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Chemistry Grade 10 — Chapter 1

History of Chemistry

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Independent practice MCQs from the supplied Class 10 Chemistry notes pack. Total: 50 questions.

A. Important / Main Topics

1. Which principle states that in a closed system, mass and energy cannot be created or destroyed?

(A) Principle of conservation of mass and energy
(B) Principle of controlled experiments
(C) Principle of peer review
(D) Principle of skepticism

Correct Answer: A

Explanation: The principle of conservation of mass and energy states that mass and energy cannot be created or destroyed in a closed system.

2. Who first showed the principle of conservation of mass and energy?

(A) Dmitri Mendeleev
(B) Antoine Lavoisier
(C) Ernest Rutherford
(D) J.J. Thomson

Correct Answer: B

Explanation: Antoine Lavoisier — this correctly answers the question.

3. In a controlled experiment, how many variables are changed at a time?

(A) Two
(B) Three
(C) One
(D) As many as needed

Correct Answer: C

Explanation: In a controlled experiment, one variable is changed at a time while others are kept constant.

4. The process by which scientific work is reviewed by other scientists before publication is called:

(A) Observation
(B) Skepticism
(C) Objectivity
(D) Peer review

Correct Answer: D

Explanation: Peer review is the process by which scientific work is reviewed by other scientists before publication.

5. In the 1700s, scientists believed that materials which could burn contained a substance called:

(A) Phlogiston
(B) Oxygen
(C) Hydrogen
(D) Nitrogen

Correct Answer: A

Explanation: In the 1700s, scientists believed that combustible materials contained a substance called "phlogiston.".

6. Which scientist proved that combustion happens because of oxygen combining with substances?

(A) J.J. Thomson
(B) Antoine Lavoisier
(C) Ernest Rutherford
(D) Dmitri Mendeleev

Correct Answer: B

Explanation: Antoine Lavoisier proved that combustion happens because of oxygen combining with substances.

7. The plum pudding model of the atom was proposed by:

(A) Ernest Rutherford
(B) Niels Bohr
(C) J.J. Thomson
(D) Dmitri Mendeleev

Correct Answer: C

Explanation: The plum pudding model of the atom was proposed by J.J. Thomson.

8. A 95% confidence interval means that:

(A) The results are 95% accurate
(B) There is a 5% chance the results are incorrect
(C) The experiment was repeated 95 times
(D) The scientist is 95% sure that the true value is within the given range

Correct Answer: D

Explanation: A 95% confidence interval means the scientist is 95% sure that the true value is within the given range.

9. Getting the same result when repeating an experiment under the same conditions is called:

(A) Repeatability
(B) Reproducibility
(C) Accuracy
(D) Precision

Correct Answer: A

Explanation: Repeatability is the ability to repeat an experiment under the same conditions.

10. Getting the same result when the experiment is done in different labs with different tools is called:

(A) Repeatability
(B) Reproducibility
(C) Accuracy
(D) Precision

Correct Answer: B

Explanation: Reproducibility is the ability to produce same or similar results under different conditions.

11. Which of the following is a scientific paradigm?

(A) A single theory that never changes
(B) A personal opinion of a scientist
(C) A set of ideas, methods, and rules that guide scientists
(D) A hypothesis that has been tested once

Correct Answer: C

Explanation: A scientific paradigm is a set of ideas, methods, and rules that guide scientists in their research.

12. The main component of natural gas is:

(A) Ethane
(B) Propane
(C) Butane
(D) Methane

Correct Answer: D

Explanation: The main component of natural gas is methane.

13. Which of the following is NOT a fossil fuel?

(A) Biogas
(B) Coal
(C) Natural gas
(D) Petroleum

Correct Answer: A

Explanation: Biogas is not a fossil fuel; it is a renewable energy source.

14. A p-value of 0.01 indicates that:

(A) There is a 99% chance the result is random
(B) There is a 1% chance the result is random
(C) The result is 1% accurate
(D) The experiment was repeated once

Correct Answer: B

Explanation: A p-value of 0.01 indicates that there is only a 1% chance that the result is random.

15. The standard deviation measures:

(A) How accurate the average is
(B) The probability that the result is random
(C) How spread out the data is
(D) The range of the confidence interval

Correct Answer: C

Explanation: Standard deviation measures how spread out the individual measurements are around the average.

16. Dmitri Mendeleev created the periodic table by observing patterns in the properties of elements. This is an example of:

(A) Controlled experiments
(B) Peer review
(C) Being objective
(D) Using observations and logical thinking

Correct Answer: D

Explanation: Dmitri Mendeleev created the periodic table by observing patterns in the properties of elements. This is an example of Using observations and logical thinking.

17. In science, results must come from facts, not from opinions or biases. This is called:

(A) Objectivity
(B) Skepticism
(C) Peer review
(D) Controlled experiments

Correct Answer: A

Explanation: Objectivity means results must come from facts, not from opinions or biases.

18. Scientists are naturally skeptical and always double-check new discoveries. This is important because:

(A) It slows down scientific progress
(B) It ensures that only trustworthy information becomes part of science
(C) It prevents scientists from working together
(D) It makes experiments more expensive

Correct Answer: B

Explanation: Skepticism helps ensure that only trustworthy information becomes part of science.

19. Which of the following is an example of a controlled experiment?

(A) Changing temperature and pressure at the same time
(B) Changing nothing and observing
(C) Changing only temperature while keeping other variables constant
(D) Changing all variables randomly

Correct Answer: C

Explanation: In a controlled experiment, one variable is changed at a time while keeping all other variables constant.

20. The phlogiston theory was replaced by:

(A) The atomic theory

(B) The quantum mechanical model
(C) The periodic table
(D) The oxygen theory of combustion

Correct Answer: D

Explanation: The phlogiston theory was replaced by The oxygen theory of combustion.

21. Rutherford's gold foil experiment led to the discovery of:

(A) A small, dense, positively charged nucleus
(B) Electrons scattered in a positive soup
(C) Energy levels in atoms
(D) The quantum mechanical model

Correct Answer: A

Explanation: Rutherford's gold foil experiment showed that atoms have a small, dense, positively charged nucleus.

22. Which of the following statements about a scientific paradigm is correct?

(A) A paradigm never changes
(B) A paradigm is a set of ideas, methods, and rules that guide scientists
(C) A paradigm is a single theory
(D) A paradigm is only used in physics

Correct Answer: B

Explanation: A paradigm is a set of ideas, methods, and rules that guide scientists in their research.

23. A scientific paradigm is replaced when:

(A) Scientists get bored with the old paradigm
(B) A single scientist disagrees with it
(C) New evidence challenges the existing paradigm
(D) The government decides to change it

Correct Answer: C

Explanation: A paradigm is replaced when new evidence challenges the existing paradigm.

24. If a chemist measures the melting point of a substance and finds the average is 120°C with a standard deviation of 0.5°C, this means:

(A) The results are inconsistent
(B) The average is inaccurate
(C) The measurement is unreliable
(D) The results are consistent

Correct Answer: D

Explanation: A small standard deviation (0.5°C) means the results are consistent.

25. Which of the following is NOT a characteristic of the scientific community?

(A) Reliance on personal opinions
(B) Use of empirical evidence
(C) Logical reasoning
(D) Peer review

Correct Answer: A

Explanation: Reliance on personal opinions — this correctly answers the question.

B. Less Important / Secondary Topics

26. When a scientist tests a new medicine, they change only the dose while keeping temperature, pressure, and other conditions the same. This is an example of:

(A) A controlled experiment
(B) Peer review
(C) Being objective
(D) Skepticism

Correct Answer: A

Explanation: Changing one variable at a time while keeping others constant is a controlled experiment.

27. A chemist first believes there is a 60% chance a reaction happens in a certain way. After new data, their confidence rises to 80%. This is an example of:

(A) Confidence interval
(B) Bayesian probability
(C) Standard deviation
(D) P-value

Correct Answer: B

Explanation: A chemist first believes there is a 60% chance a reaction happens in a certain way. After new data, their confidence rises to 80%. This is an example of Bayesian probability.

28. Which of the following was replaced by the modern concepts of oxidation and reduction?

(A) Atomic theory
(B) Quantum mechanics
(C) Phlogiston theory
(D) Periodic table

Correct Answer: C

Explanation: Phlogiston theory — this correctly answers the question.

29. In the electrolysis of a compound, the discharge of ions is influenced by their position in the electrochemical series and by their:

(A) Colour
(B) Density
(C) Smell
(D) Concentration

Correct Answer: D

Explanation: The discharge of ions during electrolysis is influenced by their position in the electrochemical series and by their concentration.

30. Which of the following best describes the relationship between repeatability and reproducibility?

(A) Repeatability involves the same conditions; reproducibility involves different conditions
(B) They are the same thing
(C) Repeatability involves different conditions; reproducibility involves the same conditions
(D) Neither is important in science

Correct Answer: A

Explanation: Repeatability involves the same conditions; reproducibility involves different conditions — this correctly answers the question.

31. Why is it important for a scientific paradigm to be based on empirical evidence and logical reasoning rather than personal opinions?

(A) To make science more difficult
(B) To ensure scientific knowledge is reliable
(C) To slow down scientific progress
(D) To prevent scientists from working together

Correct Answer: B

Explanation: Empirical evidence and logical reasoning ensure that scientific knowledge is reliable.

32. Which of the following is an example of deposition?

(A) Ice melting into water
(B) Water boiling into steam
(C) Snow forming from water vapour
(D) Steam condensing into water

Correct Answer: C

Explanation: Snow forming from water vapour is an example of deposition (gas → solid).

33. Which of the following statements about a scientific paradigm is INCORRECT?

(A) A paradigm helps scientists understand the natural world
(B) A paradigm is replaced when new evidence challenges it
(C) A paradigm guides research and development
(D) A paradigm is a single theory that never changes

Correct Answer: D

Explanation: A paradigm is not a single theory that never changes; it is a set of ideas, methods, and rules that can be replaced when new evidence challenges it.

34. A chemist measures the concentration of a solution as 0.250 M ± 0.005 M. The uncertainty in this measurement is:

(A) 0.005 M
(B) 0.250 M
(C) 0.255 M
(D) 0.245 M

Correct Answer: A

Explanation: The uncertainty in the measurement is ± 0.005 M.

35. Which of the following is NOT a part of the scientific community's shared principles?

(A) Use of empirical evidence
(B) Reliance on personal beliefs
(C) Logical reasoning
(D) Peer review

Correct Answer: B

Explanation: Reliance on personal beliefs — this correctly answers the question.

36. If a chemist measures the melting point of a substance several times in the same lab and gets the same result each time, the experiment is:

(A) Reproducible
(B) Accurate
(C) Repeatable
(D) Precise

Correct Answer: C

Explanation: If a chemist measures the melting point of a substance several times in the same lab and gets the same result each time, the experiment is Repeatable.

37. In the electrolysis of dilute aqueous NaCl, OH^- ions are discharged instead of Cl^- ions because of:

(A) The colour of the solution
(B) The temperature of the solution
(C) The type of electrode used
(D) The concentration effect and overpotential of chlorine gas

Correct Answer: D

Explanation: In dilute aqueous NaCl, OH^- ions are discharged instead of Cl^- ions due to the concentration effect and the overpotential of chlorine gas.

38. Which of the following best describes the relationship between a scientific paradigm and scientific progress?

(A) Paradigms guide scientific progress until they are replaced by better ones
(B) Paradigms prevent scientific progress
(C) Paradigms are never replaced
(D) Paradigms are only important in physics

Correct Answer: A

Explanation: Paradigms guide scientific progress until they are replaced by better ones.

39. A p-value of 0.05 means:

(A) There is a 5% chance the result is correct
(B) There is a 5% chance the result is random
(C) The result is 5% accurate
(D) The experiment was repeated 5 times

Correct Answer: B

Explanation: A p-value of 0.05 means there is a 5% chance the result is random.

40. In the electrolysis of concentrated aqueous NaCl, the product at the anode is:

(A) Hydrogen gas
(B) Oxygen gas
(C) Chlorine gas
(D) Sodium metal

Correct Answer: C

Explanation: In the electrolysis of concentrated aqueous NaCl, chlorine gas is produced at the anode.

41. A student says, "A 95% confidence level means the results are 95% accurate." Is the student correct?

(A) Yes, because 95% confidence means 95% accuracy
(B) Yes, because the experiment was repeated 95 times
(C) No, because 95% confidence means there is a 5% chance the result is wrong
(D) No, because 95% confidence means 95% of such intervals would contain the true value

Correct Answer: D

Explanation: A 95% confidence level means that 95% of such intervals would contain the true value. It does not mean "95% accurate.".

42. Which of the following statements about the phlogiston theory is correct?

(A) It stated that burning releases phlogiston
(B) It stated that burning releases oxygen
(C) It stated that burning absorbs phlogiston
(D) It stated that burning produces water

Correct Answer: A

Explanation: The phlogiston theory stated that combustible materials contained "phlogiston" that was released when burned.

43. A chemist measures the concentration of a solution as 0.50 M with a standard deviation of 0.02 M and a standard error of 0.005 M. What do these values tell us about the data?

(A) The data is inconsistent and the average is inaccurate
(B) The data is consistent and the average is accurate
(C) The data is inconsistent and the average is accurate
(D) The data is consistent and the average is inaccurate

Correct Answer: B

Explanation: A small standard deviation (0.02 M) means the data is consistent. A small standard error (0.005 M) means the average is accurate.

44. Why is it important for a scientific paradigm to be based on empirical evidence and logical reasoning rather than personal opinions?

(A) To make science more difficult
(B) To slow down scientific progress
(C) To ensure scientific knowledge is reliable
(D) To prevent scientists from working together

Correct Answer: C

Explanation: Empirical evidence and logical reasoning ensure that scientific knowledge is reliable.

45. Which of the following is an example of a paradigm shift in chemistry?

(A) The discovery of the electron
(B) The invention of the microscope

(C) The discovery of the periodic table
(D) The replacement of the phlogiston theory by the oxygen theory of combustion

Correct Answer: D

Explanation: The replacement of the phlogiston theory by the oxygen theory of combustion is a paradigm shift.

46. A chemist performs an experiment to determine the melting point of a new compound. The results of five trials are: 120.1°C, 120.0°C, 120.2°C, 120.1°C, 120.1°C. The average melting point is:

(A) 120.1°C
(B) 120.0°C
(C) 120.2°C
(D) 120.3°C

Correct Answer: A

Explanation: A chemist performs an experiment to determine the melting point of a new compound. The results of five trials are: 120.1°C, 120.0°C, 120.2°C, 120.1°C, 120.1°C. The average melting point is 120.1°C.

47. If the accepted value for the melting point is 120.0°C, is the measurement accurate?

(A) No, because the average is 120.1°C
(B) Yes, because the average is very close to the accepted value
(C) No, because the standard deviation is high
(D) Yes, because the experiment was repeated 5 times

Correct Answer: B

Explanation: The average melting point (120.1°C) is very close to the accepted value (120.0°C). The small difference is within the expected range of experimental error.

48. Which of the following best describes the relationship between scientific paradigms and scientific progress?

(A) Paradigms prevent scientific progress
(B) Paradigms are never replaced
(C) Paradigms guide scientific progress until they are replaced by better ones
(D) Paradigms are only important in physics

Correct Answer: C

Explanation: Paradigms guide scientific progress until they are replaced by better ones.

49. A chemist measures the concentration of a solution as 0.250 M ± 0.005 M. What does this uncertainty tell us about the reliability of the measurement?

(A) The measurement is 100% reliable
(B) The measurement is unreliable
(C) The true value is exactly 0.250 M
(D) The true value is close to 0.250 M

Correct Answer: D

Explanation: The uncertainty tells us that the true value is close to 0.250 M. It indicates how reliable the measurement is.

50. Which of the following statements about scientific paradigms is correct?

(A) A paradigm is a set of ideas, methods, and rules that guide scientists
(B) A paradigm is a single theory that never changes
(C) A paradigm is only used in physics
(D) A paradigm prevents scientific progress

Correct Answer: A

Explanation: A paradigm is a set of ideas, methods, and rules that guide scientists in their research.