

## INTERMEDIATE CERTIFICATE EXAMINATION, 1969

## SCIENCE - SYLLABUS A

Six questions to be answered, one question at least being chosen from each section. All the questions carry the same number of marks.

A Periodic Table of the Elements may be had from the Superintendent.

## SECTION I

1. Give examples of the various ways in which a force can affect the shape or motion of a body.

Explain the terms velocity, acceleration.

A car travelling in a straight line covers a distance of 300 feet every five seconds. Find its velocity. If the car then increased its velocity uniformly to 100 feet per second in four seconds, find the uniform acceleration.

2. Energy may be defined as capacity for doing work. Illustrate this statement by means of examples.

What would you need to know about a body in order to determine the amount of heat required to raise it to a given temperature?

How may changes in temperature be explained in terms of the motion of molecules? Give examples of the conservation of energy.

3. (a) Show by means of diagrams the location of the electrons, protons and neutrons in an atom (i) of helium, (ii) of oxygen.

Why may the number of protons and neutrons in the atom of an element be taken as the atomic weight of the element?

(b) How may (i) static electricity, (ii) current electricity, be produced? Comment on the part played by the electron in each case.

4. Answer three of the following:-

(a) Define density. Outline any method for comparing the densities of two liquids.

(b) Describe a gold-leaf electroscope. For what purpose is an electroscope used?

(c) What is the relation between the ampere (amp), volt and ohm?

Find the current flowing through a 2 kilowatt heater when connected to a 200 volt supply. Calculate also the resistance of the heater.

(d) What happens when white light is passed through a glass prism? Give an account of the production of white light and other colours by mixing.

(e) Write down the velocity of sound in air.

Describe an experiment to illustrate the wave nature of sound.

## SECTION II

5. Classify each of the following as an element, a compound or a mixture, giving your reasons:- (i) water, (ii) methane, (iii) oxygen, (iv) carbon dioxide, (v) air.

How would you show that the atmosphere contains water vapour?

How would you show that the atmosphere contains some carbon dioxide, but that breathed air contains much more carbon dioxide?

6. Describe how you would prepare and collect dry ammonia gas. (A clearly labelled diagram will suffice.)

Give an account of the physical and chemical properties of ammonia. Give the name and formula for any two salts of ammonia.

Indicate the shape of the ammonia molecule.

7. What is an allotrope?

Name any two allotropes of carbon.

Name any two allotropes of sulphur and show how they may be prepared. Mention the principal properties of the two allotropes of sulphur you have named.

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8. Answer three of the following:-

- (a) Outline an experiment in which acidulated water is decomposed electrically. What can you deduce from the results of this experiment?
- (b) Describe, with the aid of a sketch, the structure of a crystal of sodium chloride.
- (c) What is the effect of heat on (i) potassium nitrate, (ii) calcium carbonate? Name the products formed and give equations.
- (d) State what you understand by (i) an acid, (ii) a base, according to the Bronsted-Lowry theory.
- (e) Compare the general properties of covalent substances with those of electrovalent substances.

### SECTION III

9. Name the principal regions in the alimentary canal in the human body. In which regions are (a) carbohydrates, (b) proteins, (c) fats, broken down?

Describe tests, one in each case, to identify (i) carbohydrate, (ii) fat, in food samples.

Describe an experiment to illustrate the action of an enzyme.

10. Give a short account of either photosynthesis or respiration in plants.

Draw a labelled diagram to show the internal structure of a green leaf. Indicate on the diagram where gases enter or leave through the leaves of a plant during daylight, and name the gases. In what way would the situation be different during darkness?

11. Name three animals and three plants you have collected or observed in a habitat you have studied. What type of habitat was it?

In the case of one of those animals, give a labelled diagram to show its appearance, say what it feeds on, and mention a food chain (or web) of which it forms part.

12. Answer three of the following:-

- (a) Outline the life cycle of the frog or the fern.
- (b) "Bacteria are both beneficial and harmful to man." Give some reasons in support of this statement.
- (c) Give some examples of how plants are adapted to their environment.
- (d) Give a clearly labelled diagram to show the structure of the heart and the main blood vessels entering and leaving it.

(e) Name the parts of the flower labelled A, B, C, D in the diagram opposite.

