. Name the structures A and B.

- A
- B



29. Underline in the following list the food-transporting tissue in plants.

- phloem parenchyma cambium xylem

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

- (i)
- (ii)

31. Name *one* organ of vegetative propagation in plants.....

Name a plant in which you would find this organ.....

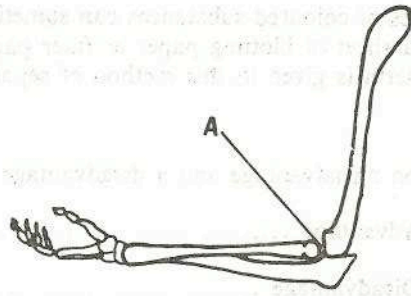
32. There are three small bones in the middle ear. Name any two of them.

- (i)
- (ii)

33. The diagram shows the bones of the human arm.

Name the joint at A

What type of joint is it?



34. Mention a way in which bacteria are useful and a way in which they are harmful to humans.

- (i) Useful
- (ii) Harmful

35. Put the symbol \checkmark in the box opposite the atmospheric conditions that would be likely to cause the highest transpiration rate in plants.

- (i) cool, moist, breezy
- (ii) warm, dry, calm
- (iii) cool, moist, calm
- (iv) warm, dry, breezy

36. During a period of dry weather, light watering may harm plants by attracting the roots upwards to the surface moisture. What is the term for the response of roots to water?

.....



I.S.C.I.P. EXAMINATION PAPER

(for candidates who have followed the Integrated Science Curriculum Innovation Project)

Examination Number

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SCIENCE - SYLLABUS A

A

THURSDAY, 14 JUNE - MORNING, 9.30 to 12.00

SECTION A is the same for all candidates and is on a separate sheet. It should be returned with SECTIONS B, C, D.

SECTIONS B, C, D

Answer all the questions in Sections B and C and any five questions from Section D.

SECTION B

Questions 1 - 15: Tick the correct answer in each of the following

1. A block has a mass of 1200 Kg and measures 2 m x 2 m x 1 m. Its density is:

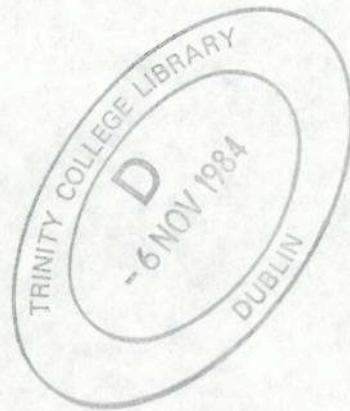
- (a) 1200 Kg/m³
- (b) 240 Kg/m³
- (c) 600 Kg/m³
- (d) 4800 Kg/m³
- (e) 300 Kg/m³

2. Which of the following uses an electromagnet to work ?

- (a) a compass
- (b) an electric bell
- (c) an electric fire
- (d) a steam engine
- (e) a battery

3. The melting point of ice is:

- (a) 78°C
- (b) 100°C
- (c) 0°C
- (d) 35°C
- (e) 273°C



4. Work is measured in:

- (a) neutrons
- (b) °C
- (c) joules
- (d) amps
- (e) grams

5. An electric current is a flow of:

- (a) volts
- (b) atoms
- (c) electrons
- (d) molecules
- (e) protons

6. ${}_{92}^{238}\text{U}$ and ${}_{92}^{235}\text{U}$ are isotopes of Uranium. This means that:

- (a) they exist in different physical forms
- (b) they have different numbers of protons
- (c) they have the same number of neutrons
- (d) they have the same number of protons and a different number of neutrons
- (e) they are different elements

7. In the nucleus of an atom we find:

- (a) only protons
- (b) electrons and protons
- (c) only neutrons
- (d) protons, neutrons and electrons
- (e) neutrons and protons

8. Neutralisation is best represented by:

- (a) water + base \longrightarrow acid solution
- (b) acid + salt \longrightarrow base solution
- (c) base + salt \longrightarrow acid + water
- (d) acid + base \longrightarrow salt + water
- (e) water + acid \longrightarrow base solution

9. The gas which makes up the largest fraction of the air is:

- (a) oxygen
- (b) nitrogen
- (c) methane
- (d) hydrogen
- (e) carbon dioxide

10. Zinc metal and sulphuric acid will react to produce one of the following gases. Which one ?

- (a) oxygen
- (b) nitrogen
- (c) carbon dioxide
- (d) hydrogen
- (e) ammonia

11. Plants which are insect pollinated usually have:

- (a) no nectar
- (b) no stamens in their flowers
- (c) sticky pollen grains and bright petals
- (d) no coloured flowers
- (e) no smell and dull coloured petals

12. To test for starch we use:

- (a) copper sulphate
- (b) iodine
- (c) lime water
- (d) Fehling's solution
- (e) mercury



13. Chlorophyll is a substance which:

- (a) is found in fungi
- (b) is stored in the roots of plants
- (c) is taken in through the stomata of plants
- (d) is the green colouring substance in plants
- (e) is used up in respiration by plants.

14. Proteins are broken down by digestion to:

(a) amino acids

(b) glucose

(c) glycerol and fatty acids

(d) vitamins

(e) minerals

15. Humans need proteins in their diet for:

(a) heat insulation

(b) transport

(c) growth and repair of cells

(d) immediate energy

(e) efficient digestion

Questions 16 - 25: Match each word or phrase in Box X with the most suitable word or phrase in Box Y.

16.

BOX X	BOX Y	ANSWER
1. An example of conduction	A. The attic of a house lagged with fibreglass	1 +
2. An example of convection	B. The handle of a poker gets hot when the end is held in a fire	2 +
3. An example of radiation	C. Mercury in a thermometer expands on heating	3 +
4. An example of insulation	D. Household hot water system	4 +
	E. The heat of the sun warms the earth	

17.

BOX X	BOX Y	ANSWER
1. A balance is used to measure	A. Distance in cm	1 +
2. A metre stick is used to measure	B. Volume in cm^3	2 +
3. A graduated cylinder is used to measure	C. Mass in grams	3 +
4. A thermometer is used to measure	D. Temperature in $^{\circ}\text{C}$	4 +
	E. Area in cm^2	

18.

BOX X	BOX Y	ANSWER
1. fulcrum	A. force acting on a lever	1 +
2. load	B. force X distance	2 +
3. effort	C. point about which a lever turns	3 +
4. turning moment	D. simple machine	4 +
	E. weight being moved by a lever	

19

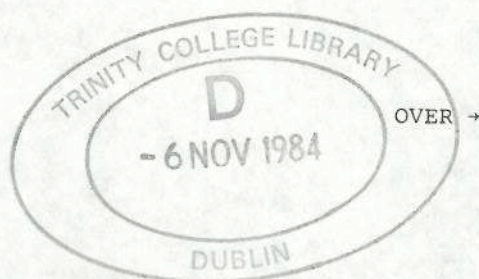
BOX X	BOX Y	ANSWER
1. sulphate ion	A. Cl^-	1 +
2. chloride ion	B. NH_4^+	2 +
3. nitrate ion	C. CO_3^{--}	3 +
4. ammonium ion	D. NO_3^-	4 +
	E. SO_4^{--}	

20.

BOX X	BOX Y	ANSWER
1. weak acid	A. pH 12	1 +
2. strong acid	B. pH 8	2 +
3. weak base	C. pH 7	3 +
4. strong base	D. pH 6	4 +
	E. pH 1	

21.

BOX X	BOX Y	ANSWER
1. sodium chloride	A. is an allotrope	1 +
2. silver	B. is an alloy	2 +
3. graphite	C. is a compound	3 +
4. steel	D. is an element	4 +
	E. is an alkali metal	



22.

BOX X	BOX Y	ANSWER
1. beryllium	A. has an electron arrangement of 2,8,4	1 +
2. silicon	B. has an electron arrangement of 2,8,2	2 +
3. fluorine	C. has an electron arrangement of 2,8,8,1	3 +
4. potassium	D. has an electron arrangement of 2,2	4 +
	E. has an electron arrangement of 2,7	

23.

BOX X	BOX Y	ANSWER
1. optic nerve	A. carries impulses from the ear	1 +
2. iris	B. controls opening and closing of pupil	2 +
3. semi-circular canals	C. carries impulses from the eye	3 +
4. auditory nerve	D. carries impulses from the skin	4 +
	E. controls balance	

24.

BOX X	BOX Y	ANSWER
1. digestion	A. eating food	1 +
2. egestion	B. breaking down food	2 +
3. ingestion	C. getting rid of waste food and other materials	3 +
4. assimilation	D. passing food into the blood system	4 +
	E. using food to build and repair tissues	

25.

BOX X	BOX Y	ANSWER
1. right auricle	A. receives blood from veins	1 +
2. artery	B. pumps blood to body	2 +
3. capillary	C. carries blood from heart	3 +
4. left ventricle	D. carries blood from lungs	4 +
	E. distributes blood to cells	

SECTION C

26. Energy can be converted from one form to another. Use the correct words to complete the following sentences:

Heat from a light bulb is an example of the conversion of _____ energy to heat.

Heat from the reaction of calcium and water is the conversion of _____ energy to heat.

Heat from friction is the conversion of _____ energy to heat.

27. Say whether the following charges attract or repel each other:

Type of electric charge	Effect on each other
(a) positive and positive	
(b) negative and negative	
(c) positive and negative	

28. Use the correct words to complete the following sentences:

A substance with a definite shape and a definite volume is a _____

A substance with a definite volume but no definite shape is a _____

A substance with no definite shape or volume is a _____

29. Complete, and balance, the following equation:

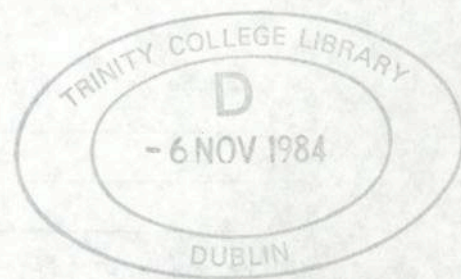
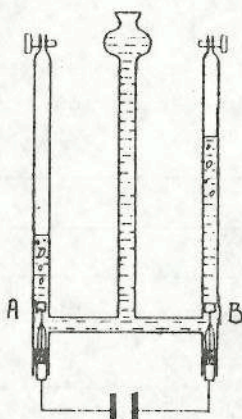


30. When coal burns, two principal gases are given off.

Name them: (i) _____ (ii) _____

Which gas turns limewater milky? _____

31.



This apparatus is a Hofmann Water Voltmeter. It splits water into its elements. The metal plates at A and B are called electrodes. They are made of _____. The plate at A has a negative charge and is called the _____. B has a positive charge and is called the _____.

32. Use the correct words to complete the following sentences:

A liquid in which other substances will dissolve is called a _____.

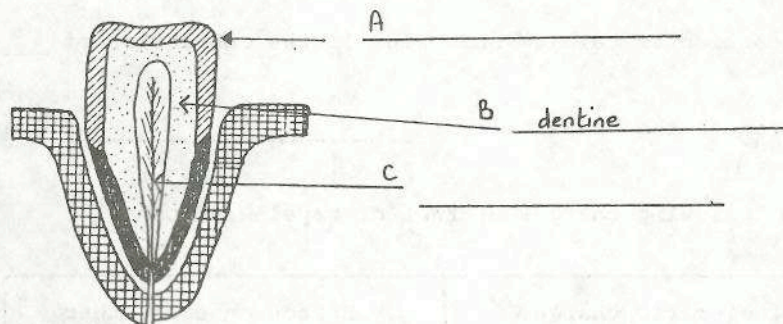
A substance that dissolves in a liquid is called a _____.

When a substance is dissolved in a liquid a _____ is formed.

33. Use the correct words to complete the following sentences:

- (a) The bone at the front of the ribcage is the _____.
- (b) The small bone at the knee is the _____.
- (c) The bones that form the wrist are the _____.

34. Tooth

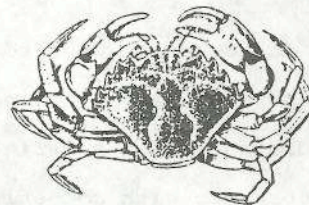


Fill in the names of parts A and C.

Explain how eating sugary foods can damage part A.

35. Complete the following sentences:

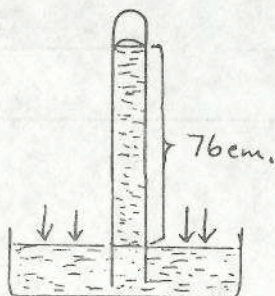
- The crab is a member of Phylum _____.
- Members of this phylum have an _____
- outside their bodies.
- _____ also belongs to this phylum.



SECTION D

Answer any five of the following

36. The air pressure on a given day can support a column of mercury 76 cm in height (see diagram).



- (a) The same experiment was set up on a high mountain. What happened to the height of the mercury in the tube?

- (b) Water is 13 times lighter than mercury. What height of water will the air pressure support?

37. A ringing bell is placed in a container and then all the air is taken out of the container using a vacuum pump. What do you notice about the sound of the bell ?

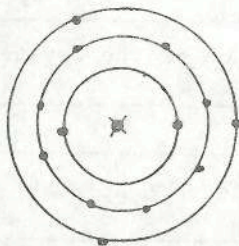
(a) _____

(b) Why does this happen ?

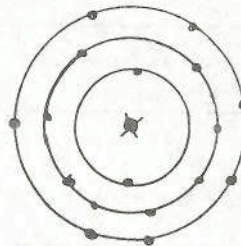
(c) What happens when the air is let back in ?

(d) Why will a dog respond to a whistle which humans cannot hear ?

38.



ALUMINIUM ATOM



CHLORINE ATOM

(i) What is the valency of Aluminium ? _____

(ii) What is the valency of Chlorine ? _____

(iii) What is the name and formula of the compound formed between them ?

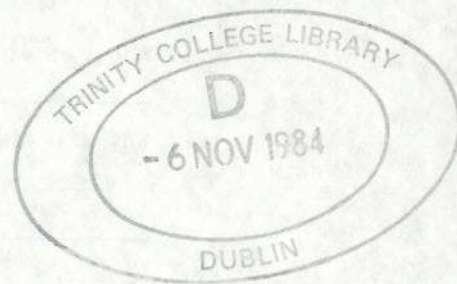
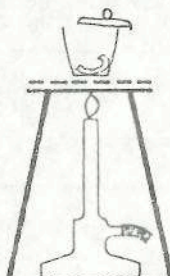
Name _____

Formula _____

(iv) What type of bond is formed between aluminium and chlorine ?

(v) What is the name of the compound $Al_2(SO_4)_3$?

39.



(i) Some magnesium is heated in a crucible, as shown in the diagram. Describe the appearance of the magnesium at the start of the experiment.

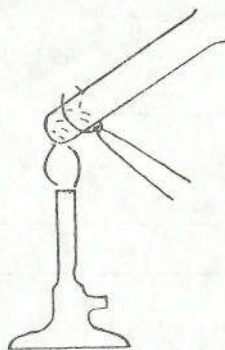
(ii) Is magnesium a metal or a non-metal ?

(iii) Why is the crucible lid placed a little to one side ?

(iv) Describe the substance formed at the end of the experiment ?

(v) What is its name and formula ?

40.



Some crystals of copper sulphate are heated as shown in the diagram.

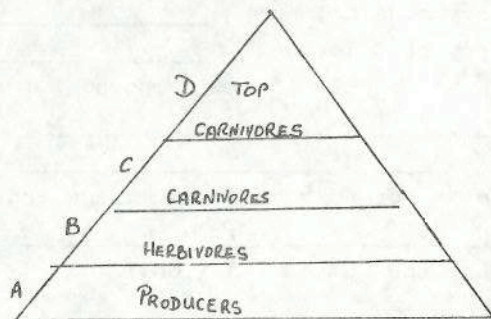
(i) What colour are the copper sulphate crystals at the start of the experiment ?

(ii) What happens to the crystals when they are heated ?

(iii) How could you restore the original appearance of the crystals ?

(iv) What substance has been lost by the crystals on heating ?

41.



(i) Where does all the energy in the ecosystem come from originally ?

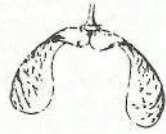
(ii) Why are the plants called producers ?

(iii) Give one example at level A, B, C and D from a habitat you have studied.

A _____ B _____

C _____ D _____

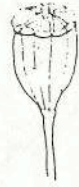
(iv) Name the habitat you studied.



a



b



c

(i) Explain how the seeds are dispersed in each case above.

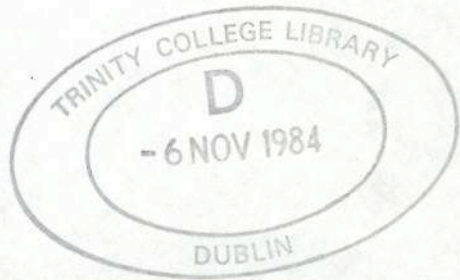
(a) _____

(b) _____

(c) _____

(ii) If the seeds were only dispersed very near to the parent plants, explain what would happen.

(iii) What are the conditions necessary for germination ?



AN ROINN OIDEACHAIS

INTERMEDIATE CERTIFICATE EXAMINATION, 1984

SCIENCE — SYLLABUS A

A

THURSDAY, 14 JUNE — MORNING, 9.30 to 12.00

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

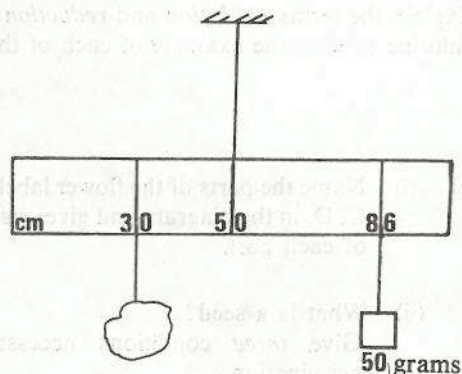
1. (i) Define density.

Describe, with the aid of a diagram, how you would measure the density of a liquid.

- (ii) State the law of the lever.

The diagram shows a uniform metre stick, suspended at its mid-point. A solid lump of copper, suspended at the 30 cm mark, is balanced by a mass of 50 grams, suspended at the 86 cm mark.

Calculate the mass of the lump of copper.



When the solid lump of copper is carefully lowered into water in a graduated cylinder, it sinks, causing the level of the water to rise from 38 cm^3 to 48 cm^3 . Calculate the density of copper.

If the lump of copper is formed into a hollow ball, it will float on water. Suggest a reason for this.

2. (a) Describe simple experiments, one in each case, to show that liquids and gases expand when heated. Mention (i) *one* use that is made of the expansion of liquids, (ii) *one* use that is made of the expansion of gases.

- (b) State (i) the relationship between the volume and the pressure of a fixed mass of gas at constant temperature,
(ii) the relationship between the volume and the temperature of a fixed mass of gas at constant pressure.

A fixed mass of gas occupies a volume of 450 cm^3 at a temperature of 27°C (300 K). What volume would it occupy at a temperature of 127°C (400 K) if there was no change in pressure?

3. (a) Sound is (i) a form of energy, (ii) a wave motion.

What is meant by energy?

Describe an experiment to illustrate sound as a wave motion.

The velocity of sound in air is 330 metres per second. If the wavelength of a musical note is 3 metres, what is the frequency of the note?

- (b) What is meant by a magnetic line of force?

An electric current is flowing in a straight wire. Describe, with the aid of a diagram, how you would plot the magnetic lines of force around the wire. Indicate the direction of the current and the direction of the lines of force.

SECTION C

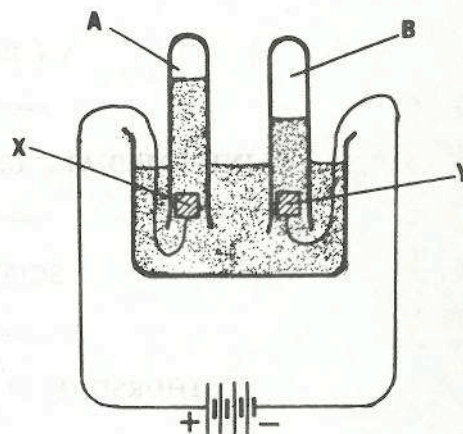
4. (a) Describe, with the aid of a labelled diagram, the preparation and collection of dry ammonia.

State the following properties of ammonia: (i) colour, (ii) odour, (iii) solubility in water, (iv) reaction to moist litmus, (v) reaction with hydrogen chloride.

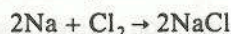
What is the shape of the ammonia molecule?

- (b) You are given a mixture of ammonium chloride and sodium chloride. Describe, with the aid of a diagram, how you would separate them.

5. The diagram shows the electrolysis of acidulated water, i.e. water to which a few drops of sulphuric acid have been added.



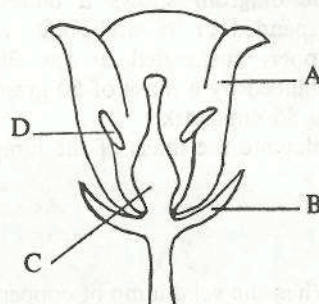
- Name an element which may be used for the electrodes X and Y.
 - Name the gases A and B and describe simple tests, one in each case, that would help you to identify them.
 - What information does the electrolysis give about the composition of water by volume?
 - How was the current carried through the solution?
 - Give *two* physical properties and *two* chemical properties of gas A.
 - Gas B is often prepared in the laboratory by the action of a dilute acid on a metal. Suggest a suitable metal and a suitable acid and write an equation for the reaction.
6. What is an electron?
 What does a neutral atom become (i) if it loses electrons, (ii) if it gains electrons?
 Draw a simple diagram showing the arrangement of electrons in an atom of sodium (atomic number 11).
 Sodium reacts with chlorine according to the equation



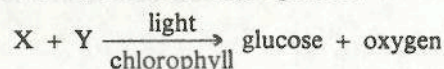
Explain the terms *oxidation* and *reduction* in terms of electron transfer. Use the reaction between sodium and chlorine to give one example of each of the following: oxidation, reduction, oxidising agent, reducing agent.

SECTION D

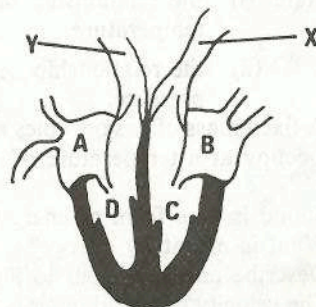
7. (a) (i) Name the parts of the flower labelled A, B, C, D, in the diagram and give *one* function of each part.
- (ii) What is a seed?
 Give *three* conditions necessary for germination.



- (b) Photosynthesis may be represented by the following equation:



- Name X and Y.
 - Describe, with the aid of a diagram, an experiment to show that oxygen is produced by photosynthesis.
8. (a) The diagram shows the human heart and its main blood vessels.
- Name the four chambers A, B, C, D.
 - X is the main artery of the body. Name it. Name also any *one* of the veins in the diagram.
 - To which chamber does the blood return after it has left chamber C and travelled round the body?
 - Y is an artery but the blood it contains differs from that usually found in arteries. What is the difference?



- (b) Why are proteins an important part of a balanced diet?
 Name the end-product of protein digestion in the alimentary canal, and say where the product is absorbed into the blood.
 Describe briefly how you would test for the presence of proteins in a sample of food.
9. (a) Explain the terms (i) producer, (ii) herbivore.
 Name *one* herbivore from the ecosystem you have studied, and give an example of a food chain involving the herbivore you have named.
 Mention *one* way in which this herbivore is adapted to survive in the ecosystem.
- (b) The mass of a sample of fresh soil was obtained and then the sample was left in a warm place in the laboratory. After a few days it was found to have lost some mass due to a decrease in the amount of substance X in the soil. The sample was then heated strongly over a bunsen burner and there was a further loss in mass due to the soil losing its remaining X and all of substance Y.
 What are X and Y?
- (c) "Pollution is a threat to man's health and even to his survival". Mention any *two* causes of pollution and, in each case, state briefly how the cause is a threat to man's health *or* survival.