

# PRACTICE EXAM 20: PHYSICAL SETTING/CHEMISTRY SIMULATION (85 QUESTIONS)

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For each question, select the item that does not belong with the other three.

1. Which does not belong with the others?

- A. lithium
- B. sodium
- C. calcium
- D. potassium

2. Which does not belong with the others?

- A. helium
- B. nitrogen
- C. neon
- D. argon

3. Which does not belong with the others?

- A. fluorine
- B. chlorine
- C. bromine
- D. oxygen

4. Which does not belong with the others?

- A. burning paper
- B. melting wax
- C. boiling water
- D. crushing a can

5. Which does not belong with the others?

- A. hydrogen
- B. oxygen
- C. helium
- D. nitrogen

6. Which does not belong with the others?

- A. oxygen gas
- B. water

- C. carbon dioxide
- D. sodium chloride

7. Which does not belong with the others?

- A. HCl
- B.  $\text{H}_2\text{SO}_4$
- C.  $\text{HNO}_3$
- D. NaOH

8. Which does not belong with the others?

- A. proton
- B. molecule
- C. neutron
- D. electron

9. Which does not belong with the others?

- A. dissolving salt in water
- B. iron rusting
- C. wood burning
- D. milk souring

10. Which does not belong with the others?

- A. iron
- B. copper
- C. gold
- D. sulfur

11. Which does not belong with the others?

- A. oxygen
- B. nitrogen
- C. iron
- D. helium

12. Which does not belong with the others?

- A. freezing
- B. melting
- C. boiling
- D. sublimation

13. Which does not belong with the others?

- A. chloride ion
- B. oxide ion
- C. fluoride ion
- D. sodium ion

14. Which does not belong with the others?

- A. synthesis
- B. decomposition
- C. distillation
- D. combustion

15. Which does not belong with the others?

- A. flammability
- B. density
- C. color
- D. boiling point

16. Which does not belong with the others?

- A. magnesium
- B. lithium

C. sodium

D. potassium

17. Which does not belong with the others?

A. magnesium

B. calcium

C. potassium

D. barium

18. Which does not belong with the others?

A. saltwater

B. pure copper

C. air

D. sand and gravel

19. Which does not belong with the others?

A. alpha particle

B. beta particle

C. gamma ray

D. proton beam

20. Which does not belong with the others?

- A. alkane
- B. alkene
- C. alkyne
- D. halogen

21. Which does not belong with the others?

- A. mole
- B. Celsius
- C. Fahrenheit
- D. Kelvin

22. Which does not belong with the others?

- A. carbon
- B. sodium
- C. sulfur
- D. phosphorus

23. Which does not belong with the others?

- A. burning fuel
- B. melting ice
- C. a hand warmer activating
- D. condensation of steam

24. Which does not belong with the others?

- A. NaCl
- B. MgO
- C. KBr
- D. CO<sub>2</sub>

25. Which does not belong with the others?

- A. O<sub>2</sub>
- B. CO
- C. N<sub>2</sub>
- D. Cl<sub>2</sub>

26. Which does not belong with the others?

- A. NaOH
- B. KOH

C. HCl

D. Ca(OH)<sub>2</sub>

27. Which does not belong with the others?

A. silicon

B. aluminum

C. boron

D. arsenic

28. Which does not belong with the others?

A. methane (CH<sub>4</sub>)

B. water (H<sub>2</sub>O)

C. carbon dioxide (CO<sub>2</sub>)

D. glucose (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>)

29. Which does not belong with the others?

A. NaCl

B. H<sub>2</sub>O

C. O<sub>2</sub>

D. CO<sub>2</sub>

30. Which does not belong with the others?

A. neutralization

B. filtration

C. distillation

D. evaporation

31. Which does not belong with the others?

A. malleable

B. good conductor

C. shiny luster

D. brittle when solid

32. Which does not belong with the others?

A. neon

B. fluorine

C. chlorine

D. iodine

33. Which does not belong with the others?

- A. lemon juice
- B. household ammonia
- C. vinegar
- D. stomach acid

34. Which does not belong with the others?

- A. ionic bond
- B. covalent bond
- C. metallic bond
- D. nuclear fission

35. Which does not belong with the others?

- A. copper
- B. rubber
- C. silver
- D. aluminum

36. Which does not belong with the others?

- A. helium
- B. argon

C. sodium

D. neon

37. Which does not belong with the others?

A. baking a cake

B. freezing water

C. tearing paper

D. dissolving sugar

38. Which does not belong with the others?

A. CO<sub>2</sub>

B. CH<sub>4</sub>

C. H<sub>2</sub>O

D. SO<sub>2</sub>

39. Which does not belong with the others?

A. increasing temperature

B. increasing concentration

C. lowering temperature

D. increasing surface area

40. Which does not belong with the others?

- A. calcium ion
- B. magnesium ion
- C. potassium ion
- D. barium ion

41. Which does not belong with the others?

- A. NaCl
- B. H<sub>2</sub>O
- C. CO<sub>2</sub>
- D. NH<sub>3</sub>

42. Which does not belong with the others?

- A. hydrogen
- B. chlorine
- C. neon
- D. carbon

43. Which does not belong with the others?

- A. combustion
- B. photosynthesis
- C. respiration
- D. a hand warmer activating

44. Which does not belong with the others?

- A. tastes bitter
- B. feels slippery
- C. turns red litmus blue
- D. turns blue litmus red

45. Which does not belong with the others?

- A. fission
- B. fusion
- C. distillation
- D. radioactive decay

46. Which does not belong with the others?

- A. saltwater
- B. sand and water

- C. oil and water
- D. a tossed salad

47. Which does not belong with the others?

- A. silicon
- B. oxygen
- C. nitrogen
- D. sulfur

48. Which does not belong with the others?

- A.  $\text{H}_2\text{O}$
- B.  $\text{NH}_3$
- C.  $\text{CH}_4$
- D.  $\text{CO}_2$

49. Which does not belong with the others?

- A. single replacement
- B. double replacement
- C. sublimation
- D. neutralization

50. Which does not belong with the others?

A. iron

B. sodium chloride

C. copper

D. mercury

51. Which does not belong with the others?

A. bromide ion

B. calcium ion

C. iodide ion

D. sulfide ion

52. Which does not belong with the others?

A. carbonic acid

B. sodium hydroxide

C. nitric acid

D. sulfuric acid

53. Which does not belong with the others?

A. H<sub>2</sub>

B. O<sub>2</sub>

C. O<sub>3</sub>

D. N<sub>2</sub>

54. Which does not belong with the others?

A. iron

B. copper

C. zinc

D. calcium

55. Which does not belong with the others?

A. evaporating water

B. bending a wire

C. burning natural gas

D. grinding salt

56. Which does not belong with the others?

A. no definite shape

B. definite shape and volume

- C. fills its container
- D. highly compressible

57. Which does not belong with the others?

- A. iron
- B. oxygen
- C. water
- D. carbon

58. Which does not belong with the others?

- A. ammonia ( $\text{NH}_3$ )
- B. methane ( $\text{CH}_4$ )
- C. carbon dioxide ( $\text{CO}_2$ )
- D. glucose ( $\text{C}_6\text{H}_{12}\text{O}_6$ )

59. Which does not belong with the others?

- A. melting ice
- B. freezing water
- C. boiling water
- D. evaporating alcohol

60. Which does not belong with the others?

- A. helium
- B. neon
- C. krypton
- D. hydrogen

61. Which does not belong with the others?

- A. acetic acid
- B. potassium hydroxide
- C. calcium hydroxide
- D. ammonia

62. Which does not belong with the others?

- A. high melting point
- B. conducts electricity when molten
- C. forms a crystal lattice
- D. usually a gas at room temperature

63. Which does not belong with the others?

- A. sodium
- B. gold
- C. potassium
- D. calcium

64. Which does not belong with the others?

- A. NaCl
- B. MgO
- C. CO<sub>2</sub>
- D. KBr

65. Which does not belong with the others?

- A. melting
- B. condensation
- C. neutralization
- D. sublimation

66. Which does not belong with the others?

- A. silver
- B. aluminum

C. iron

D. sulfur

67. Which does not belong with the others?

A. nitrogen gas

B. ammonia

C. sodium chloride

D. glucose

68. Which does not belong with the others?

A. a change in shape only

B. a color change

C. gas bubbles forming

D. a precipitate forming

69. Which does not belong with the others?

A. chlorine

B. argon

C. bromine

D. iodine

70. Which does not belong with the others?

A. magnesium

B. chlorine

C. oxygen

D. fluorine

71. Which does not belong with the others?

A. takes the shape of its container

B. definite volume

C. definite shape

D. particles in fixed positions

72. Which does not belong with the others?

A. temperature

B. concentration

C. surface area

D. color of the container

73. Which does not belong with the others?

- A. lithium
- B. sodium
- C. magnesium
- D. rubidium

74. Which does not belong with the others?

- A. hydrochloric acid
- B. ammonia
- C. sulfuric acid
- D. nitric acid

75. Which does not belong with the others?

- A. H<sub>2</sub>
- B. N<sub>2</sub>
- C. HCl
- D. F<sub>2</sub>

76. Which does not belong with the others?

- A. melting point
- B. density

C. solubility

D. reactivity with acid

77. Which does not belong with the others?

A. half-life

B. radioactive decay

C. isotope

D. distillation

78. Which does not belong with the others?

A. neon

B. argon

C. oxygen

D. krypton

79. Which does not belong with the others?

A. carbon

B. aluminum

C. zinc

D. nickel

80. Which does not belong with the others?

A. NaCl

B. CaCl<sub>2</sub>

C. CO<sub>2</sub>

D. KCl

81. Which does not belong with the others?

A. melting

B. condensation

C. boiling

D. sublimation

82. Which does not belong with the others?

A. proton

B. ion

C. neutron

D. electron

83. Which does not belong with the others?

- A. melting butter
- B. rusting iron
- C. burning toast
- D. fermenting grapes

84. Which does not belong with the others?

- A. sodium hydroxide
- B. potassium hydroxide
- C. magnesium hydroxide
- D. carbonic acid

85. Which does not belong with the others?

- A. oxygen
- B. hydrogen
- C. helium
- D. nitrogen

## Practice Exam 20 – Explained Answer Key

1. C — Calcium is the odd one because it is a Group 2 alkaline earth metal, while lithium, sodium, and potassium are all Group 1 alkali metals. Group membership determines an element's valence and reactivity. Calcium forms a +2 ion rather than the +1 ion of the alkali metals.
2. B — Nitrogen is the odd one because helium, neon, and argon are all noble gases, while nitrogen is a reactive Group 15 nonmetal. Noble gases have full outer shells. Nitrogen, lacking a full shell, readily forms compounds.

3. D — Oxygen is the odd one because fluorine, chlorine, and bromine are all Group 17 halogens, while oxygen is a Group 16 element. The halogens share seven valence electrons. Oxygen has six and behaves differently.
4. A — Burning paper is the odd one because melting wax, boiling water, and crushing a can are physical changes, while burning is a chemical change. Burning produces new substances. The other three change only form or state.
5. C — Helium is the odd one because hydrogen, oxygen, and nitrogen all exist as diatomic molecules, while helium is monatomic. Diatomic elements pair their atoms naturally. Helium, a noble gas, exists as single atoms.
6. A — Oxygen gas is the odd one because water, carbon dioxide, and sodium chloride are compounds, while oxygen gas is an element. Compounds contain more than one type of atom. Oxygen gas is made of only oxygen atoms.
7. D — NaOH is the odd one because HCl, H<sub>2</sub>SO<sub>4</sub>, and HNO<sub>3</sub> are acids, while NaOH is a base. Acids release hydrogen ions in solution. Sodium hydroxide releases hydroxide ions instead.
8. B — A molecule is the odd one because a proton, neutron, and electron are subatomic particles, while a molecule is a group of bonded atoms. Subatomic particles are components of an atom. A molecule is a larger structure.
9. A — Dissolving salt in water is the odd one because rusting, burning, and souring are chemical changes, while dissolving is a physical change. The salt can be recovered unchanged by evaporation. The other three form new substances.
10. D — Sulfur is the odd one because iron, copper, and gold are metals, while sulfur is a nonmetal. Metals are shiny conductors. Sulfur is a dull, brittle insulator.
11. C — Iron is the odd one because oxygen, nitrogen, and helium are gases at room temperature, while iron is a solid. The three gases have very low boiling points. Iron remains solid until far higher temperatures.
12. A — Freezing is the odd one because melting, boiling, and sublimation absorb energy, while freezing releases energy. The three odd-out processes move to higher-energy states. Freezing moves to a lower-energy state and gives off heat.
13. D — The sodium ion is the odd one because chloride, oxide, and fluoride ions are negatively charged anions, while the sodium ion is a positive cation. Nonmetals gain electrons to form anions. Sodium loses an electron to form a cation.
14. C — Distillation is the odd one because synthesis, decomposition, and combustion are chemical reactions, while distillation is a physical separation method. Reactions form new substances. Distillation only separates existing ones by boiling point.
15. A — Flammability is the odd one because density, color, and boiling point are physical properties, while flammability is a chemical property. Physical properties are observed without changing the substance. Flammability is seen only during a chemical reaction.
16. A — Magnesium is the odd one because lithium, sodium, and potassium form +1 ions, while magnesium forms a +2 ion. The alkali metals lose one valence electron. Magnesium, in Group 2, loses two.
17. C — Potassium is the odd one because magnesium, calcium, and barium are Group 2 alkaline earth metals, while potassium is a Group 1 alkali metal. Group 2 elements form +2 ions. Potassium forms a +1 ion.
18. B — Pure copper is the odd one because saltwater, air, and sand and gravel are mixtures, while pure copper is a pure substance. Mixtures contain more than one substance. Copper is a single element.

19. D — A proton beam is the odd one because the alpha particle, beta particle, and gamma ray are emissions from radioactive decay, while a proton beam is not a natural decay product. Decay releases alpha, beta, or gamma radiation. A proton beam is artificially produced.
20. D — Halogen is the odd one because alkane, alkene, and alkyne are classes of hydrocarbons, while halogen is a family of elements. The hydrocarbon classes differ by carbon-carbon bonding. A halogen is not a hydrocarbon at all.
21. A — The mole is the odd one because Celsius, Fahrenheit, and Kelvin are temperature scales, while the mole measures amount of substance. The three scales quantify temperature. The mole counts particles instead.
22. B — Sodium is the odd one because carbon, sulfur, and phosphorus are nonmetals, while sodium is a metal. Nonmetals are poor conductors. Sodium is a soft, reactive metal.
23. B — Melting ice is the odd one because burning fuel, a hand warmer, and condensation all release heat (exothermic), while melting ice absorbs heat (endothermic). The three odd-out processes warm their surroundings. Melting takes in energy.
24. D —  $\text{CO}_2$  is the odd one because  $\text{NaCl}$ ,  $\text{MgO}$ , and  $\text{KBr}$  are ionic compounds, while  $\text{CO}_2$  is covalent (molecular). Ionic compounds form between metals and nonmetals. Carbon dioxide forms between two nonmetals by sharing electrons.
25. B —  $\text{CO}$  is the odd one because  $\text{O}_2$ ,  $\text{N}_2$ , and  $\text{Cl}_2$  are diatomic elements, while  $\text{CO}$  is a compound. The three odd-out molecules contain a single type of atom. Carbon monoxide contains two different elements.
26. C —  $\text{HCl}$  is the odd one because  $\text{NaOH}$ ,  $\text{KOH}$ , and  $\text{Ca}(\text{OH})_2$  are bases, while  $\text{HCl}$  is an acid. The three bases contain hydroxide ions. Hydrochloric acid releases hydrogen ions instead.
27. B — Aluminum is the odd one because silicon, boron, and arsenic are metalloids, while aluminum is a metal. Metalloids have properties between metals and nonmetals. Aluminum is a true metal along the table's left side.
28. B — Water is the odd one because methane, carbon dioxide, and glucose all contain carbon, while water does not. The three odd-out compounds include carbon atoms. Water is made only of hydrogen and oxygen.
29. C —  $\text{O}_2$  is the odd one because  $\text{NaCl}$ ,  $\text{H}_2\text{O}$ , and  $\text{CO}_2$  are compounds, while  $\text{O}_2$  is an element. Compounds contain more than one type of atom. Oxygen gas contains only oxygen.
30. A — Neutralization is the odd one because filtration, distillation, and evaporation are separation methods, while neutralization is a chemical reaction. The three odd-out processes separate mixtures physically. Neutralization forms new substances.
31. D — Being brittle when solid is the odd one because malleability, good conductivity, and shiny luster are properties of metals, while brittleness is a property of nonmetals. Metals bend and conduct. Nonmetals tend to shatter.
32. A — Neon is the odd one because fluorine, chlorine, and iodine are halogens, while neon is a noble gas. The halogens are reactive nonmetals with seven valence electrons. Neon has a full outer shell and is unreactive.
33. B — Household ammonia is the odd one because lemon juice, vinegar, and stomach acid are acidic, while ammonia is basic. The three acids have a pH below 7. Ammonia has a pH above 7.
34. D — Nuclear fission is the odd one because ionic, covalent, and metallic bonds are types of chemical bonding, while fission is a nuclear process. Chemical bonds hold atoms together. Fission splits an atom's nucleus.

35. B — Rubber is the odd one because copper, silver, and aluminum are good electrical conductors, while rubber is an insulator. Metals carry current through mobile electrons. Rubber resists the flow of electricity.
36. C — Sodium is the odd one because helium, argon, and neon are unreactive noble gases, while sodium is a highly reactive metal. The noble gases have full outer shells. Sodium readily loses its single valence electron.
37. A — Baking a cake is the odd one because freezing water, tearing paper, and dissolving sugar are physical changes, while baking is a chemical change. Baking forms new substances through reactions. The other three are reversible physical changes.
38. B —  $\text{CH}_4$  is the odd one because  $\text{CO}_2$ ,  $\text{H}_2\text{O}$ , and  $\text{SO}_2$  all contain oxygen, while methane does not. The three odd-out compounds include oxygen atoms. Methane contains only carbon and hydrogen.
39. C — Lowering temperature is the odd one because increasing temperature, concentration, and surface area all speed up a reaction, while lowering temperature slows it. The three odd-out factors increase collision frequency or energy. Cooling reduces the reaction rate.
40. C — The potassium ion is the odd one because calcium, magnesium, and barium ions carry a +2 charge, while the potassium ion carries +1. The Group 2 metals lose two electrons. Potassium, in Group 1, loses only one.
41. A —  $\text{NaCl}$  is the odd one because  $\text{H}_2\text{O}$ ,  $\text{CO}_2$ , and  $\text{NH}_3$  are covalent molecules, while  $\text{NaCl}$  is an ionic compound. The three odd-out compounds share electrons between nonmetals. Sodium chloride transfers electrons from metal to nonmetal.
42. D — Carbon is the odd one because hydrogen, chlorine, and neon are gases at room temperature, while carbon is a solid. The three odd-out elements exist as gases. Carbon is a solid such as graphite or diamond.
43. B — Photosynthesis is the odd one because combustion, respiration, and a hand warmer release energy (exothermic), while photosynthesis absorbs energy (endothermic). The three odd-out processes give off heat or energy. Photosynthesis takes in light energy.
44. D — Turning blue litmus red is the odd one because tasting bitter, feeling slippery, and turning red litmus blue are properties of bases, while turning blue litmus red is a property of acids. The three odd-out traits describe bases. Acids turn blue litmus red.
45. C — Distillation is the odd one because fission, fusion, and radioactive decay are nuclear processes, while distillation is a physical separation. The three odd-out processes change the nucleus. Distillation only separates a mixture by boiling point.
46. A — Saltwater is the odd one because sand and water, oil and water, and a tossed salad are heterogeneous mixtures, while saltwater is homogeneous. The three odd-out mixtures have visibly separate parts. Saltwater is uniform throughout.
47. A — Silicon is the odd one because oxygen, nitrogen, and sulfur are nonmetals, while silicon is a metalloid. The three odd-out elements lack metallic properties entirely. Silicon has properties between metals and nonmetals.
48. D —  $\text{CO}_2$  is the odd one because  $\text{H}_2\text{O}$ ,  $\text{NH}_3$ , and  $\text{CH}_4$  all contain hydrogen, while carbon dioxide does not. The three odd-out compounds include hydrogen atoms. Carbon dioxide contains only carbon and oxygen.
49. C — Sublimation is the odd one because single replacement, double replacement, and neutralization are chemical reactions, while sublimation is a phase change. The three odd-out processes form new substances. Sublimation only changes solid directly to gas.

50. D — Mercury is the odd one because iron, sodium chloride, and copper are solids at room temperature, while mercury is a liquid. The three odd-out substances hold a fixed shape. Mercury flows as a liquid metal.
51. B — The calcium ion is the odd one because bromide, iodide, and sulfide ions are negatively charged anions, while the calcium ion is a positive cation. Nonmetals gain electrons to form anions. Calcium loses electrons to form a cation.
52. B — Sodium hydroxide is the odd one because carbonic, nitric, and sulfuric acids are acids, while sodium hydroxide is a base. The three odd-out substances release hydrogen ions. Sodium hydroxide releases hydroxide ions.
53. C —  $O_3$  is the odd one because  $H_2$ ,  $O_2$ , and  $N_2$  are diatomic molecules, while  $O_3$  (ozone) is triatomic. The three odd-out molecules contain two atoms. Ozone contains three oxygen atoms.
54. D — Calcium is the odd one because iron, copper, and zinc are transition metals, while calcium is an alkaline earth metal. The transition metals occupy the central block. Calcium sits in Group 2.
55. C — Burning natural gas is the odd one because evaporating water, bending a wire, and grinding salt are physical changes, while burning is a chemical change. The three odd-out changes do not form new substances. Burning produces carbon dioxide and water.
56. B — Having a definite shape and volume is the odd one because no definite shape, filling its container, and being highly compressible are properties of gases, while definite shape and volume describes a solid. The three odd-out traits describe gases. A solid holds a fixed shape.
57. C — Water is the odd one because iron, oxygen, and carbon are elements, while water is a compound. Elements contain a single type of atom. Water combines hydrogen and oxygen.
58. A — Ammonia is the odd one because methane, carbon dioxide, and glucose all contain carbon, while ammonia does not. The three odd-out compounds include carbon atoms. Ammonia contains only nitrogen and hydrogen.
59. B — Freezing water is the odd one because melting ice, boiling water, and evaporating alcohol absorb energy, while freezing releases energy. The three odd-out processes take in heat. Freezing gives off heat as it forms a solid.
60. D — Hydrogen is the odd one because helium, neon, and krypton are noble gases, while hydrogen is a reactive nonmetal. The noble gases have full outer shells. Hydrogen has a single electron and is reactive.
61. A — Acetic acid is the odd one because potassium hydroxide, calcium hydroxide, and ammonia are bases, while acetic acid is an acid. The three odd-out substances act as bases. Acetic acid releases hydrogen ions.
62. D — Usually being a gas at room temperature is the odd one because a high melting point, conducting when molten, and forming a crystal lattice are properties of ionic compounds, while being a gas describes molecular substances. The three odd-out traits describe ionic compounds. Many molecular substances are gases.
63. B — Gold is the odd one because sodium, potassium, and calcium are reactive metals, while gold is unreactive. The three odd-out metals readily form compounds. Gold resists corrosion and reaction.
64. C —  $CO_2$  is the odd one because  $NaCl$ ,  $MgO$ , and  $KBr$  each contain a metal, while  $CO_2$  contains only nonmetals. The three odd-out compounds pair a metal with a nonmetal. Carbon dioxide is made of two nonmetals.
65. C — Neutralization is the odd one because melting, condensation, and sublimation are phase changes, while neutralization is a chemical reaction. The three odd-out processes change physical state. Neutralization forms a salt and water.

66. D — Sulfur is the odd one because silver, aluminum, and iron are metals and good conductors, while sulfur is a nonmetal and insulator. The three odd-out elements carry current. Sulfur does not conduct electricity.
67. A — Nitrogen gas is the odd one because ammonia, sodium chloride, and glucose are compounds, while nitrogen gas is an element. Compounds contain more than one type of atom. Nitrogen gas contains only nitrogen.
68. A — A change in shape only is the odd one because a color change, gas bubbles, and a precipitate are signs of a chemical reaction, while a shape change alone is physical. The three odd-out clues indicate new substances forming. A shape change does not.
69. B — Argon is the odd one because chlorine, bromine, and iodine are halogens, while argon is a noble gas. The halogens are reactive nonmetals. Argon has a full outer shell and is unreactive.
70. A — Magnesium is the odd one because chlorine, oxygen, and fluorine gain electrons to form negative ions, while magnesium loses electrons to form a positive ion. The three odd-out nonmetals form anions. Magnesium, a metal, forms a cation.
71. A — Taking the shape of its container is the odd one because definite volume, definite shape, and particles in fixed positions are properties of solids, while taking a container's shape describes a liquid or gas. The three odd-out traits describe solids. A solid keeps its own shape.
72. D — The color of the container is the odd one because temperature, concentration, and surface area affect reaction rate, while the container's color does not. The three odd-out factors change collision frequency or energy. Color has no effect on the reaction.
73. C — Magnesium is the odd one because lithium, sodium, and rubidium are Group 1 alkali metals, while magnesium is a Group 2 alkaline earth metal. The alkali metals form +1 ions. Magnesium forms a +2 ion.
74. B — Ammonia is the odd one because hydrochloric, sulfuric, and nitric acids are acids, while ammonia is a base. The three odd-out substances release hydrogen ions. Ammonia acts as a base in water.
75. C — HCl is the odd one because H<sub>2</sub>, N<sub>2</sub>, and F<sub>2</sub> are diatomic elements, while HCl is a compound. The three odd-out molecules contain a single type of atom. Hydrochloric acid combines hydrogen and chlorine.
76. D — Reactivity with acid is the odd one because melting point, density, and solubility are physical properties, while reactivity with acid is a chemical property. Physical properties are measured without changing the substance. Reactivity is observed only during a reaction.
77. D — Distillation is the odd one because half-life, radioactive decay, and isotope are nuclear or atomic terms, while distillation is a physical separation method. The three odd-out terms relate to the nucleus. Distillation separates mixtures by boiling point.
78. C — Oxygen is the odd one because neon, argon, and krypton are noble gases, while oxygen is a reactive nonmetal. The noble gases have full outer shells. Oxygen has six valence electrons and is reactive.
79. A — Carbon is the odd one because aluminum, zinc, and nickel are metals, while carbon is a nonmetal. The three odd-out elements conduct electricity and are malleable. Carbon is a nonmetal.
80. C — CO<sub>2</sub> is the odd one because NaCl, CaCl<sub>2</sub>, and KCl are ionic compounds, while CO<sub>2</sub> is molecular. The three odd-out compounds pair a metal with a nonmetal. Carbon dioxide shares electrons between two nonmetals.
81. B — Condensation is the odd one because melting, boiling, and sublimation absorb energy, while condensation releases energy. The three odd-out processes move to higher-energy states. Condensation gives off heat as gas becomes liquid.

82. B — An ion is the odd one because a proton, neutron, and electron are subatomic particles, while an ion is a charged atom or group of atoms. The three odd-out items are building blocks of an atom. An ion is a complete atom with a net charge.
83. A — Melting butter is the odd one because rusting iron, burning toast, and fermenting grapes are chemical changes, while melting butter is a physical change. The three odd-out changes form new substances. Melting only changes the butter's state.
84. D — Carbonic acid is the odd one because sodium hydroxide, potassium hydroxide, and magnesium hydroxide are bases, while carbonic acid is an acid. The three odd-out substances contain hydroxide ions. Carbonic acid releases hydrogen ions.
85. C — Helium is the odd one because oxygen, hydrogen, and nitrogen exist as diatomic molecules, while helium is monatomic. The three odd-out elements pair their atoms. Helium, a noble gas, exists as single atoms.