

## AN ROINN OIDEACHAIS

## INTERMEDIATE CERTIFICATE EXAMINATION, 1973

## SCIENCE—SYLLABUS B

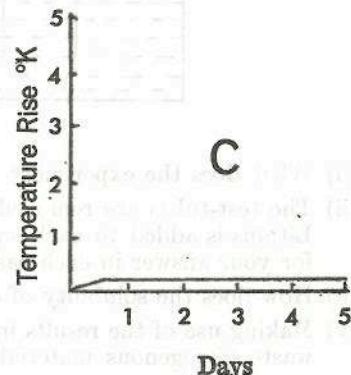
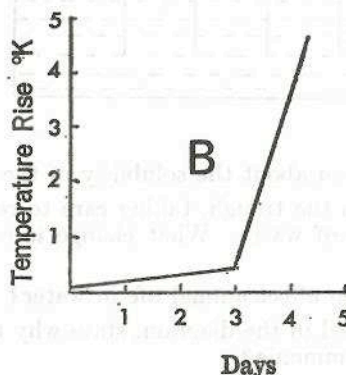
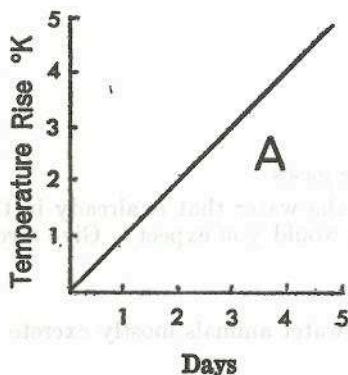
FRIDAY, 15 JUNE—AFTERNOON, 2 to 4.30

Six questions in all to be answered, including at least two from Section I, at least one from Section II and at least one from Section III. All questions carry equal marks.

## SECTION I

- Name a vegetable crop or fruit crop grown in your school garden or home garden. Write notes on that crop under the following headings:—propagation, time and method of planting, operations that benefit the crop and protect it from pests and diseases, principal type of food contained in the crop.
- Make a list of plants and animals you have found in a named land habitat which you have studied. In the case of one mammal present, what special adaptations does it possess for survival in that habitat? What evidence (if any) was there of man's influence on the habitat?
- Give short answers (a few lines in each case) to the following questions concerning any one insect pest you have studied.
  - Give an outline of the life cycle.
  - What are the main identifying characteristics of the adult stage?
  - What is the purpose of metamorphosis in the life cycle?
  - How does knowledge of the life cycle help in the control of the pest?
  - What are the least active stages in the life cycle?
  - What factors enable the pest to increase in numbers?
  - How does the pest make use of protective coloration at each stage of the life cycle?
- (a) How would you compare by simple experiment the composition of exhaled air with that of ordinary air?  
 (b) The graphs hereunder show the temperature differences recorded in three vacuum flasks:—  
 Flask A, containing soaked seeds;  
 Flask B, containing soaked seeds which have been boiled;  
 Flask C, containing soaked seeds with disinfectant added.

The three vacuum flasks contained equal weights of soaked seeds and each had a free supply of air.



Study the graphs and give reasons for the differences in temperature recorded in the three flasks.

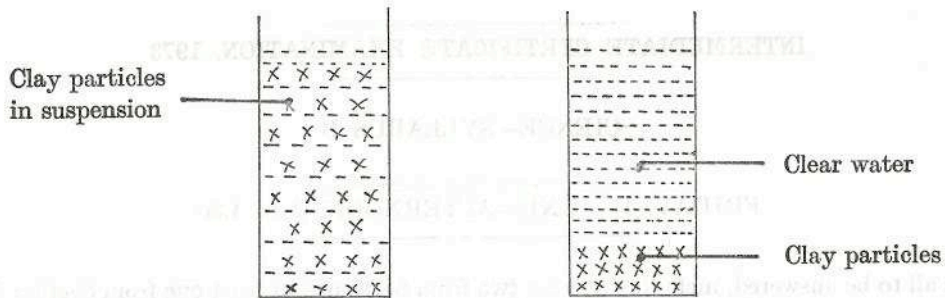
- In a certain experiment two groups of mice were fed on different diets. After some weeks, it was found that one group had normal active behaviour and growth rate, but that the mice of the other group appeared tired and showed little movement. Moreover, the second group was found to have anaemia (lack of blood).
  - Suggest how the diets of the two groups differed.
  - Give reasons for the lack of activity of the second group.
  - What effect would you expect as a result of adding milk to the diet of both groups after the experiment had finished? Give reasons for your answers.

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6. Answer four of the following questions.

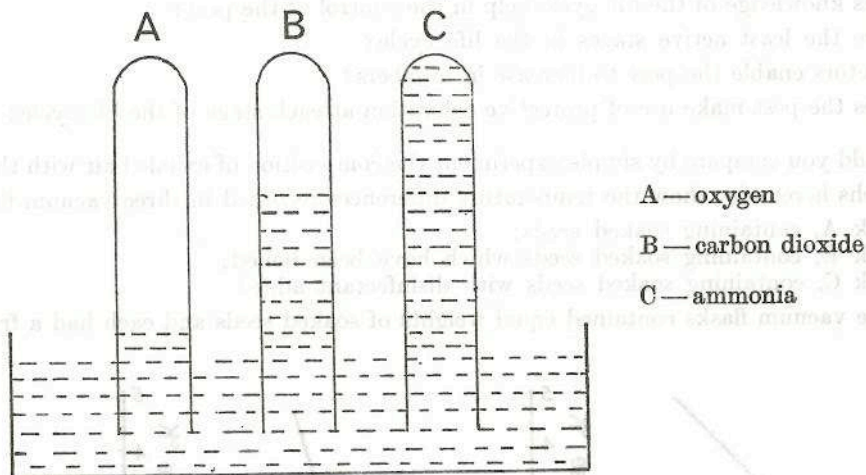
- (i) Explain the behaviour of clay particles in the jars represented hereunder and state how that behaviour is important in soil.



- (ii) Classify the following rocks under the headings Igneous, Sedimentary, Metamorphic:— sandstone, limestone, granite, coal, shale, basalt, quartz, marble.  
Give the chemical constituents of any one of the rocks listed.
- (iii) Why do trees shed their leaves in Autumn?
- (iv) Name four annual, four biennial and four perennial plants. Which type stores food and for what reasons does it do so?
- (v) How would you demonstrate the presence of bacteria in clover nodules? State briefly what precautions you would take to prevent outside contamination.
- (vi) Explain how the skin of a mammal assists in the regulation of body temperature.

### SECTION II

7. Three test-tubes containing equal volumes of the gases oxygen, carbon dioxide and ammonia were inverted in a trough of water. After some time the water rose to the levels indicated in the diagram hereunder.



- (i) What does the experiment tell you about the solubility of the three gases?
- (ii) The test-tubes are removed from the trough, taking care to retain the water that is already in them. Litmus is added to each sample of water. What change in colour would you expect? Give a reason for your answer in each case.
- (iii) How does the solubility of oxygen affect animal life in water?
- (iv) Making use of the results indicated in the diagram, state why underwater animals mostly excrete their waste nitrogenous material as ammonia?
- (v) What substance was formed when the carbon dioxide reacted with water?
8. What is meant by (a) an acid, (b) an alkali? If you were given some sulphur, describe how you would try to make a solution of sulphurous acid.  
How may solutions of (i) carbonic acid, (ii) phosphoric acid be made?
9. What are the main differences between metals and non-metals? Illustrate your answer by explaining why sodium and copper are called metals while carbon and phosphorous are considered to be non-metals.

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## SECTION III

10. Attempt any **three** of the following.
- Explain the occurrence of land breezes at night in coastal districts.
  - How may the addition of water to milk be detected? Sketch any apparatus you would use.
  - Define a force and state its properties. Name the SI unit in which a force is measured. How is that unit defined?
  - Explain the occurrence of the four seasons of the year.
  - How is the density of air measured?
11. Ice is added to water in a clean metal beaker and the contents are gently stirred with a thermometer. The outside of the beaker becomes clouded and the temperature at which the clouding occurs is recorded. More ice is added and some salt is shaken into the contents. It is noted that the ice liquefies. On further stirring ice forms on the outside of the beaker.
- Where did the moisture on the outside of the beaker originate?
  - Why, do you think, was the temperature recorded when the clouding took place on the outside?
  - Why was ice formed on the outside?
  - Why did the ice liquefy in the beaker while, at the same time, ice was forming on the outside?
  - Why was use made of a metal beaker rather than a glass beaker?
  - Use the information provided by the experiment to explain the occurrence of rain.
12. (a) How may it be shown that light travels in straight lines?  
What are the primary colours? Explain how a rainbow occurs.
- (b) Write a short account, with the aid of diagrams, of the water cycle.