

Science

Prep.1

Second Term 2024 - 2025

February Revision

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Unit One

* طبقاً لأخر تعديل في المادة للعام الدراسي 2024-2025



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✱ (1) Write the scientific term:

- 1) Elements that have metallic luster and are good conductors of heat and electricity. (.....)

- 2) A nonmetallic element that is a good conductor of electricity. (.....)

- 3) The attraction force between positive metal ions and the negative valence electron cloud which surrounds them. (.....)

- 4) A mixture composed of the melts of two metals or more. (.....)

- 5) An ion composed of more than one atom of more than one element. (.....)

- 6) A substance whose dissolution in water leads to an increase in the percentage of H^+ cations in the solution. (.....)

- 7) A substance whose dissolution in water leads to an increase in the percentage of OH^- anions in the solution. (.....)

- 8) Metal oxides, some of which dissolve in water forming alkalis. (.....)

- 9) Nonmetal oxides that dissolve in water forming acids. (.....)

- 10) Rains which result from the dissolution of acidic oxides in the atmospheric water vapor. (.....)

- 11) Chemical substances whose colour differs in acidic medium from that in alkaline medium. (.....)

- 12) An indicator that can differentiate between the different acids or the different alkalis according to their strength. (.....)

- 13) A scale ranging between the values 0 to 14, and used to determine the acidity and the basicity of solutions. (.....)

- 14) A device used to measure the pH value of solutions directly and accurately. (.....)

- 15) Compounds, mostly ionic, formed from the combination of an alkali cation with an acid anion. (.....)

*(2) Choose the right answer:

1. What is the similarity between metals and nonmetals ?

- a. They do not have metallic luster.
- b. They are good conductors of heat.
- c. They are malleable, ductile and formable.
- d. The last energy level in their atoms is not filled with electrons.

2. All the following are properties of graphite, except that it

- a. is brittle.
- b. is a bad electrical conductor nonmetal.
- c. is black in colour.
- d. does not have metallic luster.

3. The liquid element that has metallic luster is

- a. mercury.
- b. bromine.
- c. lithium.
- d. chlorine.

4. The bronze alloy is formed by adding a small percentage of metal (X) to metal (Y). Which of the following identifies the metals (X) and (Y)?

- a. (X): Copper, (Y): Tin.
- b. (X): Copper, (Y): Sulphur.
- c. (X): Sulphur, (Y): Copper.
- d. (X): Tin, (Y): Copper.

5. Which of the following is the correct arrangement of the hardness of sodium $_{11}\text{Na}$, magnesium $_{12}\text{Mg}$ and aluminum $_{13}\text{Al}$?

- a. $\text{Na} > \text{Mg} > \text{Al}$
- b. $\text{Al} > \text{Mg} > \text{Na}$
- c. $\text{Mg} > \text{Na} > \text{Al}$
- d. $\text{Al} > \text{Na} > \text{Mg}$

6. The last energy level of metal atoms contains

- a. 1 : 3 electrons.
- b. 3 : 5 electrons.
- c. 5 : 7 electrons.
- d. 8 electrons.

7. Which of the following represents pure silver element ?

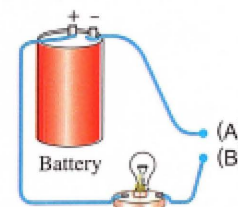
- a. Soft, conducts heat, opaque.
- b. Conducts heat, has metallic luster, brittle.
- c. Soft, conducts heat, has metallic luster.
- d. Conducts electricity, opaque, brittle.

8. The liquid element which is bad conductor of heat and electricity is

- a. bromine.
- b. chlorine.
- c. mercury.
- d. lithium.

9. In the opposite electrical circuit : Which of the following substances, when connected to the points (A) and (B), will light the bulb?

- a. Graphite and sulphur.
- b. Sulphur and copper.
- c. Graphite and aluminum.
- d. Graphite and bromine.



10. The hardest element of the following is

- a. $_{13}\text{Al}$
- b. $_{17}\text{Cl}$
- c. $_{12}\text{Mg}$
- d. $_{11}\text{Na}$

11. Copper is a component of the bronze alloy, its percentage is

- a. 5%
- b. 15%
- c. 65%
- d. 95%

12. Which of the following atomic groups carries the same charge as hydroxide group?

- a. Ammonium.
- b. Nitrate.
- c. Sulphate.
- d. Phosphate.

13. The combination of hydrogen with each of the following nonmetals produces acids, except

- a. chlorine. b. bromine. c. oxygen. d. iodine.

14. Element (X) forms the oxide XO which reacts with acids. Which of the following represents (X) and XO ?

- a. (X): Metal, XO: Acidic oxide. b. (X): Nonmetal, XO: Acidic oxide.
c. (X): Metal, XO: Basic oxide. d. (X): Nonmetal, XO: Basic oxide.

15. On dissolving calcium oxide in water, and placing two litmus strips in the solution, the colour of one of them changes into

- a. red. b. purple. c. blue. d. yellow.

16. All the molecular formulas of the following ions are correct, except

- a. sulphate SO_4^{2-} b. phosphate PO_4^{3-}
c. hydride OH^- d. nitrite NO_2^-

17. The molecular formula of hydrochloric acid is

- a. HCl b. HClO c. HClO_2 d. HClO_3

18. The correct name of H_2SO_4 acid is

- a. sulphuric acid. b. hypochloric acid.
c. sulphurous acid. d. hypochlorous acid.

19. Acids can contain the following atomic groups, except

- a. carbonate group. b. sulphate group.
c. nitrate group. d. hydroxide group.

20. Which of the following substances are acids ?

- a. Lemon and baking soda. b. Ketchup and grapes.
c. Soap and toothpaste. d. Detergents and ketchup.

21. The ion which is responsible for the acidic properties is

- a. NH^+ b. O_2^- c. H^+ d. OH^-

22. Each of the following expresses the solution of HI acid, except

- a. gas dissolved in water. b. it turns blue litmus strip to red.
c. it reacts with HCl acid. d. it contains H^+ ions.

23. Dissolving sulphuric acid H_2SO_4 in water produces

- a. H^+ cations and SO_3^{2-} anions. b. H^+ cations and $\text{S}_2\text{O}_3^{2-}$ anions.
c. H^+ cations and S^{2-} anions. d. H^+ cations and SO_4^{2-} anions.

24. All the following acids are strong, except

- a. nitric acid. b. acetic acid.
c. sulphuric acid. d. hydrochloric acid.

25. The compound which is used in antacids is

- a. MgCl_2 b. $\text{Mg}(\text{OH})_2$ c. H_2CO_3 d. NaO_2

26. Among the basic oxides is

- a. SO_2 b. SO_3 c. NaO_2 d. Na_2O

27. All the following are properties of alkalis, except

- a. they contain OH^- ions.
 b. they turn red litmus strip to blue.
 c. they can react with sodium hydroxide solution.
 d. they can react with hydrochloric acid solution.

28. When hydrochloric acid HCl reacts with sodium hydroxide NaOH , the formed salt is

- a. NaCl_2 b. H_2O c. Na_2O d. NaCl

29. pH value of a solution is changed from 8 to 5, that means it was

- a. acidic and becomes alkaline. b. acidic and becomes neutral.
 c. alkaline and becomes neutral. d. alkaline and becomes acidic.

30. Among the basic gases is

- a. NH_3 b. O_2 c. H_2 d. CO_2

31. On dissolving CO_2 gas in water, a solution is formed that changes the colour of the universal indicator strip. What is the type of the formed solution, What is the ion which causes the colour change in the indicator?

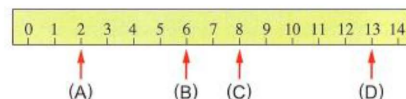
- a. Acidic, OH^- b. Alkaline, OH^-
 c. Acidic, H^+ d. Alkaline, H^+

32. The solution with pH equals 1 is

- a. strong alkali. b. weak alkali.
 c. strong acid. d. weak acid.

33. The opposite figure shows the pH values of four different solutions. The strongest alkali is

- a. (A). b. (B).
 c. (C). d. (D).



34. pH of acid rains can be equals

- a. 5 b. 7 c. 9 d. 11

35. Which of the following substances are acidic ?

- a. Bleach and hand soap. b. Bananas and tomatoes.
 c. Milk and eggs. d. Lemon and baking soda.

36. The following substances have pH greater than 7, except

- a. oven cleaners. b. calcium hydroxide solution.
 c. ammonia solution. d. grape juice.

37. The combination of Mg^{+2} cation with CO_3^{2-} anion, forms

- a. an acid. b. an alkali. c. an oxide. d. a salt.

***(4) Complete the following:**

1. The elements are bad conductors of heat and electricity, except which is a good conductor of electricity.
2. are characterized by being ductile, malleable and formable, while are characterized by being brittle (not ductile or malleable or formable).
3. As the number of valence electrons of the metal atom increase, the strength of its metallic bond
4. group has a positive charge.
5. The molecular formula of an acid begins with the symbol of cation, while the molecular formula of an alkali ends with the symbol of anion.
6. Hydrobromic acid is composed of cation and anion.
7. Lemon is, while the grease cleaner is
8. When acids dissolve in water, the percentage of cations in the solution increases, while when alkalis dissolve in water, the percentage of anions increases.
9. is a strong alkali, while is a weak acid.
10. Oxides are divided into oxides and oxides.
11. The dissolution of oxides in water forms acids, while the dissolution of oxides in water forms alkalis.
12. When an acid reacts with an alkali, and are produced.
13. Carbon dioxide gas changes the colour of the litmus strip to colour.
14. The strength of the alkaline solution increases as the pH value approaches, while the strength of the acidic solution increases as the pH value approaches
15. A change in the pH value of a solution from 3 to 7 means that it was and become
16. The name of any salt begins with the name of the followed by the name of the which forms it.
17. The molecular formula of nickel chloride salt is

*** (5) Give reasons for:**

1. The melting point of magnesium is higher than that of sodium.
.....
2. Magnesium $_{12}\text{Mg}$ is a metallic element, while sulphur $_{16}\text{S}$ is a nonmetallic element.
.....
3. Graphite is used in dry cells despite being a nonmetal.
.....
4. Aluminum $_{13}\text{Al}$ is harder and has a higher melting point than sodium $_{11}\text{Na}$
.....
5. Alloys are preferred to use in industry instead of pure metals.
.....
6. The bronze alloy is used in jewelry and statues instead of copper metal.
.....
7. The total charge of the molecule of any compound equals zero.
.....
8. It is possible to distinguish between acids and alkalis by using litmus strips.
.....

*** (6) What happens when:**

1. A piece of sulphur is hammered.
.....
2. The number of valence electrons in metal atoms increases "In order to: Their melting points".
.....
3. A metal melt is added to another metal melt.
.....
4. Calcium hydroxide Ca(OH)_2 dissolves in water.
.....
5. Hydrogen chloride gas HCl dissolves in water.
.....
6. A red litmus strip is placed in a beaker containing sodium hydroxide solution.
.....
7. Magnesium burns in the presence of oxygen, then the product dissolves in water.
.....
8. Sulphur burns in the presence of oxygen, then the product dissolves in water.
.....
9. Acids react with alkalis.
.....
10. Fossil fuels burn in factories and cars.
.....
11. Sulphur and nitrogen oxides dissolve in the water of the rains.
.....

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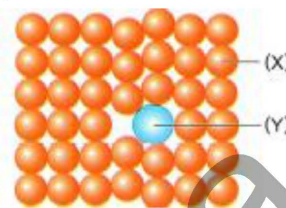
***(7) Problems:**

1 Study the following figures, then answer the questions:

1. The opposite figure illustrates the composition of the bronze alloy:

(1) What are the elements (X) and (Y) ?

(2) Why are alloys preferred to be used more than the pure metals ?



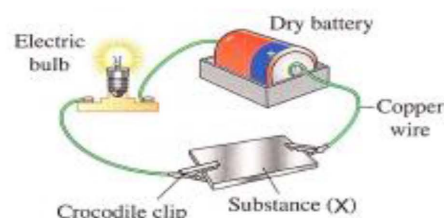
2 Cross out the odd out:

1. Magnesium / Copper/ Mercury/ Silver.
2. Hydrochloric acid / Acetic acid / Carbon dioxide gas /Ammonia gas.
3. H₂ / Cl₂ / O₂ / N₂
4. Sodium hydroxide / Baking soda /Vinegar/ Hand soap.
5. HBr / H₂O / H₂CO₃ / HNO₃
6. Lemon / Baking soda / Ketchup / Grapes.
7. HNO₃ / HBr / NaOH / H₂SO₄
8. Ca(OH)₂ / CO₂ / KOH / Mg(OH)₂

3 In the opposite figure:

What happens to illuminate the bulb, with explanation when the substance (X) is replaced with each of the following :

- (1) A piece of graphite.
- (2) A piece of sulphur.



4 Write the molecular formulas of the salts composed of the cations and anions:

- | | |
|---|--|
| (1) K ⁺ , PO ₄ ³⁻ | (2) Al ³⁺ , SO ₄ ²⁻ |
| (3) NH ₄ ⁺ , NO ₃ ⁻ | (4) Mg ²⁺ , CO ₃ ²⁻ |
| (5) Na ⁺ , Cl ⁻ | (6) Ba ²⁺ , CO ₃ ²⁻ |
| (7) NH ₄ ⁺ , Cl ⁻ | (8) NH ₄ ⁺ , PO ₄ ³⁻ |
| (9) Mg ²⁺ , SO ₄ ²⁻ | (10) Ag ⁺ , Cl ⁻ |

5 Study the following figures, then answer the questions:

From the two opposite figures :

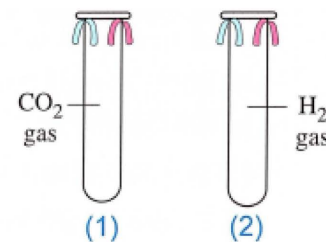
(1) What happens to the litmus strips wetted with water in tube (1) ?

What can be concluded from that ?

(2) What is the effect of H₂ gas on the wetted litmus strips in tube (2)?

State the names of two other gases that have the same effect.

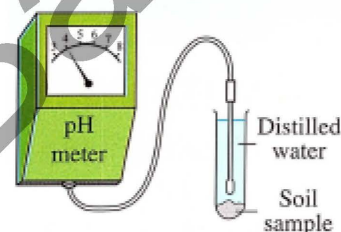
(3) What happens when H₂ gas in tube (2) is replaced with chlorine gas Cl₂ ?



6 The device illustrated in the opposite figure is used to measure the acidity or basicity of agricultural soil :

1. What is the type of this soil? Explain.

2. How can this soil be treated ?



7 The following figures illustrate the ions of some elements and atomic groups:



Write the name and the molecular formula of the salt resulting from the combination of:

1. Ion (1) with Ion (5).

2. Ion (3) with Ion (2).

3. Ion (6) with Ion (4).

8 Write the names of the following acids and alkalis :

1. H₂CO₃

2. HF

3. Mg(OH)₂

4. LiOH.....

5. H₂SO₄.....

6. NH₄OH

9 Give one example for each of the following :

1. A negatively charged atomic group.
2. A strong acid.
3. An atomic group with a charge of -2
4. An oxyacid.
5. A weak acid.
6. A strong alkali.

10 Write the chemical formula for each of the following:

1. Hydrobromic acid.
2. Nitric acid.
3. Lithium hydroxide.
4. Carbonic acid.
5. Sodium hydroxide.

Model Answer

* (1) Write the scientific term:

1. Metals	4. Alloy	7. Alkali	10. Acidic rains	13. pH
2. Graphite	5. Atomic group	8. Basic oxide	11. Indicator	14. pH meter
3. Metallic bond	6. Acids	9. Acidic oxide	12. Universal indicator	15. salt

* (2) Choose the right answer:

1. d	8. a	15. c	22. c	29. d	36. d
2. b	9. c	16. c	23. d	30. a	37. d
3. a	10. a	17. a	24. b	31. c	38. d
4. d	11. d	18. a	25. b	32. c	39. b
5. b	12. b	19. d	26. d	33. d	40. d
6. a	13. c	20. b	27. c	34. a	
7. c	14. c	21. c	28. d	35. b	

* (3) Put (√) or (X):

1. (√)	4. (X)	7. (X)	10. (X)	13. (X)
2. (X)	5. (X)	8. (√)	11. (√)	14. (X)
3. (X)	6. (X)	9. (X)	12. (X)	15. (X)

* (4) Complete the following:

1. Nonmetal - graphite	4. Ammonium	8. $H^+ - OH^-$	10. Acidic - basic	12. Salt - water	16. Cation - anion
2. Metals - nonmetals	5. $H^+ - OH^-$	9. Sodium hydroxide	11. Nonmetal (acidic) - metallic (basic)	13. Blue - red	17. $NiCl_2$
3. Increase	6. $H^+ - Br^-$	- acetic acid		14. 14 - 0	
	7. Acid - alkali			15. Acid - neutral	

* (5) Give reasons for:

- Because As the number of valence electrons in the metal atom increases, the strength of its metallic bond also increases and melting point increase.
- Because $_{12}Mg$ contain two electrons in the outermost energy level , while $_{16}S$ contain six electrons in outermost energy level.
- Graphite is the only good electrical conductor nonmetal.
- Because As the number of valence electrons in the metal atom increases, the strength of its metallic bond also increases and hardness increase.
- Because alloy is harder than pure metals.
- Because bronze alloy is more resistant to rusting.
- Because The number of hydroxide groups in the alkali molecule **equals** the magnitude of the charge of the cation (or the atomic group) that composes it.
- Because acid turns blue litmus paper into red , and alkalis turns red litmus paper into blue.

* (6) What happens when:

- The piece of sulphur crumbles easily
- The melting point will increase
- It will form alloy
- It forms alkaline solution
- It forms acidic solution
- The red litmus strip changes into blue
- It forms magnesium oxide (Basic oxide) which dissolves in water and form alkaline solution.
- It forms Sulphur oxide (acidic oxide) which dissolves in water and form acidic solution.
- It will form salt and water.
- It produces acidic gases such as NO_2 and SO_2 which dissolve it water vapour and form acidic rains.
- It forms acidic rains.

*(7) Problems:

1	<p>(1) * Element (X): Copper. * Element (Y): Tin.</p> <p>(2) Because alloys are harder than pure metals, which tend to be soft and often unfit for industrial uses.</p>	2	<ol style="list-style-type: none"> 1. Mercury 2. Ammonia gas. 3. Cl₂ 4. Vinegar 5. H₂O 6. Baking soda 7. NaOH 8. CO₂
3	<p>(1) The bulb remains lit/ Because graphite is a good conductor of electricity.</p> <p>(2) The bulb goes out/ Because sulphur is a bad conductor of electricity.</p>	4	<ol style="list-style-type: none"> 1. K₃PO₄ 2. Al₂(SO₄)₃ 3. NH₄NO₃ 4. MgCO₃ 5. NaCl 6. BaCO₃ 7. NH₄Cl 8. (NH₄)₃PO₄ 9. MgSO₄ 10. AgCl
5	<p>(1) The blue litmus strip turns to red / This indicates that carbon dioxide gas has an acidic effect.</p> <p>(2) It does not affect the colours of the litmus strips / Oxygen gas (O₂), Nitrogen gas (N₂).</p> <p>(3) The colours of the litmus strips disappear.</p>	6	<ol style="list-style-type: none"> 1. acidic soil – because pH is less than 7 2. by adding alkaline substance.
7	<p>(1) * Element ions: (1), (3), (5). * Atomic group ions: (2), (4), (6).</p> <p>(2) 1- Potassium chloride/ KCl 2- Calcium sulphate / CaSO₄ 3- Ammonium carbonate / (NH₄)₂CO₃</p>	8	<ol style="list-style-type: none"> 1. Carbonic acid 2. Hydrofluoric acid 3. Magnesium hydroxide 4. Lithium hydroxide 5. Sulphuric acid 6. Ammonium hydroxide
9	<ol style="list-style-type: none"> 1. OH⁻ 2. HCl 3. SO₄⁻² 4. HNO₃ 5. Acetic acid 6. Sodium hydroxide 	10	<ol style="list-style-type: none"> 1. HBr 2. HNO₃ 3. LiOH 4. H₂CO₃ 5. NaOH