Chemistry Grade 12 — Chapter 1

Ethics and Values in Chemistry

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Independent practice MCQs from the supplied Class 12 Chemistry notes pack. Total: 50 questions.

A. Important / Main Topics

1. Cognitive bias is best defined as:

(A) The tendency to make decisions or behave illogically due to personal characteristics.
(B) A deliberate attempt to mislead others.
(C) A formal method of verifying experimental data.
(D) A rule used to balance chemical equations.

Correct Answer: A

Explanation: The notes define cognitive bias as the tendency to make decisions or behave illogically because of values, memory, socialization, and other personal characteristics.

2. Logical fallacies are claims that:

(A) Are always mathematically incorrect.
(B) Sound convincing at first but can be refuted by logical reasoning.
(C) Are supported only by experimental evidence.
(D) Cannot be stated in words.

Correct Answer: B

Explanation: The notes state that logical fallacies sound convincing at first but can be refuted by logical reasoning.

3. A claim made on the basis of insufficient evidence is called:

(A) Confirmation bias
(B) Straw man fallacy
(C) Hasty generalization
(D) Appeal to tradition

Correct Answer: C

Explanation: The notes define a hasty generalization as a claim made on the basis of insufficient evidence, often using a small, unrepresentative sample.

4. The fallacy that assumes if one event occurs after another, the first must be the cause of the second is:

(A) False authority
(B) Faulty analogy
(C) Begging the question
(D) Post hoc ergo propter hoc

Correct Answer: D

Explanation: The notes state that this fallacy assumes that if one event occurs after another, the first must be the cause of the second.

5. Distorting or exaggerating another person's claim and then attacking the distorted version is known as:

(A) Straw man fallacy
(B) Confirmation bias
(C) Redefinition
(D) Fallacy of exclusion

Correct Answer: A

Explanation: The notes define the straw man fallacy as distorting or exaggerating another's claim and then attacking the distorted version.

6. The principle of Occam's razor suggests that:

(A) The most complex explanation is always correct.
(B) The simplest explanation for an event should be chosen.
(C) Authority figures are always right.
(D) Tradition is the best guide.

Correct Answer: B

Explanation: The notes state that Occam's razor suggests choosing the more straightforward of two possible explanations.

7. Which of the following is a pro of chemical substances?

(A) They always cause cancer.
(B) They are always safe for workers.
(C) They can reduce carbon footprints through clean energy technologies.
(D) They never cause environmental pollution.

Correct Answer: C

Explanation: The notes list clean energy technologies reducing carbon footprints as a benefit of chemical substances.

8. A con of weak or outdated regulations regarding chemicals is that they:

(A) Protect public health effectively.
(B) Foster innovation in chemical processes.
(C) Reduce compliance costs for companies.
(D) Fail to address current risks.

Correct Answer: D

Explanation: The notes state that weak or outdated regulations may fail to address current risks, leaving populations and ecosystems vulnerable.

9. A declaration or proposition that represents the central idea of a debate is called a:

(A) Claim
(B) Premise
(C) Counterclaim
(D) Assumption

Correct Answer: A

Explanation: The notes define a claim as the central idea or stance of a debate that the speaker or author is attempting to demonstrate.

10. A statement that opposes the main claim is called a:

(A) Rebuttal
(B) Counterclaim
(C) Premise
(D) Conclusion

Correct Answer: B

Explanation: The notes define a counterclaim as a statement that opposes the main claim.

11. The component of an argument that challenges an opposing viewpoint is the:

(A) Claim
(B) Premise
(C) Rebuttal
(D) Assumption

Correct Answer: C

Explanation: The notes define a rebuttal as a response that challenges and opposes an opposing viewpoint.

12. The statements or reasons that provide the foundation for a claim are called:

(A) Conclusions
(B) Assumptions

(C) Counterclaims
(D) Premises

Correct Answer: D

Explanation: The notes state that premises are the statements or reasons that provide the foundation for the claim.

13. The final statement that naturally follows from the initial statements of an argument is the:

(A) Conclusion
(B) Claim
(C) Premise
(D) Rebuttal

Correct Answer: A

Explanation: The notes define the conclusion as the final statement that naturally follows from the initial statements.

14. Basic convictions accepted without evidence that lay the groundwork for reasoning are called:

(A) Premises
(B) Assumptions
(C) Claims
(D) Rebuttals

Correct Answer: B

Explanation: The notes define assumptions as basic convictions accepted without evidence that lay the groundwork for reasoning.

15. The fallacy that involves excluding evidence that could disprove a hypothesis is called the:

(A) Faulty analogy
(B) Appeal to tradition
(C) Fallacy of exclusion
(D) Argument from non-testable hypothesis

Correct Answer: C

Explanation: The notes state that the fallacy of exclusion involves excluding evidence that could disprove a hypothesis.

16. A scientist only pays attention to results that support their hypothesis and ignores results that contradict it. Which cognitive bias is being demonstrated?

(A) Hasty generalization
(B) Straw man fallacy
(C) Post hoc ergo propter hoc
(D) Confirmation bias

Correct Answer: D

Explanation: Confirmation bias is the tendency to process information by searching for or interpreting information consistent with existing beliefs and ignoring contradictory information.

17. A student concludes that a new catalyst is ineffective because it did not work in a single trial. This is an example of:

(A) Hasty generalization
(B) False authority
(C) Faulty analogy
(D) Begging the question

Correct Answer: A

Explanation: Drawing a broad conclusion from a small, unrepresentative sample is a hasty generalization.

18. A speaker says, "My opponent wants to ban all cars," when the opponent only proposed stricter emissions limits. This is an example of:

(A) Appeal to tradition
(B) Straw man fallacy
(C) Redefinition
(D) Confirmation bias

Correct Answer: B

Explanation: The speaker distorts the opponent's claim and attacks the distorted version, which is the straw man fallacy.

19. Believing that a theory is valid because an expert in an unrelated field supports it is an example of:

(A) Appeal to tradition
(B) Faulty analogy
(C) False authority
(D) Fallacy of exclusion

Correct Answer: C

Explanation: The false authority fallacy is taking for granted that the views of a well-known authority in one field should be followed in another field.

20. A hypothesis that cannot be verified or disproven is problematic in science because:

(A) It is always mathematically incorrect.
(B) It is too simple.
(C) It relies on traditional practices.
(D) It weakens the foundation of scientific investigation based on evidence.

Correct Answer: D

Explanation: The notes state that an argument from a non-tes.

21. A company claims its new product is the best because it has "always been made this way." This is an example of:

(A) Appeal to tradition
(B) False authority
(C) Hasty generalization
(D) Post hoc ergo propter hoc

Correct Answer: A

Explanation: Believing something is true or superior just because it is a traditional practice is the appeal to tradition fallacy.

22. Which of the following is a con of chemical substances in terms of human health and the environment?

(A) Medical advancements
(B) Exposure to harmful chemicals can cause health problems.
(C) Agricultural improvements
(D) Clean energy technologies.

Correct Answer: B

Explanation: The notes list exposure to harmful chemicals causing health problems as a con.

23. Which of the following is a pro of corporate social responsibility for a chemical company?

(A) It increases environmental pollution.
(B) It reduces compliance costs.
(C) It enhances reputation and consumer trust.
(D) It weakens safety standards.

Correct Answer: C

Explanation: The notes state that companies can enhance their reputation and consumer trust by adopting corporate social responsibility practices.

24. A key conflict of interest for a chemical company is between:

(A) Research and development
(B) Employees and customers
(C) Local and international regulations
(D) Profit and safety

Correct Answer: D

Explanation: The notes state that financial incentives might lead companies to prioritize profits over safety and ethical considerations.

25. In the renewable energy debate, "Cutting down on carbon emissions is an essential objective" is an example of:

(A) An assumption
(B) A claim
(C) A premise
(D) A rebuttal

Correct Answer: A

Explanation: The notes give this statement as an example of an assumption—a basic conviction accepted without evidence.

B. Less Important / Secondary Topics

26. "Burning fossil fuels releases large amounts of carbon dioxide into the atmosphere" used to support a claim about renewable energy is an example of:

(A) A premise
(B) A conclusion
(C) A counterclaim
(D) A rebuttal

Correct Answer: A

Explanation: This statement is a reason that provides the foundation for the claim, so it is a premise.

27. "Renewable energy sources are unreliable and cannot provide a stable energy supply" is an example of:

(A) A claim
(B) A counterclaim
(C) A premise
(D) An assumption

Correct Answer: B

Explanation: This statement opposes the main claim that green energy is important, so it is a counterclaim.

28. "New technologies have improved efficiency and have reduced costs" in response to a counterclaim about renewable energy is an example of:

(A) A premise
(B) A conclusion
(C) A rebuttal
(D) An assumption

Correct Answer: C

Explanation: This statement challenges the counterclaim, so it is a rebuttal.

29. Which of the following is a con of strict regulations in the chemical industry?

(A) They encourage industry standards.
(B) They foster innovation.
(C) They protect public health.
(D) They can impose significant compliance costs.

Correct Answer: D

Explanation: The notes state that strict regulations can impose significant compliance costs on companies.

30. The false cause fallacy is dangerous in physical sciences because it can:

(A) Mislead scientists into false causal relationships.
(B) Always improve experimental accuracy.
(C) Simplify complex calculations.
(D) Replace the need for experiments.

Correct Answer: A

Explanation: The notes state that the false cause fallacy can mislead scientists into false causal relationships.

31. A chemical company that adopts practices to reduce environmental impact and promote community health is demonstrating:

(A) Confirmation bias
(B) Corporate social responsibility
(C) Appeal to tradition
(D) Hasty generalization

Correct Answer: B

Explanation: The notes describe corporate social responsibility as practices that focus on reducing environmental impact and promoting community health.

32. The argument that "solar and wind power do not produce carbon emissions during operation" is used as:

(A) A claim
(B) A counterclaim
(C) A premise
(D) A conclusion

Correct Answer: C

Explanation: This is a supporting reason for the claim that green energy is important, so it is a premise.

33. Which statement about assumptions is correct according to the notes?

(A) They are always explicitly stated in an argument.
(B) They are the final conclusions of an argument.
(C) They are always false.
(D) They are accepted without evidence and lay the groundwork for reasoning.

Correct Answer: D

Explanation: The notes define assumptions as basic convictions accepted without evidence that lay the groundwork for reasoning but are not directly mentioned.

34. In a brochure claiming an eco-friendly product is best, the statement "It is made from 100% recycled materials" is a:

(A) Premise
(B) Counterclaim
(C) Rebuttal
(D) Conclusion

Correct Answer: A

Explanation: This is a supporting reason for the claim that the product is the best choice, so it is a premise.

35. The statement "Choosing our products ensures a greener and more sustainable lifestyle" in a brochure is a:

(A) Claim
(B) Conclusion
(C) Counterclaim
(D) Premise

Correct Answer: B

Explanation: This is the final statement that summarizes the argument, so it is the conclusion.

36. A researcher finds that a reaction occurs whenever a particular gas is present and concludes the gas causes the reaction, without testing other variables. Which fallacy is most directly involved?

(A) Confirmation bias
(B) Straw man fallacy
(C) Post hoc ergo propter hoc
(D) Appeal to tradition

Correct Answer: C

Explanation: The researcher assumes causation from sequence alone, which is the false cause (post hoc) fallacy.

37. A company argues that its chemical is safe because "no one has proven it harmful." Which fallacy does this argument most closely resemble?

(A) Begging the question
(B) Fallacy of exclusion
(C) Hasty generalization
(D) Argument from non-testable hypothesis

Correct Answer: D

Explanation: The claim cannot be verified or disproven by evidence, which is the argument from a non-tes.

38. An argument states: "This policy is good because it is new." Which assumption is hidden in this argument?

(A) New things are always better.
(B) All new things are bad.
(C) The policy is not new.
(D) The policy is good.

Correct Answer: A

Explanation: The argument relies on the unstated assumption that "new" means "better" to connect the premise to the claim.

39. A scientist claims a drug is effective but removes trial data where it failed. This most directly violates:

(A) Confirmation bias
(B) The fallacy of exclusion
(C) Hasty generalization
(D) False authority

Correct Answer: B

Explanation: Excluding evidence that could disprove a hypothesis is the fallacy of exclusion.

40. Two different explanations exist for an observation. A scientist automatically chooses the more complex one without justification. This error is:

(A) Faulty analogy
(B) Appeal to tradition
(C) Falling Occam's razor
(D) Redefinition

Correct Answer: C

Explanation: Occam's razor favors the simpler explanation; failing to apply it is "falling Occam's razor.".

41. An industry representative says, "We should not regulate this chemical because it has been used for decades." This argument primarily relies on:

(A) False authority
(B) Faulty analogy
(C) Begging the question
(D) Appeal to tradition

Correct Answer: D

Explanation: The argument assumes a practice is correct because it has been done for a long time, which is the appeal to tradition.

42. A student argues: "Atoms are like tiny solar systems, so electrons orbit the nucleus like planets." This reasoning is flawed because it is:

(A) A faulty analogy
(B) A hasty generalization
(C) An appeal to tradition
(D) A post hoc fallacy

Correct Answer: A

Explanation: The argument assumes two things alike in some respects must be alike in others, which is a faulty analogy.

43. A company argues for a chemical process by saying: "Our process is safe because it is safe." This is an example of:

(A) False authority
(B) Begging the question
(C) Confirmation bias
(D) Fallacy of exclusion

Correct Answer: B

Explanation: The argument assumes the conclusion it is trying to prove, which is begging the question.

44. Which statement best explains why an argument from a non-testable hypothesis is a serious problem in the physical sciences?

(A) It makes calculations too long.
(B) It always contradicts mathematical laws.
(C) It cannot be verified or disproven, weakening the evidence-based foundation of science.
(D) It relies on too much data.

Correct Answer: C

Explanation: It cannot be verified or disproven, weakening the evidence-based foundation of science. — this correctly answers the question.

45. A government changes the required success criteria for a new chemical safety test after the test has already met the original criteria. This is an example of:

(A) Hasty generalization
(B) Post hoc fallacy
(C) Straw man fallacy
(D) Redefinition (shifting the standards)

Correct Answer: D

Explanation: Altering the criteria for success once it has been achieved is redefinition or shifting the standards.

46. A chemical company argues that a proposed safety rule is bad because "our competitor supports it." Which fallacy does this most closely resemble?

(A) Straw man fallacy
(B) Faulty analogy
(C) Confirmation bias
(D) Fallacy of exclusion

Correct Answer: A

Explanation: Straw man fallacy — this correctly answers the question.

47. A report claims: "Pesticides are safe because a famous actor endorses them." This argument is flawed primarily because it relies on:

(A) Hasty generalization
(B) False authority
(C) Appeal to tradition
(D) Redefinition

Correct Answer: B

Explanation: The argument relies on the prestige of a well-known person outside the relevant field, which is the false authority fallacy.

48. A scientist argues that because two molecules have similar sizes, they must have the same reactivity. This reasoning is an example of:

(A) Confirmation bias
(B) Begging the question
(C) A faulty analogy

(D) A post hoc fallacy

Correct Answer: C

Explanation: The notes give the example of assuming that similar atom sizes imply similar chemical re.

49. An argument includes a counterclaim but then ignores it entirely without offering a response. Which component of a strong argument is missing?

(A) The claim
(B) The premise
(C) The conclusion
(D) The rebuttal

Correct Answer: D

Explanation: A strong argument should respond to the counterclaim with a rebuttal; ignoring it leaves the argument incomplete.

50. A company claims its product is "the best" and supports this only with the premise "It is our product." This argument is weak because:

(A) The premise assumes the conclusion instead of providing independent support.
(B) It uses too many premises.
(C) It lacks an assumption.
(D) It includes a rebuttal.

Correct Answer: A

Explanation: The premise does not provide independent evidence but simply restates the claim, which is a circular argument (begging the question).