BRAINSE AN IARBHUNOIDEACHAIS

DAY VOCATIONAL CERTIFICATE EXAMINATIONS, 1973

SCIENCE (SYLLABUS A)

THURSDAY, 7th JUNE, 2.00 - 4.30 p.m.

INSTRUCTIONS

(a) Answer any six questions from this paper.
(b) All questions carry equal marks.

SECTION A - PHYSICS

1. (a) What is meant by the weight of a body ?
   (b) How would you find the centre of gravity of a piece of cardboard of irregular shape ?
   (c) A metre rule is suspended at its centre of gravity. A 100g mass is suspended 30 cm to the left of the centre of gravity and a mass of 150g is suspended 20 cm to the right of it. Does the rule balance ? Give a reason for your answer.
   (d) Give two examples of levers in everyday use.

2. (a) If heat is going from body A to body B, which is the hotter ?
   (b) How would you demonstrate the transfer of heat by convection ? Explain how the heat is transferred.
   (c) Draw the apparatus you would use and state what you would do to show that gases expand when heated.
   (d) Generally, telegraph wires sag more in summer than in winter. Why is this ?

3. (a) How would you charge an ebonite rod ?
   (b) Draw a labelled diagram of a gold leaf electroscope. Explain why the leaves open as a charged rod nears the top.
   (c) Using an electroscope or otherwise, how would you find out if a given substance conducts electricity ?
   (d) State which of the following units is used in measuring electric current: amperes, volts, kilowatts, ohms.

4. Answer any eight of the following items. Keep your answers short.
   (a) If a 12g weight produces an extension of 2 cm in a taut spiral spring, what weight will produce an extension of 6 cm ?
   (b) What is viscosity ?
   (c) Give an example of Brownian movement.
   (d) Draw the lines of force about a bar magnet.
   (e) At what voltage is electricity provided by,
   (i) a car battery (iii) E.S.B. for a domestic supply.
   (f) 2 m^3 of a solid weighs 8 kg. Calculate the density of the solid.
   (g) Name a heat insulator and briefly describe its use.
   (h) Describe any instrument which makes use of the fact that liquids expand when heated.
   (i) Give an example of the conversion of one form of energy into another.
   (j) When is it possible to heat a substance without raising its temperature ?
   (k) "To every action there is an equal and opposite reaction." Give an example of this.
   (l) What instrument would you use and what reading would you expect, when measuring atmospheric pressure ?

SECTION B - CHEMISTRY

5. (a) What is a chemical change ?
   (b) Which of the following are chemical changes ?
   (i) iron rusting (ii) water boiling (iii) wood burning (iv) iron being magnetised.
   Name a substance produced in each chemical change you mention.
   (c) Is a new substance formed when sodium chloride (common salt) dissolves in water ? What would you do to verify your answer ?
   (d) Name a chemical change used in industry.

6. (a) SO_2 and NH_3 are the formulae for sulphur dioxide and ammonia respectively. What do these formulae tell you ?
   (b) Draw the apparatus and name the substances you would use to prepare and collect ammonia. How would you dissolve the gas in water ?
   (c) How would you show that the gas is alkaline ? Name one other chemical property of the gas.
   (d) Name and give the formula of the acid used in car batteries ?

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7. (a) Name two covalent compounds and two mixtures.
   (b) Describe what you would do to separate sodium chloride from iron filings.
   (c) If you were given a sample of milk or copper sulphate solution, what apparatus would you need and what would you do to remove and collect all the water from the sample ?

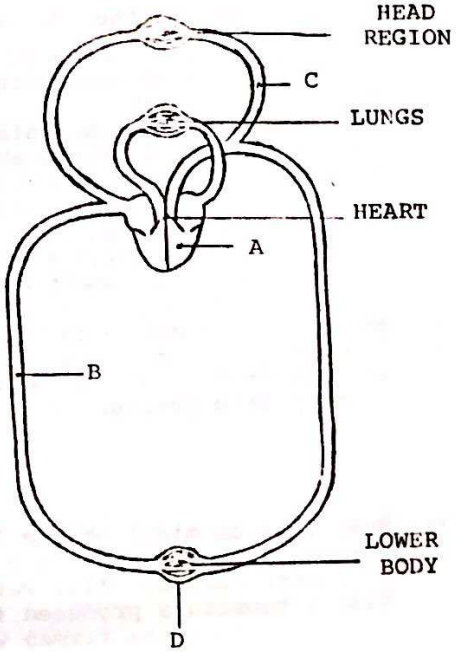
8. Answer any two of the following:-
   (a) A sealed flask containing phosphorus on a bed of sand is weighed and then the phosphorus ignited without breaking the seal. Does the flask get heavier as the phosphorus burns ? When the flask is cool the seal is removed and then replaced. Is there now a change in weight ? Give reasons in each case.
   (b) What is meant by a 'noble gas' ? An atom of argon contains eighteen electrons. Draw a diagram to show how these are arranged. Use the diagram to explain why argon is a noble gas. Name another noble gas.
   (c) A small piece of sodium metal is dropped into water. Describe what happens, name the substances produced and write the equation for the reaction. How is sodium stored in the laboratory ?

SECTION C - BIOLOGY

9. (a) What is meant by (i) competition, (ii) adaptation.
   (b) In the case of one habitat you have visited
      (i) state the time of the year and describe briefly what it looked like (a simple sketch or map will be accepted instead of a written description).
      (ii) name three animals and three plants you found there and describe (or indicate on your sketch or map) where you found them in the habitat.
      (iii) describe one example of adaptation you noticed in the habitat.
   (c) What equipment did you, or your group, bring with you to help you study the habitat ?

10. (a) What is photosynthesis ?
    (b) Name the raw materials needed by plants to manufacture food.
    (c) What apparatus would you use and what would you do to show that light is needed for food manufacture by plants ?
    (d) Name any plant which does not make its own food.

11. (a) What are the functions of the blood ?
    (b) The diagram represents the circulation of the blood.
       (i) Give the name and function of the heart chamber A.
       (ii) Name each of the three types of blood vessels at B, C and D.
    (c) What happens as blood passes through (i) the lungs, and (ii) the kidneys ?
    (d) A person injures his arm. How would you know if an artery had been cut ?



12. Answer any two of the following:-
    (a) Why must seeds be dispersed ? Describe two ways in which seeds are dispersed, giving one example in each case.
    (b) Name two enzymes and describe their action. Describe a laboratory experiment to demonstrate the action of an enzyme.
    (c) Describe an experiment you would do to find out about the composition of a sample of soil. In what way is the soil useful to plants ?