

INTERMEDIATE CERTIFICATE EXAMINATION, 1968

SCIENCE (Syllabus A)

WEDNESDAY, 19th JUNE - Morning, 10 to 12.30

Six questions to be attempted, of which three must be taken from Section I, and three from Section II. Illustrate your answers by means of diagrams wherever possible.

SECTION I

1. (a) Describe how you would find (i) the area of Connaught from a map, (ii) the volume of a large potato, (iii) the volume of a small irregular piece of wood.
 (b) State whether the following statement is true or not: "The weight of a body is constant". Give the reason for your answer.
 Describe fully how you would set up and use a spiral spring to compare the mass of two objects. (66 marks)
2. Give a full account, with the aid of a diagram, of how you would construct a mercury barometer. Show how you would use the barometer to measure the pressure of the atmosphere. What height of water corresponds to 29 inches of mercury?
 Calculate the maximum height to which a common pump could raise brine, of specific gravity 1.1, when the atmospheric pressure is 29 inches of mercury.
 (Specific gravity of mercury = 13.6.) (66 marks)
3. Describe fully how you would measure the specific gravity of (i) a given liquid, (ii) sand. Discuss the effect of increase in temperature on the specific gravity of a liquid. (66 marks)
4. (a) What do you understand by (i) a calorie, (ii) the specific heat of a metal?
 A calorimeter, of water equivalent 10 gm., contains 30 gm. of water at 4°C. How many grams of water at 90°C. should be added to raise the temperature of the contents to 10°C.?
 (b) State what you understand by the latent heat of fusion of ice and describe how you would measure it. (67 marks)
5. (a) Describe how you would measure the boiling point of a given liquid. How would you show the effect of increased pressure on the boiling point of a liquid?
 (b) Comment on the factors which affect (i) the melting point of a pure solid, (ii) the evaporation of a liquid.
 (c) The volume of a given mass of gas at 27°C. and at a pressure of 750 mm. of mercury is 760 c.c. Find its volume at S.T.P. (67 marks)

SECTION II

6. Give an account of how you would prepare and collect a sample of (i) oxygen, (ii) nitrogen. Describe the principal physical and chemical properties of these two gases. (66 marks)
7. (a) A mixture contains sodium chloride, ammonium chloride and sand. Describe fully how you would obtain from the mixture a reasonably pure sample of (i) ammonium chloride, (ii) sodium chloride.
 (b) What do you understand by fractional distillation? Describe, with the aid of a diagram, how you would obtain a reasonably pure sample of alcohol from a mixture of alcohol and water. (66 marks)
8. State what happens when each of the following reacts with water: (i) sodium, (ii) magnesium, (iii) quicklime (calcium oxide), (iv) sulphur dioxide, (v) anhydrous copper sulphate. Name the products formed.
 Outline the properties of the products in (i) and refer to the conditions under which the reaction takes place in (ii). (66 marks)
9. Name three oxides of nitrogen and compare them with regard to physical and chemical properties.
 Describe fully how you would prepare and collect any one of them. (67 marks)
10. Give an account of an experiment to measure the percentage of carbon dioxide in limestone. Describe the properties of carbon dioxide and discuss the action of carbon dioxide on limewater. (67 marks)