CHEMISTRY MCQ BOOKLET

Grade 9 · Chapter 10 · Acids, Bases, and Salts

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Independent MCQs on Arrhenius and Brønsted–Lowry acids and bases, strength, reactions, acid rain, and uses. Not copied from the book exercise. Total: 108 questions. Each item has four options, the correct letter, and a short explanation of why it is correct.

A. Important / Main Topics

1. Arrhenius (1887) defined acids as substances that produce H□ ions when:

(A) dissolved in water
(B) dissolved in oil only
(C) heated in a vacuum
(D) mixed with sand

Correct Answer: A

Explanation: The Arrhenius acid is an aqueous hydrogen-ion donor in water.

2. Arrhenius defined bases as substances that produce OH□ ions when:

(A) dissolved in petrol only
(B) dissolved in water
(C) frozen solid only
(D) mixed with CO□ gas only

Correct Answer: B

Explanation: This is correct because the Arrhenius base yields hydroxide ions in aqueous solution.

3. Blue litmus in acid turns:

(A) deeper blue
(B) green
(C) red
(D) colourless always

Correct Answer: C

Explanation: An acid turns blue litmus paper red, which is the standard indicator change.

4. Red litmus in a base turns:

(A) deeper red
(B) yellow
(C) black
(D) blue

Correct Answer: D

Explanation: A base turns red litmus paper blue, which is the standard indicator change.

5. Aqueous acids typically taste:

(A) sour
(B) bitter
(C) sweet like sucrose only
(D) metallic like iron rust

Correct Answer: A

Explanation: Sour taste is the classic sensory property of acids (never taste unknowns in the lab).

6. Aqueous bases typically taste:

(A) sour
(B) bitter
(C) exactly like vinegar

(D) exactly like lemon

Correct Answer: B

Explanation: Bitter taste is associated with bases, together with a soapy feel for alkalis.

7. Acids and bases are both described as:

(A) never corrosive
(B) unable to conduct when aqueous
(C) corrosive
(D) unable to affect litmus

Correct Answer: C

Explanation: Both classes can attack tissues and materials; they must be handled with care.

8. Aqueous solutions of acids and of bases typically:

(A) never conduct electricity
(B) conduct only if they are gases
(C) conduct only if they are solids
(D) conduct electricity because they contain ions

Correct Answer: D

Explanation: This is correct because mobile ions in water carry the current.

9. Brønsted–Lowry (1923) defined an acid as a:

(A) proton donor
(B) proton acceptor
(C) electron-pair acceptor only in this chapter
(D) source of OH□ only

Correct Answer: A

Explanation: This is correct because the acid gives away H□ (a proton) to a base.

10. Brønsted–Lowry defined a base as a:

(A) proton donor
(B) proton acceptor
(C) source of H□ only
(D) substance that always turns blue litmus red

Correct Answer: B

Explanation: The base takes the proton that the acid donates.

11. Water is amphoteric in the Brønsted–Lowry sense because it can:

(A) only donate protons
(B) never react with HCl or NH□
(C) both donate and accept protons
(D) only produce electrons

Correct Answer: C

Explanation: Water accepts H□ from HCl and donates H□ to NH□.

12. HCl + H□O → H□O□ + Cl□ shows water acting as a:

(A) proton donor
(B) strong alkali like NaOH
(C) insoluble base
(D) proton acceptor (base)

Correct Answer: D

Explanation: H□O takes the proton from HCl and becomes H□O□.

13. NH□ + H□O → NH□□ + OH□ shows water acting as a:

(A) proton donor (acid)
(B) proton acceptor only
(C) strong acid like HCl

(D) spectator sulfate

Correct Answer: A

Explanation: This is correct because h□O gives a proton to ammonia, leaving OH□ in solution.

14. H□O□ is the hydronium ion formed when:

(A) OH□ gains a proton
(B) H□ is transferred to a water molecule
(C) ammonia accepts a proton only
(D) a metal oxide dissolves in oil

Correct Answer: B

Explanation: The proton from the acid does not stay as a free bare H□ in water; it bonds to H□O.

15. Strong acids such as HCl, HNO□, and H□SO□:

(A) ionize only about 5% in water
(B) never produce H□
(C) ionize completely (or virtually completely) in water
(D) are insoluble bases

Correct Answer: C

Explanation: Complete ionization is what "strong" means for these acids.

16. Ethanoic acid CH□COOH is a weak acid because it ionizes only about:

(A) 100%
(B) 0% always
(C) 50% as a strong alkali
(D) 5%

Correct Answer: D

Explanation: This is correct because only a small fraction of the molecules donate protons at equilibrium.

17. Strong bases include NaOH, KOH, and:

(A) Ca(OH)□
(B) NH□
(C) Al(OH)□ as a fully soluble alkali
(D) CH□COOH

Correct Answer: A

Explanation: Calcium hydroxide is listed among the strong bases that supply OH□ effectively.

18. Ammonia NH□ is a:

(A) strong acid
(B) weak base
(C) strong alkali like NaOH
(D) insoluble salt only

Correct Answer: B

Explanation: NH□ accepts protons only to a limited extent, so it is a weak base.

19. Al(OH)□ is classified as a:

(A) strong alkali fully like NaOH
(B) strong acid
(C) weak base (and it is also poorly soluble)
(D) hydronium ion

Correct Answer: C

Explanation: Aluminium hydroxide is a weak, typically insoluble base.

20. An alkali is a base that is:

(A) insoluble in water
(B) always a gas
(C) always CH□COOH

(D) soluble in water

Correct Answer: D

Explanation: NaOH and KOH are alkalis; many metal hydroxides are bases but not alkalis.

21. Cu(OH)□, Al(OH)□, and Fe(OH)□ are examples of:

(A) insoluble bases
(B) water-soluble alkalis
(C) strong acids
(D) hydronium salts

Correct Answer: A

Explanation: They are bases that do not dissolve enough to count as alkalis.

22. Acid + metal (reactive) typically gives:

(A) salt + carbon dioxide only
(B) salt + hydrogen
(C) salt + ammonia only
(D) water + CO□ only

Correct Answer: B

Explanation: The metal displaces hydrogen from the acid.

23. Acid + carbonate typically gives:

(A) salt + hydrogen only
(B) salt + ammonia
(C) salt + water + carbon dioxide
(D) only a metal oxide

Correct Answer: C

Explanation: Carbonates fizz with acid as CO□ is released.

24. Acid + base neutralization typically gives:

(A) salt + hydrogen
(B) salt + ammonia + water only for every acid–base pair
(C) only carbon dioxide
(D) salt + water

Correct Answer: D

Explanation: This is correct because h□ and OH□ (or oxide) combine to water while the salt remains.

25. A base heated with an ammonium salt typically gives:

(A) a salt + ammonia + water
(B) hydrogen gas only
(C) only CO□
(D) only Cl□

Correct Answer: A

Explanation: Ammonia is displaced from the ammonium salt by the stronger base.

26. Acid rain contains extra acidity mainly from:

(A) only ethanoic acid from vinegar factories
(B) HNO□ and H□SO□ formed from air pollutants
(C) only sugar solutions
(D) only ammonia

Correct Answer: B

Explanation: This is correct because nitrogen and sulfur oxides lead to nitric and sulfuric acids in rain.

27. Acid rain damages metals and also attacks:

(A) only noble gases
(B) only gold always unharmed as the only effect
(C) carbonate building materials such as limestone and marble

(D) only nitrogen gas

Correct Answer: C

Explanation: Carbonates dissolve with acid, so stonework can be eaten away.

28. A metal oxide plus water can produce a:

(A) strong acid always
(B) hydronium ion as the oxide itself
(C) hydrocarbon
(D) hydroxide (a base/alkali if soluble)

Correct Answer: D

Explanation: Na□O or CaO with water gives the corresponding hydroxide.

29. Amphoteric oxides/hydroxides listed include Al□O□, Al(OH)□, ZnO, and:

(A) Zn(OH)□
(B) NaOH only
(C) HCl
(D) CH□COOH

Correct Answer: A

Explanation: Zinc hydroxide, like aluminium hydroxide, can react with both acids and strong alkalis.

30. Amphoteric means the substance can react with:

(A) only acids
(B) both acids and bases
(C) only water as a solvent with no acid or base
(D) only carbonates

Correct Answer: B

Explanation: This is correct because al□O□ and ZnO show both acidic and basic behaviour.

31. A laboratory use of HCl is:

(A) making soap as NaOH does
(B) as the main antacid Mg(OH)□
(C) cleaning metals / removing oxide scale
(D) as a fertilizer identically to HNO□'s listed use only

Correct Answer: C

Explanation: Hydrochloric acid is used to pickle or clean metal surfaces.

32. HNO□ is used in making:

(A) only soap
(B) only antacid tablets
(C) only metal-cleaning HCl baths
(D) fertilizers and explosives

Correct Answer: D

Explanation: Nitric acid is a key industrial acid for nitrogen fertilizers and explosives.

33. H□SO□ is described as widely used in the:

(A) chemical industry as a major industrial acid
(B) manufacture of soap as the alkali
(C) only as an antacid
(D) only as a metal-cleaning household vinegar

Correct Answer: A

Explanation: Sulfuric acid is a bulk chemical used to make many other substances.

34. NaOH is used in making:

(A) antacid milk of magnesia only
(B) soap
(C) only marble statues

(D) only HCl gas

Correct Answer: B

Explanation: Sodium hydroxide is the alkali in soap manufacture.

35. Mg(OH)□ is used as an:

(A) explosive like some HNO□ products
(B) metal-cleaning strong acid
(C) antacid
(D) Contact-process catalyst

Correct Answer: C

Explanation: Milk of magnesia is a weakly alkaline suspension that neutralizes excess stomach acid.

36. Litmus is red in acid and blue in alkali, so a solution that turns red litmus blue is:

(A) acidic
(B) always a strong acid
(C) always CH□COOH
(D) basic/alkaline

Correct Answer: D

Explanation: That is the base colour change of red litmus.

37. A solution that turns blue litmus red is:

(A) acidic
(B) alkaline
(C) always NaOH
(D) always an insoluble base

Correct Answer: A

Explanation: That is the acid colour change of blue litmus.

38. Both acids and bases in water conduct because ionization or dissociation produces:

(A) only molecules with no charge
(B) ions that can move
(C) only noble-gas atoms
(D) only uncharged sugar

Correct Answer: B

Explanation: Electrical conductivity of the solution is evidence of ions.

39. HCl is a strong acid; CH□COOH is weak. The difference is the:

(A) colour of litmus, which only weak acids affect
(B) fact that only HCl contains hydrogen
(C) extent of ionization in water
(D) fact that only ethanoic acid can neutralize a base

Correct Answer: C

Explanation: Strength is about how completely the acid donates protons, not whether it is an acid at all.

40. NaOH is a strong alkali; NH□ is a weak base. The difference is how completely they:

(A) turn into HCl
(B) form carbon dioxide
(C) rust iron
(D) produce OH□ (or accept protons) in water

Correct Answer: D

Explanation: NaOH is fully dissociated; ammonia is only partly protonated.

41. Ca(OH)□ is a strong base and, because it dissolves enough to give OH□, it is also an:

(A) alkali
(B) insoluble carbonate
(C) strong acid

(D) hydronium ion

Correct Answer: A

Explanation: Limewater is aqueous calcium hydroxide, a soluble base.

42. Cu(OH)□ is a base but not an alkali because it is:

(A) fully like NaOH in water
(B) insoluble (or only sparingly soluble) in water
(C) a strong acid
(D) always a gas

Correct Answer: B

Explanation: Alkali is reserved for water-soluble bases.

43. Zn + 2HCl → ZnCl□ + H□ is an example of acid plus:

(A) carbonate
(B) ammonium salt
(C) metal
(D) metal oxide only

Correct Answer: C

Explanation: The salt is zinc chloride and the gas is hydrogen.

44. CaCO□ + 2HCl → CaCl□ + H□O + CO□ is acid plus:

(A) a reactive metal only
(B) ammonia
(C) an alkali producing H□ only
(D) a carbonate

Correct Answer: D

Explanation: The gas that turns limewater milky is carbon dioxide.

45. HCl + NaOH → NaCl + H□O is:

(A) neutralization (acid plus alkali)
(B) acid plus metal giving hydrogen
(C) acid plus carbonate giving CO□
(D) base plus ammonium salt giving NH□

Correct Answer: A

Explanation: Neutralization products are a salt and water from acid plus alkali.

46. Ca(OH)□ + 2NH□Cl → CaCl□ + 2NH□ + 2H□O illustrates base plus:

(A) carbonate
(B) ammonium salt
(C) a free metal giving H□
(D) HNO□ making explosives only

Correct Answer: B

Explanation: Ammonia gas is released from the ammonium salt.

47. Oxides of nitrogen and sulfur in the air lead to acid rain as they form:

(A) only NaOH
(B) only Mg(OH)□ antacid
(C) HNO□ and H□SO□
(D) only soap

Correct Answer: C

Explanation: Those two strong acids are the acids named for acid rain.

48. Limestone buildings suffer in acid rain because limestone is mainly:

(A) sodium hydroxide
(B) pure aluminium metal that cannot react
(C) an alkali like KOH

(D) a carbonate ($CaCO_3$) that reacts with acid

Correct Answer: D

Explanation: This is correct because acid plus carbonate chemistry attacks the stone.

49. $Na_2O + H_2O \rightarrow 2NaOH$ shows a metal oxide forming an:

(A) alkali (soluble hydroxide)
(B) acid
(C) insoluble $Cu(OH)_2$
(D) ammonium salt

Correct Answer: A

Explanation: Sodium oxide is a basic oxide that gives sodium hydroxide with water.

50. Al_2O_3 reacting with both HCl and NaOH is evidence that Al_2O_3 is:

(A) only a strong acid
(B) amphoteric
(C) only an alkali like NaOH
(D) a hydronium ion

Correct Answer: B

Explanation: Amphoteric oxides work with acids and with strong bases.

51. ZnO similarly reacts with acids and with alkalis, so ZnO is:

(A) only a carbonate
(B) a strong binary acid like HCl
(C) amphoteric
(D) always insoluble and inert

Correct Answer: C

Explanation: Zinc oxide is grouped with aluminium oxide as amphoteric.

52. HCl used for metal cleaning works because acid plus metal oxide/scale can give:

(A) only ammonia
(B) only soap
(C) only antacid
(D) a soluble salt (and often water), removing the coating

Correct Answer: D

Explanation: The oxide coating dissolves as a chloride salt.

53. Fertilizer manufacture using HNO_3 depends on nitric acid's:

(A) role as a strong acid that supplies nitrate for plant nutrients
(B) ability to make soap
(C) use as milk of magnesia
(D) property of turning red litmus blue

Correct Answer: A

Explanation: Nitrate salts from nitric acid are nitrogen fertilizers.

54. Soap making needs a strong alkali such as:

(A) HCl
(B) NaOH
(C) CH_3COOH
(D) HNO_3

Correct Answer: B

Explanation: This is correct because sodium hydroxide saponifies fats and oils.

55. An antacid based on $Mg(OH)_2$ works by:

(A) adding extra stomach HCl
(B) oxidizing the stomach like $KMnO_4$
(C) neutralizing excess acid with a weakly alkaline hydroxide

(D) forming acid rain

Correct Answer: C

Explanation: This is correct because the hydroxide ions (or the base) cancel surplus H□.

56. Arrhenius definitions require water because H□ and OH□ are specified as appearing in:

(A) the gas phase only with no solvent
(B) pure solid NaCl only
(C) liquid mercury only
(D) aqueous solution

Correct Answer: D

Explanation: The 1887 definitions are water-centred.

57. Brønsted–Lowry definitions are wider than Arrhenius because they describe proton transfer even when:

(A) the base is not an OH□ substance, as with NH□
(B) no acid exists
(C) litmus cannot be used ever
(D) no ions can form in any solvent

Correct Answer: A

Explanation: Ammonia is a base by accepting H□ even though it is not Arrhenius OH□ to start with.

58. In HCl + H□O, HCl is the Brønsted acid and Cl□ is the:

(A) hydronium ion
(B) species left after the proton is donated
(C) alkali NaOH
(D) insoluble base

Correct Answer: B

Explanation: This is correct because after HCl donates H□, chloride remains.

59. In NH□ + H□O, NH□ is the Brønsted base and NH□□ is the:

(A) hydroxide ion
(B) strong acid H□SO□
(C) protonated ammonia
(D) metal oxide

Correct Answer: C

Explanation: Ammonium ion is ammonia after it has accepted a proton.

60. Complete ionization of H□SO□ in water means virtually all of the acid molecules have:

(A) failed to produce ions
(B) turned into NH□
(C) become insoluble Cu(OH)□
(D) produced ions (it is a strong acid)

Correct Answer: D

Explanation: Strong sulfuric acid is a fully ionizing acid in the Grade 9 treatment.

61. About 5% ionization of ethanoic acid means most CH□COOH molecules remain:

(A) uncleaved molecules in the mixture
(B) fully split into ions like HCl
(C) strong alkali
(D) amphoteric ZnO

Correct Answer: A

Explanation: Weak acids are only slightly ionized.

62. KOH is grouped with NaOH as a:

(A) weak acid
(B) strong alkali

(C) insoluble base like Fe(OH)□
(D) carbonate

Correct Answer: B

Explanation: Potassium hydroxide is a water-soluble strong base.

63. Fe(OH)□ is grouped with Cu(OH)□ as an:

(A) alkali like NaOH
(B) strong acid
(C) insoluble base
(D) nitric acid fertilizer

Correct Answer: C

Explanation: Iron(III) hydroxide does not dissolve as an alkali.

64. Hydrogen gas from acid + metal can be recognised in other chapters by a pop; here the products named are:

(A) salt and CO□
(B) salt, water, and NH□ only
(C) only water
(D) salt and H□

Correct Answer: D

Explanation: Hydrogen gas from acid + metal can be recognised in other chapters by a pop; here the products named are salt and H□.

65. Carbon dioxide from acid + carbonate is the same gas as in the limewater test; the extra product besides salt and CO□ is:

(A) water
(B) hydrogen always
(C) ammonia always
(D) chlorine

Correct Answer: A

Explanation: This is correct because acid + carbonate → salt + water + carbon dioxide.

66. Neutralization heat is often noticed, but the chemical products of acid + alkali are:

(A) two acids
(B) a salt and water
(C) only hydrogen
(D) only a metal

Correct Answer: B

Explanation: That is the definition of neutralization in this chapter.

67. Ammonia from a base plus ammonium salt is the same NH□ that is a:

(A) strong acid
(B) insoluble Fe(OH)□
(C) weak base in water
(D) strong alkali fully like KOH

Correct Answer: C

Explanation: This is correct because the displaced gas dissolves to give a weakly alkaline solution.

68. Acid rain on iron railings is damaging because acids attack:

(A) only noble-gas fillings
(B) only soap
(C) only antacids
(D) metals (and also carbonates)

Correct Answer: D

Explanation: Both metal corrosion and carbonate erosion are listed effects.

69. CaO + H□O → Ca(OH)□ is lime reacting with water to give slaked lime, an:

(A) alkali/base hydroxide
(B) acid
(C) ammonium salt
(D) hydronium ion

Correct Answer: A

Explanation: This is correct because a basic oxide has formed a hydroxide.

70. Al(OH)□ as amphoteric can neutralize acid and also dissolve in excess:

(A) sugar solution only
(B) strong alkali such as NaOH
(C) pure nitrogen
(D) helium

Correct Answer: B

Explanation: That dual behaviour is why it is amphoteric.

71. Zn(OH)□ matches Al(OH)□ as an amphoteric:

(A) strong binary acid
(B) Haber catalyst
(C) hydroxide
(D) fizzy-drink gas

Correct Answer: C

Explanation: Both hydroxides react with acids and with strong bases.

72. Industrial H□SO□ is not mainly an antacid; that household role belongs to:

(A) concentrated sulfuric acid
(B) HNO□ explosives
(C) HCl metal pickle baths as medicine
(D) Mg(OH)□

Correct Answer: D

Explanation: Magnesium hydroxide is the antacid on the uses list.

73. Soap manufacture is not a listed use of HCl; it is a use of:

(A) NaOH
(B) HNO□ only
(C) Mg(OH)□ only
(D) H□SO□ as the alkali

Correct Answer: A

Explanation: Sodium hydroxide is the alkali that saponifies fats and oils to make soap.

74. Metal cleaning is listed for HCl rather than for:

(A) any acid in the chapter
(B) NaOH soap or Mg(OH)□ antacid as the primary listed job
(C) HNO□ fertilizers only as cleaning
(D) H□SO□ chemicals only as pickle

Correct Answer: B

Explanation: Each acid/base on the uses list has a distinctive application.

75. Sour acids and bitter bases are sensory labels; both remain:

(A) safe to taste in every lab
(B) unable to affect indicators
(C) potentially corrosive, so tasting is not a lab method
(D) non-ionic in water always

Correct Answer: C

Explanation: Litmus and other tests replace tasting for identification.

76. Aqueous conduction of CH□COOH is weaker than that of HCl of similar concentration because ethanoic acid:

(A) has no hydrogen
(B) is a strong alkali
(C) is amphoteric ZnO
(D) produces fewer ions (it is weak)

Correct Answer: D

Explanation: Fewer ions mean poorer conductivity for the weak acid.

77. NH□(aq) conducts less well than NaOH(aq) of similar concentration because ammonia is:

(A) only partly ionized as a weak base
(B) a strong acid
(C) an insoluble carbonate
(D) pure water with no reaction

Correct Answer: A

Explanation: Limited NH□□ and OH□ means fewer charge carriers.

78. H□O□ in water is how the chapter represents the:

(A) hydroxide ion
(B) aqueous proton from an acid
(C) alkali NaOH molecule
(D) amphoteric oxide

Correct Answer: B

Explanation: Hydronium is the protonated water molecule.

79. OH□ from Arrhenius bases, or from NH□ + H□O, is the ion that turns:

(A) blue litmus red
(B) all indicators colourless always
(C) red litmus blue
(D) metals into carbonates only

Correct Answer: C

Explanation: Hydroxide is the alkaline ion that gives the base litmus change.

80. Which trio are strong acids in this chapter?

(A) CH□COOH, NH□, H□O
(B) NaOH, KOH, Ca(OH)□
(C) Cu(OH)□, Al(OH)□, Fe(OH)□
(D) HCl, HNO□, H□SO□

Correct Answer: D

Explanation: This is correct because those three mineral acids ionize completely in water.

B. Less Important / Secondary Topics

81. The year 1887 in this chapter is linked with:

(A) Arrhenius H□/OH□ definitions
(B) Brønsted–Lowry proton theory
(C) the Haber iron catalyst
(D) standard 25 °C enthalpy

Correct Answer: A

Explanation: This is correct because arrhenius proposed the water-ion definitions then.

82. The year 1923 is linked with:

(A) Arrhenius only
(B) Brønsted–Lowry acid–base theory
(C) rusting of iron

(D) mole concept

Correct Answer: B

Explanation: Proton donor/acceptor definitions date from 1923.

83. Blue to red with litmus diagnoses:

(A) a base
(B) a neutral salt always
(C) an acid
(D) an alkali like KOH

Correct Answer: C

Explanation: That is the acid test with blue litmus.

84. Red to blue with litmus diagnoses:

(A) an acid
(B) pure sugar water always
(C) a strong acid like HCl
(D) a base/alkali

Correct Answer: D

Explanation: That is the alkaline test with red litmus.

85. Sour versus bitter is the taste pair for:

(A) acid versus base
(B) salt versus water only
(C) metal versus carbonate
(D) strong versus weak ionization numbers only

Correct Answer: A

Explanation: Acids are described as sour while bases are described as bitter.

86. Amphoteric water in HCl + H□O is behaving as a:

(A) proton donor
(B) base (proton acceptor)
(C) strong alkali solid
(D) insoluble hydroxide

Correct Answer: B

Explanation: It accepts the proton from hydrogen chloride.

87. Amphoteric water in NH□ + H□O is behaving as an:

(A) proton acceptor only
(B) Arrhenius OH□ solid
(C) acid (proton donor)
(D) HNO□ molecule

Correct Answer: C

Explanation: Water donates a proton to ammonia and therefore acts as a Brønsted acid.

88. Which acid is weak in the chapter's list?

(A) HCl
(B) HNO□
(C) H□SO□
(D) CH□COOH

Correct Answer: D

Explanation: Ethanoic acid is the ~5% ionized example.

89. Which base is weak among NaOH, KOH, Ca(OH)□, and NH□?

(A) NH□
(B) NaOH
(C) KOH

(D) Ca(OH)□

Correct Answer: A

Explanation: Ammonia is the weak base; the hydroxides named are strong.

90. Which hydroxide is an alkali?

(A) Cu(OH)□
(B) NaOH
(C) Fe(OH)□
(D) Al(OH)□ as a typical alkali

Correct Answer: B

Explanation: This is correct because sodium hydroxide dissolves to give a strongly alkaline solution.

91. Which hydroxide is not an alkali?

(A) KOH
(B) NaOH
(C) Cu(OH)□
(D) Ca(OH)□ as limewater

Correct Answer: C

Explanation: Copper(II) hydroxide is an insoluble base.

92. Acid + Zn gives hydrogen; acid + CaCO□ gives:

(A) hydrogen as well always
(B) only ammonia
(C) only soap
(D) carbon dioxide

Correct Answer: D

Explanation: The carbonate reaction is the CO□-producing one.

93. Neutralization products are salt and water; base + ammonium salt products include:

(A) ammonia (and water and a salt)
(B) only H□
(C) only CO□
(D) only Cl□

Correct Answer: A

Explanation: Ammonia is the distinctive extra product.

94. Acid rain's named acids are nitric acid and:

(A) ethanoic acid
(B) sulfuric acid
(C) hydrochloric acid from the stomach only
(D) boric acid

Correct Answer: B

Explanation: Nitric acid and sulfuric acid are the two acids named for acid rain.

95. A basic oxide plus water yields a hydroxide; an example is:

(A) CO□ + H□O as a metal oxide
(B) SO□ + H□O as sodium oxide
(C) Na□O + H□O → 2NaOH
(D) NO□ as CaO

Correct Answer: C

Explanation: Sodium oxide is a metal oxide that makes an alkali.

96. Al□O□, Al(OH)□, ZnO, and Zn(OH)□ are grouped as:

(A) strong acids only
(B) always alkalis like KOH
(C) always insoluble carbonates

(D) amphoteric oxides/hydroxides

Correct Answer: D

Explanation: They react with both acids and bases.

97. HCl's listed use is metal cleaning; HNO□'s listed uses include:

(A) fertilizers and explosives
(B) soap only
(C) antacid tablets
(D) only marble sculpture

Correct Answer: A

Explanation: Nitric acid is tied to nitrogen products including explosives.

98. NaOH's listed use is soap; Mg(OH)□'s listed use is:

(A) metal pickling as the main acid
(B) antacid
(C) Contact-process catalyst
(D) making HNO□ explosives

Correct Answer: B

Explanation: Magnesium hydroxide is milk of magnesia.

99. H□SO□'s listed role is as a major acid in the:

(A) antacid bottle
(B) soap kettle as the alkali
(C) chemical industry
(D) only household vinegar

Correct Answer: C

Explanation: Sulfuric acid is the bulk industrial acid of the uses list.

100. Complete ionization versus ~5% ionization is strong versus:

(A) alkali
(B) amphoteric oxide
(C) carbonate
(D) weak acid (ethanoic)

Correct Answer: D

Explanation: Those figures distinguish HCl-type acids from CH□COOH.

101. Arrhenius bases must provide OH□ in water; Brønsted bases need only:

(A) accept a proton
(B) contain hydroxide in their formula already always
(C) turn blue litmus red
(D) fizz with carbonates

Correct Answer: A

Explanation: NH□ has no OH in the formula yet is a Brønsted base.

102. Corrosive describes both acids and bases; therefore lab identification should use:

(A) tasting
(B) indicators such as litmus, not tasting
(C) drinking the sample
(D) skin testing

Correct Answer: B

Explanation: Indicators are the safe colour tests.

103. Aqueous NaOH conducts well because it is a strong alkali fully providing:

(A) H□O□ as the main ion
(B) only molecules of sugar
(C) Na□ and OH□ ions

(D) only CO□

Correct Answer: C

Explanation: Sodium and hydroxide ions are the charge carriers that let the solution conduct.

104. Aqueous HCl conducts well because it is a strong acid fully providing:

(A) OH□ as the main ion from HCl itself
(B) only NH□
(C) only ZnO
(D) H□O□ (and Cl□)

Correct Answer: D

Explanation: Hydronium and chloride are the ions from complete ionization.

105. Marble damaged by acid rain is the same carbonate chemistry as:

(A) acid + carbonate → salt + water + CO□
(B) acid + metal → H□
(C) base + ammonium salt → NH□
(D) oxide + water → alkali only

Correct Answer: A

Explanation: CaCO□ in marble reacts like any carbonate with acid.

106. Amphoteric Al(OH)□ can act as a base toward HCl and as an acid toward:

(A) more HCl only
(B) NaOH
(C) N□ gas
(D) He

Correct Answer: B

Explanation: This is correct because excess strong alkali dissolves aluminium hydroxide.

107. Which word equation is acid + metal?

(A) acid + carbonate → salt + water + CO□
(B) acid + base → salt + water
(C) acid + metal → salt + H□
(D) base + ammonium salt → salt + NH□ + H□O

Correct Answer: C

Explanation: This is correct because hydrogen gas marks the metal reaction.

108. Which word equation is neutralization?

(A) acid + metal → salt + H□
(B) acid + carbonate → salt + water + CO□
(C) base + ammonium salt → salt + NH□ + H□O
(D) acid + base → salt + water

Correct Answer: D

Explanation: Salt and water with no H□ or CO□ is the neutralization pattern.