

UNEB U.C.E CHEMISTRY (PAPER 1) 2017

1. Brass is an alloy of
 - A. Lead and tin
 - B. Iron and carbon
 - C. Copper and zinc
 - D. Magnesium and aluminum
2. A mixture of sodium carbonate and sodium hydrogen carbonate can best be separated by fractional crystallization because the two salts have different.
 - A. densities
 - B. solubilities
 - C. melting points
 - D. boiling points
3. The atomic number of an element T is 15. Which one of the following is the nature of the oxide of T?
 - A. Acidic
 - B. Neutral
 - C. Basic
 - D. Amphoteric
4. Which one of the following substances is formed when sodium is burnt in limited amount of air?
 - A. Sodium oxide
 - B. Sodium peroxide
 - C. Sodium carbonate
 - D. Sodium nitride
5. Which one of the following allotropes of sulphur is stable above 960C?
 - A. Monoclinic sulphur
 - B. Rhombic sulphur
 - C. Plastic sulphur
 - D. Amorphous sulphur.
6. The atomic numbers of elements W, X, Y and Z are 9, 11, 12, 14 respectively. Which one of the following pairs of elements can combine to form a covalent compound?
 - A. W and X
 - B. X and Y
 - C. Y and Z
 - D. Z and W
7. Which one of the following anions when in solution would form a yellow precipitate with lead (II) ions?
 - A. Cl⁻(aq)
 - B. CO₃²⁻(aq)
 - C. I⁻(aq)
 - D. SO₄²⁻(aq)
8. Which one of the following carbonates when heated decomposes without leaving a solid residue?
 - A. Ammonium carbonate.
 - B. Copper (II) carbonate
 - C. Magnesium carbonate
 - D. Lead (II) carbonate
9. In which one of the following gases will magnesium burn to form a white solid that will react with water to form ammonia?
 - A. N₂O
 - B. N₂O
 - C. NO
 - D. N₂

10. The full symbol of an atom of an element Z is ${}_{19}^{39}\text{Z}$. Which one of the following is the number of neutrons in the nucleus of Z?

- A. 19
- B. 20
- C. 39
- D. 58

11. Which one of the following properties is true about carbon and sulphur?

Both elements

- A. form covalent compounds only
- B. form acidic oxides only
- C. conduct electricity
- D. have allotropes

12. Which one of the following substances can conduct electricity either in solution or molten state?

- A. Hydrogen chloride
- B. Sugar
- C. Ethanol
- D. Sulphur

Which one of the following substances contains the same number of moles as 10cm³ of a 0.5M nitric acid? (1 mol of a gas occupies 22.4 dm³ at s.t.p; H = 1; C = 12; N = 14)

- A. 5.6dm³ of carbon dioxide at s.t.p
- B. 17g of ammonia
- C. 112cm³ of oxygen at s.t.p
- D. 12g of carbon

14. Which one of the following metals is used in the laboratory preparation of hydrogen?

- A. Iron
- B. Zinc
- C. Magnesium
- D. Potassium

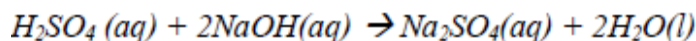
15. Which one of the following sets of compounds belongs to the same homologous series?

- A. C₂H₄, C₃H₆ and C₄H₈
- B. C₂H₆, C₂H₂ and C₃H₈
- C. C₂H₂, C₃H₆ and C₄H₁₀
- D. C₂H₆, C₅H₁₀ and C₃H₈

16. The atomic numbers of elements T, U, V and Z are 11, 16, 17 and 20 respectively. Which one of the elements forms an ion with a charge of negative two?

- A. T
- B. U
- C. V
- D. Z

17. Sulphuric acid reacts with sodium hydroxide according to the following equation.



Which one of the following is the volume of a 2M sulphuric acid required to react completely with 10cm³ of a 2M sodium hydroxide solution?

- A. 5.0 cm³
- B. 10.0 cm³
- C. 20.0 cm³
- D. 40.0 cm³

18. When a piece of hot copper was lowered into a bell jar of air, the volume of air in the jar decrease. Which one of the following gases caused the decrease in the volume?

- A. Water vapor

- B. Carbon dioxide
- C. Oxygen
- D. Nitrogen

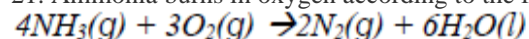
19. Which one of the following substances is not decomposed when strongly heated?

- A. K_2CO_3
- B. $NaNO_3$
- C. $FeSO_4$
- D. $NaHCO_3$

20. Which one of the following pairs of substances will react when strongly heated together?

- A. Magnesium oxide and iron
- B. Zinc and aluminum oxide
- C. Iron (III) oxide and copper
- D. Lead (II) oxide and magnesium

21. Ammonia burns in oxygen according to the following equation



The maximum volume of oxygen required to burn 60cm³ of ammonia is

- A. 45cm³
- B. 80 cm³
- C. 90 cm³
- D. 180 cm³

22. The electronic configurations of elements X and Y?

- A. XY_3
- B. X_2Y_3
- C. X_2Y
- D. X_3Y_2

23. Which one of the following equations represents the reaction that does not take place during the manufacture of nitric acid from ammonia?

- A. $4NH_3(g) + 5O_2(g) \rightarrow NO(g) + 6H_2O(l)$
- B. $4NO_2(g) + 2H_2O(L) + O_2(g) \rightarrow 4HNO_3(aq)$
- C. $4NH_3(g) + 3O_2(g) \rightarrow 6H_2O(l) + 2N_2(g)$
- D. $2NO(g) + O_2(g) \rightarrow 2NO_2(g)$

24. 0.4g of metal hydroxide MOH reacted completely with 20cm³ of a 0.5M hydrochloric acid. The relative formula mass of MOH is

A. $\left(\frac{0.5 \times 20}{0.4 \times 1000}\right)$

B. $\left(\frac{0.4 \times 20 \times 0.5}{1000}\right)$

C. $\left(\frac{1000 \times 0.5}{0.4 \times 20}\right)$

D. $\left(\frac{0.4 \times 1000}{0.5 \times 20}\right)$

25. Which one of the following carbonates will react with dilute sulphuric acid to give a blue solution and a gas that turns lime water milky?

- A. Zinc carbonate
- B. Iron (II) carbonate
- C. Magnesium carbonate
- D. Copper (II) carbonate

26. Which one of the following substances will react with ammonium chloride to form ammonia?

- A. HNO_3
- B. CuO
- C. KOH
- D. SO_2

27. When a solution containing 2g of sodium hydroxide was completely reacted with hydrochloric acid, 2730J of heat was evolved. Which one of the following is the heat of neutralization of sodium hydroxide by hydrochloric acid? ($\text{NaOH} = 40$)

A. $-\left(\frac{2730 \times 2}{100 \times 40}\right) \text{kJmol}^{-1}$

B. $-\left(\frac{1000 \times 40}{2 \times 2730}\right) \text{kJmol}^{-1}$

C. $-\left(\frac{2730 \times 1000 \times 2}{40}\right) \text{kJmol}^{-1}$

D. $-\left(\frac{2730 \times 40}{1000 \times 2}\right) \text{kJmol}^{-1}$

28. Which one of the following gases can bleach flowers but not litmus paper?

- A. Sulphur dioxide
- B. Nitrogen dioxide
- C. Sulphur trioxide
- D. Chlorine

29. Which one of the following is the concentration in grams per litre of a solution that contains 0.05 moles of sodium chloride in 50cm^3 ? ($\text{NaCl} = 58.5$).

- A. $\left(\frac{0.5 \times 50}{1000 \times 58.5}\right)$
- B. $\left(\frac{0.05 \times 1000 \times 58.5}{50}\right)$
- C. $\left(\frac{0.05 \times 50 \times 58.5}{1000}\right)$
- D. $\left(\frac{1000 \times 50}{58.5 \times 0.05}\right)$

30. Which one of the following statements is true about chlorine?

- A. It displaces fluorine from solution of its salts
- B. It is a reducing agent
- C. It is less dense than air
- D. It forms a precipitate with lead (II)nitrate solution

31. Which one of the following equations represents a redox reaction?

- A. $Pb^{2+}(aq) + SO_4^{2-}(aq) \rightarrow PbSO_4(s)$
- B. $CO_3^{2-}(aq) + 2H^+(aq) \rightarrow H_2O(l) + CO_2(g)$
- C. $Fe(s) + 3Cl_2(g) \rightarrow 2FeCl_3(s)$
- D. $HCl(aq) + NaOH(aq) \rightarrow NaCl(aq) + H_2O(l)$

32. When 0.52g of methanol was burnt, the heat evolved raised the temperature of 85g of water from 20.3°C to 53.3°C. Which one of the following is the molar heat of combustion of methanol? (The specific heat capacity of water = 4.2Jg⁻¹ K⁻¹, C=12, H = 1, O=16)

- A. $\left(\frac{85 \times 4.2 \times 32 \times 33}{0.52 \times 1}\right)$
- B. $\left(\frac{0.52 \times 1}{85 \times 4.2 \times 32 \times 33}\right)$
- C. $\left(\frac{85 \times 4.2 \times 33}{0.52 \times 32 \times 1}\right)$
- D. $\left(\frac{0.52 \times 32 \times 1}{85 \times 4.2 \times 33}\right)$

33. Which one of the following acids when reacted with a given mass of copper (II) carbonate will liberate the least amount of carbon dioxide?

- A. 1M sulphuric acid
- B. 2M nitric acid
- C. 2M ethanoic acid
- D. 2M hydrochloric acid

34. The mass of oxalic acid (H₂C₂O₄) required to prepare 250cm³ of a 1.5M solution of the acid is

(H = 1; C = 12; O = 16)

A. $\left(\frac{1.5 \times 250}{1000 \times 90}\right) \text{g}$

B. $\left(\frac{1000 \times 250}{90 \times 1.5}\right) \text{g}$

C. $\left(\frac{90 \times 250}{1000 \times 1.5}\right) \text{g}$

D. $\left(\frac{1.5 \times 250 \times 90}{1000}\right) \text{g}$

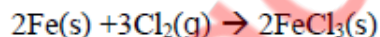
35. Which one of the following is/ are produced when a small amount of carbon dioxide is bubbled into sodium hydroxide solution.

- A. Sodium hydrogen carbonate and water
- B. Sodium carbonate and water
- C. Sodium hydrogen carbonate only
- D. Sodium carbonate only

36. The order of reactivity of the elements X, Y and Z is $Z > X > Y$. Which one of the following equations represents a possible reaction?

- A. $Y(s) + X^{2+}(aq) \rightarrow X(s) + Y^{2+}(aq)$
- B. $X(s) + Z^{2+}(aq) \rightarrow Z(s) + X^{2+}(aq)$
- C. $Y(s) + Z^{2+}(aq) \rightarrow Y^{2+}(aq) + Z(s)$
- D. $Z(s) + Y^{2+}(aq) \rightarrow Z^{2+}(aq) + Y(s)$

37. Chlorine reacts with iron from iron (III) chloride according to the following equation.



Which one of the following would be the volume of chlorine that would react with 5.6g of iron to produce (III) chloride at s.t.p?

(Fe = 56; 1 mole of a gas occupies 22.4 litres at s.t.p)

A. $\left(\frac{3 \times 5.6 \times 22.4}{56}\right) \text{l}$

B. $\left(\frac{3 \times 5.6 \times 22.4}{2 \times 56}\right) \text{l}$

C. $\left(\frac{3 \times 56 \times 22.4}{2 \times 56}\right) \text{l}$

D. $\left(\frac{3 \times 5.6 \times 22.4}{3 \times 56}\right) \text{l}$

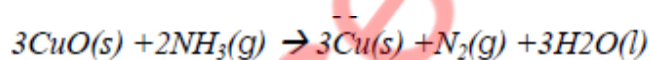
38. The formula of the ion formed when excess ammonia is added to aqueous solution of copper (II) ions is

- A. $Cu(OH)_4^{2+}$
- B. $Cu(OH)_4^{2-}$
- C. $Cu(NH_3)_4^{2+}$
- D. $Cu(NH_3)_4^{2-}$

39. The electronic configuration of an atom of element G is 2:8:2. Which one of the following elements will show properties similar to G?

- A. ${}_{14}^{28}Q$
- B. ${}_{13}^{27}R$
- C. ${}_{13}^{39}W$
- D. ${}_{20}^{40}T$

40. Ammonia reacts with copper(II) oxide to form copper according to the following equation.



The mass of copper formed when 12g of ammonia is reacted with copper (II) oxide is
(Cu = 64; N = 16; H=1)

- A. $\left(\frac{12 \times 64}{17 \times 3}\right)g$
- B. $\left(\frac{12 \times 64}{2 \times 17}\right)g$
- C. $\left(\frac{12 \times 2 \times 64}{3 \times 17}\right)g$
- D. $\left(\frac{12 \times 3 \times 64}{2 \times 17}\right)g$

Each of the questions 41 to 45 consists of an assertion (statement) on the left-hand side and a reason on the right-hand side

Select

- A. if both the assertion and reason are true statements and the reason is a correct explanation of the assertion
- B. if both the assertion and reason are true statements but the reason is not a correct explanation of the assertion.
- C. if the assertion is true but the reason is not a correct statement
- D. if the assertion is not correct but the reason is a correct statement

INSTRUCTIONS SUMMARISED:

	Assertion	Reason
A	True	True (Reason is a correct explanation)
B	True	True (Reason is not a correct explanation)
C	True	Incorrect
D	Incorrect	Correct

41. Water can be separated from its mixture with cooking oil by using a separating funnel **because** Water and cooking oil have different boiling points
42. In the manufacture of sulphuric acid by the contact process, Sulphur trioxide is dissolved in concentrated sulphuric acid instead of water **because** Hard water contains sulphates and hydrogen carbonate ions
43. Washing with hard water takes a lot of soap **because** Hard water contains sulphates and hydrogen carbonate ions
44. Concentrated nitric acid reacts with sulphur to form sulphur dioxide **because** the concentrated acid is an oxidizing agent
45. Powdered zinc reacts faster with hydrochloric acid than equal mass of zinc foil **because** Zinc powder contains more atoms than zinc foil
46. Which of the following salts can be prepared by passing dry hydrogen chloride over the heated metal?
1. CuCl_2
 2. ZnCl_2
 3. FeCl_3
 4. MgCl_2
47. Which of the following is/are characteristics of alkenes? Alkenes
1. are hydrocarbons
 2. decolourise bromine water
 3. burn to form water and carbon dioxide
 4. are saturated compounds
48. Which of the following oxides is/are soluble in excess potassium hydroxide solution?
1. PbO
 2. CuO
 3. ZnO
 4. FeO
49. Which of the following is/ are property(ies) of aqueous hydrogen chloride?
1. It reacts with copper to form hydrogen
 2. it reacts with carbonates to form carbon dioxide

3. It bleaches litmus paper
4. It reacts with calcium oxide to form a salt and water

50. Which of the following is/are true about the product obtained when copper is heated in air?

1. It is black solid
2. It reacts with sodium hydroxide
3. It reacts with nitric acid
4. It is a brown solid

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