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Chemistry Grade 9 — Chapter 1

Nature of Science in Chemistry

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Practice MCQs extracted from the supplied Class 9 Chemistry chapter tests (Section A). Total: 30 questions.

A. Important / Main Topics

1. Chemistry is defined as the science that investigates:

(A) The materials of the universe and the changes they undergo
(B) Only the reactions that occur in laboratories
(C) Only the elements present in the periodic table
(D) The motion of planets and stars

Correct Answer: A

Explanation: The chapter defines chemistry as the science that investigates the materials of the universe and the changes that these materials undergo.

2. Which of the following is NOT studied under the scope of chemistry?

(A) Composition of a substance
(B) Gravitational pull between two masses
(C) Structure of an atom
(D) Changes in properties of matter

Correct Answer: B

Explanation: Gravitational pull is studied in physics, not chemistry; chemistry deals with matter, its composition, structure, properties, and changes.

3. The branch of chemistry that deals with substances containing carbon (except carbonates, bicarbonates, oxides, and carbides) is:

(A) Inorganic chemistry
(B) Physical chemistry
(C) Organic chemistry
(D) Analytical chemistry

Correct Answer: C

Explanation: Organic chemistry deals with substances containing carbon, with the four specified exceptions (carbonates, bicarbonates, oxides, and carbides).

4. Forensic chemistry is an application of:

(A) Organic chemistry
(B) Geochemistry
(C) Nuclear chemistry
(D) Analytical chemistry

Correct Answer: D

Explanation: Forensic chemistry is the application of analytical chemistry; it involves examining physical traces to identify unknown compounds.

5. Which branch of chemistry studies chemical processes occurring in stars, planets, and interstellar space?

(A) Astrochemistry
(B) Geochemistry
(C) Nuclear chemistry
(D) Biochemistry

Correct Answer: A

Explanation: Astrochemistry deals with chemical processes and reactions in astronomical environments such as stars, planets, comets, and interstellar space.

6. The main purpose of green chemistry is to:

(A) Increase the use of hazardous substances
(B) Reduce the use of hazardous substances
(C) Study only laboratory reactions
(D) Replace chemistry with physics

Correct Answer: B

Explanation: Green chemistry is the model of chemical products and processes that reduce the use of hazardous substances.

7. Which of the following is a correct sequence of the relationship between science, technology, and engineering?

(A) Engineering → Science → Technology
(B) Technology → Science → Engineering
(C) Science → Technology → Engineering
(D) Science → Engineering → Technology

Correct Answer: C

Explanation: Science → Technology → Engineering — this correctly answers the question.

8. In the example of solar energy, the role of the technologist is to:

(A) Discover how photovoltaic cells work
(B) Design the wiring of a solar power plant
(C) Study the chemistry of silicon
(D) Develop solar panels from scientific principles

Correct Answer: D

Explanation: In the example of solar energy, the role of the technologist is to Develop solar panels from scientific principles.

9. The essential questions listed for each branch of chemistry are best described as:

(A) Guiding questions for exploration and understanding
(B) Exam questions that must be memorized
(C) Questions that have simple yes/no answers
(D) Questions unrelated to the branch

Correct Answer: A

Explanation: These questions are open-ended guiding questions for learning, not exam questions.

10. Which of the following is a real-life application of inorganic chemistry?

(A) Synthesizing new medicines
(B) Lithium-ion batteries
(C) Forensic examination of drugs
(D) Water purification using filtration

Correct Answer: B

Explanation: Lithium-ion batteries are a direct application of inorganic chemistry (metals and salts).

11. Which statement best explains why chemistry interacts with other sciences?

(A) It is only concerned with laboratory experiments
(B) It replaces biology and physics
(C) It studies how matter and energy change together
(D) It ignores the composition of matter

Correct Answer: C

Explanation: Chemistry interacts with other sciences by studying how matter and energy change together, linking physics, biology, geology, medicine, and engineering.

12. Which pair correctly matches a branch of chemistry with its focus?

(A) Physical chemistry — pollution and its effects
(B) Polymer chemistry — changes in atomic nuclei

(C) Nuclear chemistry — study of polymers
(D) Industrial chemistry — large-scale production of chemical substances

Correct Answer: D

Explanation: Industrial chemistry deals with the large-scale production of chemical substances, turning lab chemistry into factory-scale production.

13. A chemist working on designing a new drug for cancer treatment is most likely a specialist in:

(A) Medicinal chemistry
(B) Geochemistry
(C) Astrochemistry
(D) Nuclear chemistry

Correct Answer: A

Explanation: Medicinal chemistry deals with the study of drug–biological target interaction and the development of new medicinal agents.

14. Which of the following best describes the relationship between chemistry and energy?

(A) Chemistry only studies matter, not energy
(B) Every change in matter involves a change in energy
(C) Energy changes only occur in physical changes
(D) Energy is not involved in chemical reactions

Correct Answer: B

Explanation: Chemistry deals with matter and energy together because every change in matter involves a change in energy (absorbed or released).

15. A geochemist would most likely study:

(A) Chemical processes in stars
(B) Design of new medicines
(C) Distribution of elements in the Earth's crust
(D) Atomic nuclei changes

Correct Answer: C

Explanation: Geochemistry deals with the chemical composition, distribution, and transformation of elements and compounds in the Earth's crust.

B. Less Important / Secondary Topics

16. In the example of designing a water filtration system, which engineers are involved?

(A) Chemical engineers and mechanical engineers
(B) Only electrical engineers
(C) Only civil engineers
(D) Only software engineers

Correct Answer: A

Explanation: Chemical engineers and mechanical engineers — this correctly answers the question.

17. Which of the following is NOT a characteristic of analytical chemistry?

(A) Determines what is in a substance
(B) Studies pollution and its effects on humans
(C) Determines how much of a substance is present
(D) Uses instruments and methods to identify substances

Correct Answer: B

Explanation: Studying pollution and its effects is the focus of environmental chemistry, not analytical chemistry.

18. Which of the following best explains why chemistry is essential to medicine?

(A) Chemistry explains only the structure of the human body
(B) Chemistry cannot be applied to medicine
(C) Medicines are made of organic compounds designed by chemists
(D) Medicines are unrelated to chemistry

Correct Answer: C

Explanation: Organic chemists synthesize new medicines that interact with specific targets like proteins or enzymes in the body.

19. In the example of making French fries, what is the role of the chemical engineer?

(A) Studying the chemistry of carbohydrates
(B) Extracting oil from seeds
(C) Frying the potatoes
(D) Designing oil production equipment and processes

Correct Answer: D

Explanation: Chemical engineers design oil production equipment and processes so that oil is produced efficiently and safely for cooking.

20. Which of the following is a correct pairing of a branch of chemistry with its application?

(A) Analytical chemistry — forensic chemistry
(B) Organic chemistry — water purification
(C) Inorganic chemistry — forensic chemistry
(D) Physical chemistry — medicines synthesis

Correct Answer: A

Explanation: Forensic chemistry is the application of analytical chemistry, involving the examination of physical traces to identify unknown compounds.

21. A scientist is studying a newly discovered substance found in a deep-sea vent. She wants to determine its exact chemical composition and the relative amounts of each element present. Which branch of chemistry is most directly suited for this task?

(A) Organic chemistry
(B) Analytical chemistry
(C) Astrochemistry
(D) Nuclear chemistry

Correct Answer: B

Explanation: Analytical chemistry deals with the methods and instruments for determining the composition and properties of matter, answering "what is in this substance, and how much?".

22. A new industrial process is being designed to produce a fertilizer on a massive scale while minimizing the use of hazardous chemicals. Which two branches of chemistry are most directly involved in this process?

(A) Geochemistry and astrochemistry
(B) Nuclear chemistry and polymer chemistry
(C) Industrial chemistry and green chemistry
(D) Analytical chemistry and biochemistry

Correct Answer: C

Explanation: Industrial chemistry and green chemistry — this correctly answers the question.

23. A physics student asks a chemistry student, "Why does a compressed gas cylinder explode if heated?" The chemistry student explains the relationship between temperature, pressure, and particle behavior. This scenario best illustrates:

(A) Chemistry is the same as physics
(B) Chemistry is only useful in laboratories
(C) Chemistry is a branch of engineering
(D) Chemistry interacts with other sciences by studying matter and energy changes

Correct Answer: D

Explanation: Chemistry links with physics by studying how matter (the gas) and energy (heat) interact, explaining the pressure increase.

24. A pharmaceutical company develops a new drug. Which sequence of chemical branches is most logically followed from discovery to patient use?

(A) Medicinal chemistry → Analytical chemistry → Industrial chemistry → Biochemistry
(B) Biochemistry → Analytical chemistry → Industrial chemistry → Medicinal chemistry
(C) Organic chemistry → Geochemistry → Nuclear chemistry → Analytical chemistry
(D) Analytical chemistry → Astrochemistry → Physical chemistry → Industrial chemistry

Correct Answer: A

Explanation: Medicinal chemistry → Analytical chemistry → Industrial chemistry → Biochemistry — this correctly answers the question.

25. An engineer is designing a solar power plant. She uses the photovoltaic principle discovered by scientists, uses panels built by technologists, and designs the electrical grid. Which statement about this process is correct?

(A) Science is more important than engineering
(B) Science, technology, and engineering are interconnected and depend on each other
(C) Engineering and technology are identical
(D) Technology is the first step in the process

Correct Answer: B

Explanation: The chapter emphasizes that science discovers principles, technology turns them into tools, and engineering implements them at scale — all three depend on each other.

26. A forensic chemist is called to a crime scene to analyze an unknown white powder. Which **essential question from the analytical chemistry branch best guides her work?**

(A) Why is carbon the backbone of organic compounds?
(B) What is the structure of an atom?
(C) How are analytical methods used to identify and quantify chemical substances?
(D) How do nuclear reactions differ from chemical reactions?

Correct Answer: C

Explanation: The essential questions for analytical chemistry focus on methods used to identify and quantify substances.

27. A student claims that "chemistry only studies reactions that happen in test tubes." Which of the following provides the strongest counterexample?

(A) Mixing two chemicals in a beaker
(B) Heating a substance in a test tube
(C) Using a Bunsen burner
(D) Rusting of iron on a car

Correct Answer: D

Explanation: Rusting happens naturally in the environment, outside the laboratory, showing that chemistry studies all matter and its changes in the real world.

28. A geochemist and an astrochemist both study the distribution of elements. Which statement best explains how their fields differ?

(A) Geochemistry studies Earth's crust; astrochemistry studies stars and planets
(B) Geochemistry studies space; astrochemistry studies Earth
(C) Both study only laboratory reactions
(D) Astrochemistry is a branch of geochemistry

Correct Answer: A

Explanation: Geochemistry is the chemistry of the Earth's crust, while astrochemistry deals with chemical processes in astronomical environments like stars and planets.

29. A new material is discovered that can absorb harmful pollutants from air. Which combination of branches would best study its effectiveness and its environmental impact?

(A) Organic chemistry and astrochemistry
(B) Analytical chemistry and environmental chemistry
(C) Nuclear chemistry and medicinal chemistry
(D) Polymer chemistry and geochemistry

Correct Answer: B

Explanation: Analytical chemistry would measure the material's effectiveness (composition/quantification), while environmental chemistry would study its impact on the environment.

30. Which of the following **best shows the relationship between science, technology, and engineering in the creation of a new medicine?**

(A) Science designs the tablet; technology creates the factory; engineering discovers the molecule

(B) Engineering discovers the molecule; science designs the factory; technology tests the drug

(C) Science discovers the active molecule; technology develops a way to produce it; engineering designs the factory for mass production

(D) Technology discovers the molecule; engineering tests the drug; science designs the factory

Correct Answer: C

Explanation: Science discovers the active molecule; technology develops a way to produce it; engineering designs the factory for mass production — this correctly answers the question.