CLASS IX – SCIENCE PRACTICE PAPER (2026-27)

Step-by-Step Solutions and Marking Scheme

Chapter 1: Exploration – Entering the World of Secondary Science | Max. Marks: 40

SECTION A – Objective Questions (1 mark each)

Q1 **[1 mark]**

A model simplifies a real system by keeping only the details that matter for the question being asked. It is not an exact copy and not a guess.

Answer: (B)

Q2 **[1 mark]**

Fig. 1 keeps only the quantities that matter for the question "Will the ball cross the boundary without hitting the ground?": mass *m*, speed *v* and direction (angle θ).

The **colour of the ball** is not needed and makes no difference to the answer, so it can be ignored.

Answer: (D)

Q3 **[1 mark]**

The symbol c comes from the Latin word *celeritas*, meaning speed.

Answer: (A)

Q4 **[1 mark]**

The ground crew used the density of fuel in lb per litre instead of kg per litre. This unit mix-up led to a shortage of about 15,000 litres.

Answer: (B)

Q5 **[1 mark]**

In science a theory is not a guess. It explains *why* patterns occur and is based on careful testing and critical examination. It is open to improvement when new evidence arrives.

Answer: (B)

Q6 **[1 mark]**

Step 1: Breaths per day = 15 × 1440 = 21,600.

Step 2: Air per day = 21,600 × 0.5 L = 10,800 litres.

Answer: (B) 10,800 litres

Q7 **[1 mark]**

When predictions do not match observations, scientists re-examine their assumptions, models or measurements. They do not reject science and do not alter observations.

Answer: (C)

Q8 **[1 mark]**

Fig. 2 shows that in a solar eclipse the Moon comes between the Sun and Earth and its shadow falls on part of the Earth. An eclipse is just a play of shadows.

A shadow causes no significant physical, chemical or biological change in food. The claim has no scientific support. Options (B), (C) and (D) are incorrect statements.

Answer: (A)

Q9 **[1 mark]**

Fig. 3 shows reliability high for hours or a few days and falling for longer periods.

Assertion: true. Forecasts are reliable for hours or a few days and uncertain later.

Reason: true. Tiny differences in conditions grow over time, so long-range forecasts become uncertain. R correctly explains A.

Answer: (A)

Q10 **[1 mark]**

Assertion: false. Ignoring air resistance is a deliberate choice that lets us understand the basic effect of gravity; it is not a mistake.

Reason: true. Models involve assumptions and deliberately ignoring details.

Answer: (D)

SECTION B – Very Short Answer Questions (2 marks each)

Q11 **[2 marks]**

(a) Law (1 mark): A law describes a regular pattern observed in nature, often expressed in words or mathematical relationships. Example: Newton's laws of motion explain the jerk felt when a bus stops suddenly.

(b) Principle (1 mark): A principle is a broad idea that helps us make sense of a given situation. Example: the principle of conservation of energy applied when climbing stairs.

Q12 **[2 marks]**

(a) (1 mark) The level beam in Fig. 4 shows that the mass of the vegetables is equal to the mass of the standard weight, i.e. **1 kg**.

(b) (1 mark) Any one: standard units are based on agreed international standards, not local objects or opinions; they ensure fairness in daily life and trade (a kilogram means the same everywhere); results from different places can be compared; SI units avoid conversion errors.

Q13 **[2 marks]**

Good questions ask for measurable data and past patterns, not simple yes/no answers. Any two (1 mark each):

- What was the condition of the sky the last time it rained?
- What is today's humidity? Was it above 80 per cent the last time it rained?
- What are today's wind speed and direction?
- Is the temperature dropping like it did before the recent rains?

Q14 **[2 marks]**

Option A:

Step 1 (1 mark): Saha did not model every atom, reaction or movement inside a star. He ignored many complex processes and treated the matter of the star as a hot gas.

Step 2 (1 mark): He focused only on temperature, pressure and how atoms formed ions. This showed that the colour of stars is closely connected to their temperature.

Option B:

Step 1 (1 mark): To understand the heart as a functioning organ system, the individual cells are ignored on purpose.

Step 2 (1 mark): This keeps the model simple enough while still answering the question asked. Ignoring details is a deliberate choice, not a mistake.

SECTION C – Short Answer Questions (3 marks each)

Q15 **[3 marks]**

(i) (1 mark) Breaths per day = $14 \times 1440 = 20{,}160 \approx$ **20,000 breaths**.

(ii) (1 mark) 4 breaths fill a balloon of about 2 litres, so one breath = $2 \div 4 =$ **0.5 litre**.

(iii) (1 mark) Air breathed per day = $20{,}000 \times 0.5 = 10{,}000$ litres (using 20,160 gives 10,080 L). So we breathe roughly **10,000 litres** of air a day.

Q16 **[3 marks]**

(i) (1 mark) Details to keep (any two): route length of 3 km, average cycling speed of 12 km/h (stops at the two traffic signals can be added in a more detailed model).

(ii) (1 mark) Details to ignore (any two): the red colour of the bicycle, the trees along the road, the tea stall.

(iii) (1 mark) Time = distance ÷ speed = 3 km ÷ 12 km/h = 0.25 h = 0.25 × 60 = **15 minutes**.

Ignoring the other details keeps the model simple enough to work with, while still answering the question: how long does the journey take?

Q17 **[3 marks]**

Option A:

Step 1 (1 mark): Calories needed per day = 4 × 2000 = 8000 kcal.

Step 2 (1 mark): 100 g of rice gives 350 kcal, so rice per day = (8000 ÷ 350) × 100 g ≈ 2286 g ≈ 2.3 kg. For 30 days = 2.3 × 30 ≈ 69 kg, i.e. about **70 kg** of rice.

Step 3 (1 mark): Reasonableness check: 100 g for a month would be far too little and a few tonnes far too much. About 70 kg lies between these extremes, so the answer makes sense.

Option B:

Step 1 (1 mark): An eclipse is only a play of shadows. We ask: what physical change occurs during an eclipse?

Step 2 (1 mark): Further questions: does the temperature change significantly? Does food go bad if it is left in a shadow?

Step 3 (1 mark): We find no physical, chemical or biological mechanism that supports the claim, so it is disproved by evidence, not by opinion.

SECTION D – Case-Based Questions (4 marks each)

Q18 **[4 marks]**

(i) (1 mark) The ground crew used the fuel density in pounds (lb) per litre instead of kilograms (kg) per litre, so they calculated too little fuel.

(ii) (1 mark) The SI unit of mass is the **kilogram (kg)**. The unit wrongly used was the **pound (lb)**.

(iii) (1 mark) SI units are internationally agreed, so everyone means the same thing. Using them everywhere avoids conversions and errors, and allows results to be compared.

(iv) (1 mark) Any one: use only SI units for all calculations; cross-check the answer with a rough estimate; have a second person verify unit conversions.

Q19 **[4 marks]**

(i) (1 mark) From Fig. 5: **Biology** (size and behaviour of viruses).

(ii) (1 mark) From Fig. 5: particle motion and electrostatic attraction (Physics).

(iii) (1 mark) The divisions are made by us only to help organise knowledge. They are not independent of each other.

(iv) (1 mark) Any one: understanding climate change, developing medicines, designing sustainable technologies.

SECTION E – Long Answer Question (5 marks)

Q20 **[5 marks]**

Option A:

(i) (1 mark) Key question: “Will the ball cross the boundary without hitting the ground first?”

(ii) (2 marks) Very important: mass of the ball, speed and direction of the hit. **Can be ignored:** brand of the bat, colour of the ball, amount of grass on the field. (½ mark for each correct item up to 2 marks.)

(iii) (1 mark) Air resistance and spin have smaller effects. As we build more and more complex models, we add extra details for greater accuracy.

(iv) (1 mark) No. Ignoring details is done on purpose to keep things simple enough, and the model can still answer the question. These choices are not mistakes.

Option B:

(i) (1 mark) A prediction is a reasoned expectation based on evidence and careful thinking; a guess has no such basis.

(ii) (1 mark) Any one: using ideas about motion we can predict how far a kicked football will travel; using chemical reactions we can estimate how much carbon dioxide will be produced; using biology we can predict how breathing changes while running.

(iii) (1 mark) Confidence in the underlying science grows.

(iv) (1 mark) They re-examine their assumptions, models or measurements. This drives further exploration.

(v) (1 mark) Scientists reject ideas only on evidence. No theory is final, and being corrected by nature is what lets science improve our understanding of the world.

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