

IMMANUEL HIGH SCHOOL

Nagavara, Bangalore – 560045

IMPORTANT QUESTIONS FOR SA-1

SCIENCE — CLASS X (SSLC)

Compiled from Previous Years' KSEAB SSLC Papers & DSERT LBA Question Bank

Legend: (PY) = repeatedly seen in past KSEAB SSLC annual/SA papers. (LBA) = matches DSERT Lesson Based Assessment style/competency. (PY+LBA) = both — highest priority for revision.

PHYSICS

1. ELECTRICITY

1-mark / MCQ / VSA

- SI unit of current, potential difference, resistance, resistivity, and electric power — direct recall questions. [1] (PY+LBA)
- Write the formula: $P = VI = I^2R = V^2/R$; and the commercial unit of electrical energy (kWh, 1 unit = 3.6×10^6 J). [1] (PY+LBA)
- Why are the coils of electric heaters, toasters made of an alloy (nichrome) rather than a pure metal? [1] (PY)

2 & 3 marks

- State Ohm's Law and draw/describe the V–I graph for a conductor obeying it. [2] (PY+LBA)
- Define resistivity; state the factors on which the resistance of a conductor depends (length, area of cross-section, nature of material, temperature). [2/3] (PY+LBA)
- Derive the expression for equivalent resistance of resistors connected (i) in series, (ii) in parallel. [3] (PY+LBA)
- Numericals: find equivalent resistance of a series/parallel/mixed combination of given resistors (very frequently repeated with different numeric values, e.g. $4\Omega, 6\Omega, 12\Omega$ in parallel; 5Ω & 10Ω in series and parallel). [2/3] (PY+LBA)
- Numerical: find the current through, or power consumed by, a device given its rated voltage and wattage; find current drawn by two lamps in parallel from the mains. [3/4] (PY+LBA)
- Numerical: heat produced by a resistor/appliance using $H = I^2Rt$, and cost of electricity consumed over a period at a given tariff. [3/4] (PY+LBA)
- Why is a series arrangement not used for domestic wiring / connecting electrical appliances? [2] (PY)

4 marks

- Numerical involving resistivity: find the length of a wire of given diameter and resistivity required to give a certain resistance; effect of doubling the diameter on resistance. [4] (PY+LBA)
- Draw a labelled diagram of a simple domestic electric circuit; explain the role of a fuse and of earthing (safety). [4] (PY+LBA)

2. MAGNETIC EFFECTS OF ELECTRIC CURRENT

1-mark / MCQ / VSA

- Name the rule to find the direction of magnetic field/force/induced current: Right-Hand Thumb Rule, Fleming's Left-Hand Rule, Fleming's Right-Hand Rule — know the difference between the three. [1] (PY+LBA)
- Name the device that converts (i) electrical energy to mechanical energy, (ii) mechanical energy to electrical energy. [1] (PY+LBA)

2 & 3 marks

- Draw the magnetic field lines around a straight current-carrying conductor / around a current-carrying circular loop / inside and outside a current-carrying solenoid. [2/3] (PY+LBA)
- List the factors affecting the strength of the magnetic field produced by a circular coil (current, number of turns, radius). [2] (PY+LBA)

5. State the rule (SNOW-Front-Back / Fleming's Right-Hand Rule) to find the direction of induced current, and define electromagnetic induction. [2/3] (PY+LBA)
6. Compare the magnetic field pattern of a current-carrying solenoid with that of a bar magnet. [3] (PY)
7. Explain the working of an electric bell using an electromagnet. [3] (PY)

4 & 5 marks — guaranteed long-answer questions

8. State the principle, and explain with a labelled diagram, the construction and working of an electric motor. [4/5] (PY+LBA)
9. State the principle, and explain with a labelled diagram, the construction and working of an AC generator (dynamo). [4/5] (PY+LBA)
10. Explain the force experienced by a current-carrying conductor in a magnetic field ($F = BIL$) with a diagram, and state Fleming's Left-Hand Rule. [3/4] (PY+LBA)
11. Explain overloading and short-circuiting in domestic circuits, and the precautions to avoid them. [3/4] (PY)

CHEMISTRY

3. CHEMICAL REACTIONS AND EQUATIONS

1-mark / MCQ / VSA

1. Identify the type of reaction from a given chemical equation (combination/decomposition/displacement/double displacement). [1] (PY+LBA)
2. Define oxidation and reduction with one example each. [1] (PY+LBA)

2 & 3 marks

3. Balance a given chemical equation (very frequently repeated, e.g. $\text{Fe} + \text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + \text{H}_2$; $\text{MnO}_2 + \text{HCl} \rightarrow \text{MnCl}_2 + \text{Cl}_2 + \text{H}_2\text{O}$). [2] (PY+LBA)
4. Write balanced chemical equations for combination, decomposition (thermal, electrolytic, photolytic), displacement, and double-displacement reactions, each with one real example. [2/3] (PY+LBA)
5. What is a precipitation reaction? Illustrate with the reaction between sodium sulphate and barium chloride. [2] (PY+LBA)
6. What is corrosion? Explain the rusting of iron and one method of prevention (galvanisation, painting, oiling). [2/3] (PY+LBA)
7. What is rancidity? Suggest methods to prevent it (antioxidants, airtight/vacuum packing, refrigeration). [2/3] (PY+LBA)
8. Distinguish between exothermic and endothermic reactions with examples. [2] (PY+LBA)
9. Explain a displacement reaction using the example of a more reactive metal (e.g. iron/zinc) displacing a less reactive metal from its salt solution (e.g. $\text{Fe} + \text{CuSO}_4$). [2/3] (PY+LBA)

4. ACIDS, BASES AND SALTS

1-mark / MCQ / VSA

1. Name common acids/bases found in household items (curd — lactic acid; vinegar — acetic acid; lemon — citric acid; milk of magnesia — magnesium hydroxide). [1] (PY+LBA)
2. Name an olfactory indicator; name a natural indicator that turns pink in a basic solution (phenolphthalein — synthetic, but frequently asked with litmus/turmeric as natural indicators). [1] (PY+LBA)

2 & 3 marks

3. Why does a dry HCl gas not turn dry litmus paper red, but does so in the presence of water? [2] (PY)
4. What happens when zinc granules are added to a solution of a dilute acid? Write the chemical equation, and describe the test for the gas evolved (pop sound with a burning matchstick). [2/3] (PY+LBA)
5. What happens when a metal carbonate/bicarbonate reacts with a dilute acid? Write the chemical equation and the test for CO_2 (lime water turns milky). [2/3] (PY+LBA)
6. Explain the neutralisation reaction with a chemical equation and one everyday application (e.g. use of antacids for acidity, use of baking soda for bee stings). [2/3] (PY+LBA)

7. Explain the importance of pH in everyday life: in the digestive system, in soil for plant growth, and in preventing tooth decay. [3] (PY+LBA)
8. Write the chemical name, formula, preparation reaction, and one use of: (a) washing soda, (b) baking soda, (c) bleaching powder, (d) Plaster of Paris. [2/3/4] (PY+LBA)
9. What is water of crystallisation? Explain with reference to hydrated copper sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) or gypsum/Plaster of Paris. [3/4] (PY+LBA)
10. Distinguish between strong and weak acids/bases on the basis of the degree of ionisation and pH value. [3/4] (PY)

BIOLOGY

5. LIFE PROCESSES

1-mark / MCQ / VSA

1. Name the pigment involved in photosynthesis; name the raw materials and products of photosynthesis. [1] (PY+LBA)
2. Name the enzymes secreted by salivary glands, gastric glands, pancreas, and small intestine, and the food component each acts upon. [1] (PY+LBA)
3. Define the functional unit of the kidney; name the two types of conducting (vascular) tissue in plants. [1] (PY+LBA)

2 & 3 marks

4. Write the balanced chemical equation for photosynthesis and state the factors necessary for the process. [2/3] (PY+LBA)
5. Distinguish between aerobic and anaerobic respiration, with the end products of each. [2/3] (PY+LBA)
6. Explain the process of nutrition in Amoeba with a labelled diagram. [2/3] (PY+LBA)
7. Describe the structure and function of alveoli in the human respiratory system. [2/3] (PY)
8. Explain double circulation in humans, and state its significance. [3] (PY+LBA)
9. With a labelled diagram, describe the structure of the human heart. [3] (PY+LBA)
10. Describe the structure and function of a nephron in the human excretory system. [3] (PY+LBA)
11. Explain transportation of water and minerals in plants via xylem, and of food via phloem (translocation). [2/3] (PY)

4 marks

12. With a labelled diagram, explain the human excretory system and the process of urine formation (filtration, reabsorption, secretion). [4] (PY+LBA)
13. With a labelled diagram, explain the human digestive system, tracing the path of food from the mouth to the anus and the role of digestive glands. [4] (PY+LBA)

6. CONTROL AND COORDINATION

1-mark / MCQ / VSA

1. Define a synapse; name the basic functional unit of the nervous system. [1] (PY+LBA)
2. Name the hormone secreted by the thyroid/pancreas/adrenal/pituitary gland and state one function. [1] (PY+LBA)
3. Name the plant hormone responsible for cell elongation / for promoting growth / for closing of stomata during water stress. [1] (PY+LBA)

2 & 3 marks

4. What is a reflex action? Give an example and explain the reflex arc with a labelled diagram. [2/3] (PY+LBA)
5. Distinguish between a reflex action and a voluntary/walking action, on the basis of the level of nervous control. [2] (PY+LBA)
6. Draw a labelled diagram of a neuron and explain the function of its parts (dendrite, cell body, axon). [2/3] (PY+LBA)

7. Explain any three tropic movements in plants (phototropism, geotropism, hydrotropism, thigmotropism) with examples. [3] (PY+LBA)
8. Explain the mechanism of the sensitive plant (*Mimosa pudica*) responding to touch — an example of movement not caused by growth. [2/3] (PY)
9. Name the three main parts of the human brain and state one function of each (forebrain, midbrain, hindbrain). [2/3] (PY+LBA)
10. Explain the role of feedback mechanisms in regulating hormone action, with the example of blood sugar regulation by insulin. [3] (PY)

Tip for revision planning: the (PY+LBA) tagged items above are the highest-yield questions for both classroom LBA unit tests and the SA-1 exam. In Physics, the electric-motor and AC-generator diagrams (Magnetic Effects, Q8–9) are essentially guaranteed as the 5-mark question — ensure every student can draw and label both from memory. In Chemistry, balancing equations and identifying reaction types are asked in nearly every paper. In Biology, the excretory system/nephron diagram and the reflex-arc diagram are the most frequently repeated labelled-diagram questions.

