1 Exploration – Entering the World of Secondary Science

Multiple Choice Questions

1. Which of the following is NOT mentioned as something we can change or control when experimenting with puri puffing?
   (a) Thickness of rolled dough (b) Temperature of hot oil
   (c) Colour of the dough (d) Size of the rolled dough

2. Which factor would you investigate when studying why a puri puffs up during frying?
   (a) The price of the oil (b) The type of flour used
   (c) The colour of the cooking vessel (d) The brand of the stove

3. Which symbol in the textbook represents the spirit of exploration and curiosity?
   (a) Root (b) Sun (c) Kite (d) Moon

4. What distance-related factor makes Earth 'just right' for life?
   (a) Distance from the Moon (b) Distance from Mars
   (c) Perfect distance from the Sun where water remains liquid
   (d) Distance from other galaxies

5. Which of the following is an example of everyday scientific investigation mentioned in the chapter?
   (a) Why does a satellite orbit Earth? (b) Why does dough rise?
   (c) How do black holes form? (d) What causes solar eclipses?

6. Models are used to:
   (a) Complicate things (b) Simplify systems
   (c) Avoid experiments (d) Replace science

Short Answer Questions

1. When investigating why a puri puffs up, what are the two main things a scientist must consider?
2. Name one type of invisible helper organism mentioned in the chapter.
3. What effect of electric current helps to keep us warm?
4. In which state of matter can particles move around freely?
5. What are the two main things a scientist must determine when designing a simple experiment, as explained in the puri investigation example?
6. What is scientific exploration?
7. Why are assumptions made in models?

Long Answer Questions

1. Explain the role of models in science.
2. Differentiate between laws, theories, and principles.
3. Why is scientific language important?
4. Explain the importance of SI units with an example.

5. Describe the systematic investigation approach explained in the chapter using the puri experiment example. Include what can be changed, what can be observed, and what precautions should be taken.
6. Choose one example from the chapter (such as electric current's heating/magnetic effects, forces and pressure in weather patterns, or Earth's distance from the Sun for life) and explain how systematic investigation - observing carefully, asking focused questions, and designing simple experiments would help us understand it better.

Assertion – Reason Questions

1. A: Science uses models.
   R: Real-world systems are complex.

2. A: SI units are important.
   R: They ensure uniform measurement.

3. A: Theories are guesses.
   R: They are based on evidence.

4. A: Mathematics is used in science.
   R: It expresses relationships clearly.

5. A: Science is static.
   R: It changes with new evidence.

Match the Following:

Column A	Column B
(a) Heating effect of electric current	(i) Can cause gentle breeze or cyclones
(b) Pressure difference in air	(ii) Can move around freely
(c) Particles in solids	(iii) Keeps us warm
(d) Particles in gases	(iv) Cannot move much

Answers

MCQs

1. (c) Colour of the dough
2. (b) The type of flour used
3. (c) Kite
4. (c) Perfect distance from the Sun where water remains liquid
5. (b) Why does dough rise?
6. (b) Simplify systems

Short Questions – Answers

Ans 1:A scientist must consider:
- What factors can be changed (variables)
- What can be observed or measured

Ans 2: One invisible helper organism: Bacteria (helps in digestion)

Ans 3: Heating effect of electric current

Ans 4: Gas state

Ans 5: A scientist must determine:
- What to change (independent variable)
- What to observe or measure (dependent variable)

Ans 6: Scientific exploration is the process of observing, questioning, experimenting, and analyzing to understand the natural world.

Ans 7: To simplify complex systems and focus on key factors.

Long Questions – Answers

Ans 1:
Models are simplified representations of real-world systems. Since the natural world is complex, models help scientists focus on key aspects by ignoring less important details. For example, atoms are represented as spheres in chemistry, and objects are treated as points in physics. Models allow easier understanding, prediction, and analysis. However, they are not perfect and are refined as new information becomes available.

Ans 2:
- Law: Describes patterns (e.g., Newton's laws).
- Theory: Explains why the pattern occurs (e.g., atomic theory).
- Principle: Broad idea applied in various situations (e.g., conservation of energy).
- Laws describe, theories explain, and principles guide understanding.

Ans 3:
Scientific language ensures clarity and precision. It uses standard terms, symbols, and units that are universally understood. This avoids confusion and allows scientists worldwide to communicate effectively.

Ans 4 : SI units ensure uniform measurement worldwide. For example, confusion between pounds and kilograms caused a fuel miscalculation in an aircraft.

Ans 5: The puri experiment demonstrates a systematic scientific approach:

Step 1: Identify the problem – Why does a puri puff up?
Step 2: Form a hypothesis – Puffing may depend on heat or dough thickness.
Step 3: Control variables – Keep oil type and dough size constant.
Step 4: Change one variable – Change thickness or temperature.
Step 5: Observe results – Note how much the puri puffs.
Step 6: Draw conclusions – Identify the factor affecting puffing.

Precautions:
- Change only one variable at a time
- Maintain constant conditions
- Observe carefully

Ans 6: To study the heating effect of electric current:

- Observation: Electric devices become warm when current flows.
- Question: Why does current produce heat?
- Experiment: Pass current through a wire and measure temperature change.
- Control variables: Same wire type and length
- Change variable: Amount of current

Conclusion:
Higher current produces more heat. This systematic approach helps understand scientific concepts clearly.

Assertion – Reason

1. Both true, R explains A
2. Both true, R explains A
3. A false, R true
4. Both true
5. A false

Match the following

Column A	Column B
(a) Heating effect of electric current	(iii) Keeps us warm
(b) Pressure difference in air	(i) Can cause gentle breeze or cyclones
(c) Particles in solids	(iv) Cannot move much
(d) Particles in gases	(ii) Can move around freely