

INTERMEDIATE CERTIFICATE EXAMINATION, 1965

SCIENCE (Syllabus A)

THURSDAY 24th JUNE—Evening, 3 to 5.30

Not more than six questions are 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. What is meant by the centre of gravity of a body? Describe how you would find by experiment the centre of gravity of a thin piece of cardboard of irregular shape.
Describe, with the aid of a labelled diagram, a laboratory balance. Discuss the importance of the location of the centre of gravity of the beam of the balance in relation to the fulcrum.
(66 marks)
 2. Describe fully how you would measure (i) the density of a given liquid, (ii) the density of atmospheric air.
A block of lead weighs 115 gm. in air and 103 gm. in water. Find the density of lead. Find, also, what fraction of the block of lead would be above the surface when the lead is floating in mercury. (Density of mercury = 13.6 gm. per c.c.)
(66 marks)
 3. (a) State what you understand by (i) convection of heat, (ii) radiation of heat, and give examples in each case.
(b) Distinguish between (i) real expansion of a liquid and (ii) apparent expansion of a liquid.
Describe, with the aid of a sketch of the apparatus, how you would measure the coefficient of apparent expansion of a liquid. Explain your method.
(66 marks)
 4. State (i) Boyle's Law, (ii) Charles' Law.
Describe, with the aid of a sketch of the apparatus, an experiment to demonstrate Boyle's Law.
The volume of a given mass of gas at 7°C. and at a pressure of 800 mm. of mercury is 532 c.c. Find its volume at S.T.P.
(67 marks)
 5. State what you understand by (i) specific heat, (ii) the latent heat of fusion of ice, (iii) the latent heat of steam.
Describe fully how you would measure the latent heat of fusion of ice.
A calorimeter, of water equivalent 10 gm., contains 44 gm. of water at 5°C. To this is carefully added 40 gm. of metal turnings at 97°C. When the mixture is stirred it reaches a final temperature of 7°C. Find the specific heat of the metal.
(67 marks)
- SECTION II
6. Describe how you would prepare and collect oxygen and give an account of its properties. Mention any other method by which oxygen may be prepared.
(66 marks)
 7. Describe fully how you would prepare a solution of hydrochloric acid and give an account of its properties.
Name any three salts of hydrochloric acid and describe how you would prepare one of them.
(66 marks)
 8. State what you understand by (i) an element, (ii) a compound.
Describe briefly the properties of each of any four of the following substances and name the elements in each of the four you select:— (a) bluestone, (b) caustic soda, (c) (c) potassium chlorate, (d) sulphur dioxide, (e) sulphuric acid, (f) washing soda.
(66 marks)
 9. Describe, with the aid of a sketch of the apparatus, how you would prepare and collect carbon dioxide.
Give an account of the properties of carbon dioxide.
How would you find experimentally the percentage of carbon dioxide in a given sample of chalk or limestone?
(67 marks)
 10. Define the chemical equivalent of an element.
Describe, with the aid of a diagram, how you would find the chemical equivalent of an element by displacement of hydrogen from an acid. Name the element you choose.
When 3.548 gm. of a certain oxide was reduced 3.108 gm. of the metal was obtained. Calculate the chemical equivalent of the metal.
(67 marks)