

DAY GROUP CERTIFICATE EXAMINATIONS, 1968

SCIENCE (SYLLABUS A)

THURSDAY, 20th JUNE - 10 - 12.30 p.m.

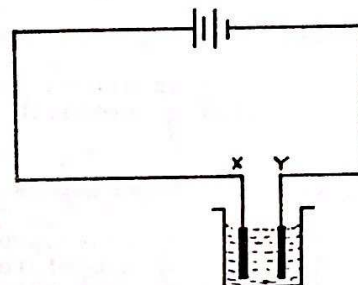
Six questions to be answered.

Questions may be chosen from any section of the paper.

All questions carry equal marks.

SECTION A. PHYSICS.

1. State the principle of the lever and give two practical examples of its use.  
How is the moment of a force measured?  
Two boys, one weighing 5 stone and the other weighing 4 stone, sat on a see-saw, each 6 ft. from the pivot. How far back should the lighter boy move to keep the see-saw in balance? How far forward should the heavier boy move to achieve the same result?
2. A glass tube, 33 in. long, closed at one end and filled with mercury, is inverted into a mercury-filled dish and stands vertically.
  - (a) Why does the mercury fall a certain distance?
  - (b) What keeps the mercury suspended at the height shown?
  - (c) What does this arrangement enable us to measure?
  - (d) Can it help us to forecast the weather?
  - (e) Why is mercury used?
3. A quantity of broken ice is placed in a beaker and the beaker and its contents are then heated gradually until nothing visibly remains in the beaker. A centigrade thermometer may be used to assist your observations during this process.  
Make a table of all the observations you could make while carrying out this experiment and attempt to account for each observation in terms of the idea that matter is composed of molecules.
4. The diagram shows two conducting plates X and Y, dipping into a solution of copper sulphate.
  - (i) Indicate the direction of electron flow through the circuit.
  - (ii) What is observed when the current has been flowing for some time?
  - (iii) Is copper deposited and, if so, is it at X or Y?
  - (iv) Which way does copper travel through the solution and what sort of electricity is carried by it?



SECTION B - CHEMISTRY

5. What is the Law of Conservation of Matter?  
A stoppered flask containing phosphorus is weighed and is then heated until the phosphorus burns. On cooling it is weighed again.  
Describe what is happening when the phosphorus is burning and explain any change in weight which may occur.  
The stopper is then removed and the flask and stopper again weighed. Has the weight altered this time? Explain your answer.  
What conclusions can you draw from this experiment?
6. Describe and explain what happens when:-
  - (a) carbon dioxide is passed through lime-water;
  - (b) dilute sulphuric acid is added to zinc metal;
  - (c) sodium metal is placed on water;
  - (d) sulphur and iron filings are heated together.

7. What is the difference between a molecule and a crystalline lattice ? Name two compounds which exist as molecules and two which exist as crystalline lattices. Using the table given below write down electronic structures for each of the following compounds, concerning yourself only with the outermost electron shell in each atom:-

(i) Water, (ii) Ammonia, (iii) Magnesium Oxide, (iv) Sodium Chloride.

Element	Hydrogen	Nitrogen	Oxygen	Sodium	Magnesium	Chlorine
Atomic Number	1	7	8	11	12	17

8. What do you understand by (i) an acid, (ii) an alkali ? Give two examples of each. Describe how you would neutralise an alkali with an acid, listing the observations you would make in the course of the experiment. Explain what is happening during the neutralisation process.

### SECTION C - BIOLOGY

9. Give an account of a terrestrial habitat which you have examined, under the following headings:-

- (a) Time of year.
- (b) Type of soil.
- (c) Plants found there.
- (d) Animals found there.

10. In the case of any three of the following plants, explain how they can be propagated, without the production of flowers:-

potato, daffodil, strawberry, iris, privet.

11. (a) Give a brief account of the circulation of the blood.

(b) How would you distinguish between:-

- (i) an artery and a vein,
- (ii) a ventricle and an auricle ?

12. Describe experiments you would carry out:-

- (a) to show that carbon dioxide is necessary for photosynthesis;
- (b) to test a leaf for starch;
- (c) to show that chlorophyll is necessary for photosynthesis.