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CHEMISTRY
PAPER 1
Nov, 2020
1½ hrs

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Uganda Certificate of Education
RESOURCEFUL MOCK EXAMINATIONS 2020
CHEMISTRY
PAPER 1
TIME: 1hour 30minutes

Instructions

- *This paper consists of fifty (**50**) objective questions.*
- *All questions are **compulsory**.*
- *Answer the questions by writing the correct alternative in the box on the right hand side of the question.*

1. Which one of the following alloys contains lead?
A) Solder B) Stainless steel
C) Duralumin D) Brass

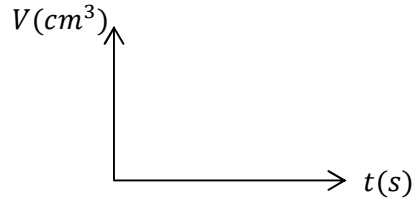
2. Lead (II) bromide conducts electricity when in molten state, but in solid state, it is not an electrolyte. This is because lead(II) bromide;
A) Is a covalent compound in solid state
B) Exists as atoms in solid state
C) Has moving electrons in molten state
D) Exists as moving charged particles in molten state

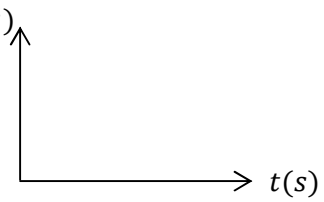
3. The ion R^{2+} has 12 neutrons and 10 electrons. The atomic mass of R is;
A) 20 B) 21 C) 22 D) 24

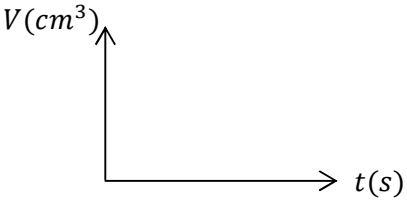
4. Two experiments were conducted separately at similar conditions;

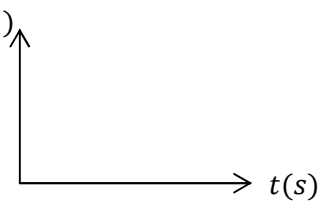
Experiment 1
5g of magnesium carbonate powder(in excess) was added to 20cm^3 of 0.1M hydrochloric acid

Experiment II
5g of magnesium carbonate powder(in excess) was added to 20cm^3 of 0.1M Sulphuric acid. Which one of the following graphs best shows the result obtained?

A) 

B) 

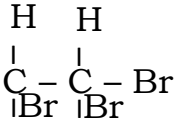
C) 

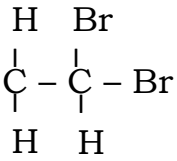
D) 

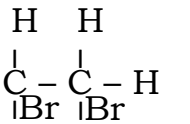
5. The following is the equation that represents the reaction between ethene and bromine.

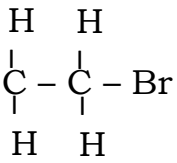
Ethene + Br_2 $\longrightarrow$ **Q**

Which one of the following is the structural formula of **Q**?

A) 

B) 

C) 

D) 

6. Below is an ionic equation for the raction that takes place in a Daniel cell.

$Zn(s) + Cu^{2+}(aq) \longrightarrow Cu(s) + Zn^{2+}(aq)$

Which one of the following is **not** true of the equation?

A) Cu^{2+} is reduces
B) Zn is an oxidizing agent
C) Cu^{2+} accepts electrons from Zn
D) Zn is oxidiszed

7. When **1.8g** of glucose is burned, the heat that is released can raise the temperature of **50cm³** of water by **1.3⁰C**. Calculate the heat of combustion of 1mole of glucose. (Relative molecular mass of glucose is **180**, Density of water is **1.0g/cm**, Specific heat capacity of water is $4.2Jg^{-1}{}^{0}C^{-1}$).

A) $\left(\frac{1.8 \times 4.2 \times 1.3}{1000 \times 180}\right) KJmol^{-1}$
B) $\left(\frac{1.8 \times 4.2 \times 1.3 \times 180}{1000 \times 1.8 \times 50}\right) KJmol^{-1}$
C) $\left(\frac{50 \times 4.2 \times 1.3 \times 1.8}{1000 \times 180}\right) KJmol^{-1}$
D) $\left(\frac{15 \times 4.2 \times 1.3 \times 180}{1000 \times 1.8}\right) KJmol^{-1}$

8. Which one of the following is the reason why sodium chloride is added to the hot solution of oil and alkali during the saponification process?

A) To reduce the solubility of soap produced
B) To reduce the soap bubbles produced
C) To reduce the surface tension of water
D) To increase the solubility of soap

9. Which one of the reactions listed below is a redox reaction?
A) Polymerization B) Neutralization
C) Displacement D) Substitution

10. Which of the following pairs of substances can be differentiated by reacting with dilute hydrochloric acid?
A) Aluminium and iron
B) Zinc carbonate and zinc sulphate
C) Silver nitrate solution and lead(II) nitrate solution
D) Sodium carbonate and magnesium carbonate

11. Which one of these gases will have the slowest rate of diffusion at room temperature and atmospheric pressure? (C=12, H=1, O=16, C*l*=35.5, N=14)
A) CH_3Cl B) CO_2 C) NH_3 D) O_2

12. Which one of the following gases **does not** react with water?
A) NH_3 B) Cl_2 C) CO D) SO_2

13. A solid **X**, dissolved in dilute nitric acid to form a colourless solution which when reacted with dilute hydrochloric acid, formed a white precipitate. **X** is;
A) aluminium oxide B) copper(II) oxide
C) lead(II) oxide D) zinc oxide

14. Ammonium salts are used as nitrogen fertilizers. The ammonium salt that would provide the biggest amount of nitrogen to plants is (H=1, N=14, O=16, P=31, Cl=35.5, S=32)
A) $(NH_4)_3PO_4$ B) $(NH_4)_2SO_4$
C) NH_4Cl D) NH_4NO_3

15. Sulphur dioxide was bubbled through water. The resultant solution;
A) Is a bleaching agent B) Is an oxidizing agent
C) Turns red litmus blue D) Liberates oxygen when exposed to sunlight

16. Which one of the following pairs of solutions when mixed, will show apparent loss in final mass?
A) Lead(II) nitrate and potassium iodide
B) Silver nitrate and sodium chloride
C) Lead(II) nitrate and dilute Sulphuric acid
D) Sodium carbonate and dilute hydrochloric acid

17. The electronic configuration of an atom of element **G** is **2:8:6**. The compound formed between **G** and hydrogen;
A) Reacts with damp sulphur dioxide to form a yellow solid
B) Dissolves in water to form a neutral solution
C) Dissolves in water to form alkaline solution
D) Is a solid with high melting point.

18. Which one of the following is **not** an ore of iron?
A) Fe_2O_3 B) Fe_3O_4 C) $FeSO_4$ D) $FeCO_3$

19. When concentrated Sulphuric acid was added to white sugar, a black solid was formed. This is because sulphric acid.
A) Burnt the sugar
B) Oxidized the sugar
C) Reduced the sugar
D) Dehydrated the sugar

20. Which one of the following ions forms a colourless solution, when reacted with sodium hydrogen carbonate and on heating the resultant solution, produces a white precipitate?
A) $Cu^{2+}(aq)$
B) $Pb^{2+}(aq)$
C) $Ca^{2+}(aq)$
D) $Zn^{2+}(aq)$

21. Some sodium hydroxide solution was added to a nitrate **Q** on warming the mixture, a colourless gas that fumes with concentrated hydrochloric acid was given off. **Q** could be;
A) Lead(II) nitrate
B) Ammonium nitrate
C) Sodium nitrate
D) Silver nitrate

22. **18.0cm³** of **0.2M** sodium hydroxide solution were required to neutralize **60cm³** of an acid **H_2X**, containing **5.8g** of acid **per litre** of solution. The formula mass of **X** is (H=1)
A) 88 B) 95 C) 96 D) 114

23. With which of the following metals is iron coated to make glavanised iron?
A) Aluminium
B) Magnesium
C) Tin
D) Zinc

24. Which one of the following metal carbonates will decompose most easily on heating?
A) Copper(II) carbonate
B) Calcium carbonate
C) Magnesium carbonate
D) Potassium carbonate

25. Which one of the following could be added to a solution to increase its pH value?
A) Ammonia solution
B) Dilute hydrochloric acid
C) Potassium hydrogen sulphate solution
D) Sodium chloride solution

26. An oxide of a metal **T** contains 78% of **T**. The empirical formula of the oxide is (T=56, O=16).
A) TO B) TO_2 C) T_2O_3 D) T_3O_4

27. During the industrial production of nitric acid, ammonia is oxidized to nitrogen (II) oxide according to the following equation

$4NH_3(g) + O_2(g) \longrightarrow 4NO(g) + 6H_2O(l)$ $\Delta H=909Kmol^{-1}$

Which one of the following conditions favours the highest proportion of nitrogen (II) oxide in the reaction mixture?
A) High pressure and high temperature
B) Use of platinum at low temperature
C) Low pressure and high temperature
D) Use of platinum at high temperature

28. Which one of the following is the electronic configuration of an element of Period 3 of the Periodic Table and its oxide is amphoteric in nature?
A) 2:8:6 B) 2:8:5 C) 2:8:3 D) 2:5

29. Which of the following ions form a white precipitation that does not dissolve in excess aqueous ammonia?
i) Al^{3+} ii) Mg^{2+} iii) Pb^{2+} iv) Zn^{2+}
A) (i) , (ii) and (iii) only B) (i) and (iv) only
C) (ii) and (iv) only D) (ii), (iii) and (iv) only

30. **2.0M**copper(II) chloride solution was electrolyzed using carbon rods. What were formed at cathode and anode?

	Cathode	**Anode**
A	Hydrogen	Oxygen
B	Copper	Oxygen
C	Copper	Chlorine
D	Hydrogen	Chlorine

31. What volume of ammonia at s.t.p will be produced when $45cm^3$of nitrogen reacts completely with hydrogen according to the equation

$N_2(g) + 3H_2(g) \longrightarrow 2NH_3(g)$
A) $22.5cm^3$ B) $45cm^3$
C) $90cm^3$ D) $135cm^3$

32. The brown ring test can be performed on a nitrate solution by adding to the nitrate.
A) Iron (III) sulphate solution, then slowly adding concentrated Sulphuric acid
B) Iron (II) sulphate solution, then slowly adding concentrated hydrochloric acid
C) Iron(III) sulphate solution then adding slowly concentrated hydrochloric acid
D) Iron (II)sulphate solution, then slowly adding concentrated Sulphuric acid

33. Hydrogen peroxide decomposes to produce oxygen. Identify the condition(s) under which the rate of production of oxygen would be fastest.
A) A 2M H_2O_2 at room temperature
B) A 2M H_2O_2 plus MnO_2 heated to 30^{0C}
C) A 1M H_2O_2 heated to 35^0C
D) A 1M H_2O_2 plus MnO_2 at room temperature

34. Sulphuric acid reacts with a base, **XOH**, according to the equation;

$H_2SO_4(aq) + 2XOH(aq) \longrightarrow X_2SO_4(aq) + 2H_2O(l)$
What volume of 0.5M Sulphuric acid is required to react completely with **10cm³** of **2M XOH** solution?
A) $5cm^3$ B) $10cm^3$ C) $20cm^3$ D) $30cm^3$

35. When dry air was passed through sodium hydroxide solution and then over heated copper metal, nitrogen was finally obtained. The role of sodium hydroxide solution was to;
A) React with water vapour B) Remove oxygen
C) Provide steam to react with copper D) Absorb carbon dioxide

36. Iron reacts with dilute sulphuric acid according to the following equation.

$Fe(s) + H_2SO_4(aq) \longrightarrow FeSO_4(aq) + H_2(g)$

The mass of iron (II) sulphate formed when excess Sulphuric acid reacts with **16.8g** of iron is (Fe=56, S=32, O=16)
A) 45.6g B) 16.8g C) 50.4g D) 6.189g

37. When elements **X** and **Y** are heated together, they form a compound with the formula $\mathbf{X_3Y_2}$. Elements**X** and **Y** have the following electronic configurations, respectively;
A) 2:5 and 2;8:2 B) 2;6 and 2:8:1
C) 2:8:2 and 2:5 D) 2:8:1 and 2:8:5

38. The gas that cannot be dried using concentrated Sulphuric acid is;
A)Sulphuric dioxide B) Hydrogen sulpphide
C) Carbon monoxide D) Hydrogen chloride

39. When ethene gas is compressed in a steel vessel at a high temperature a white waxy solid is formed on the side of the vessel. This white solid has a relative molecular mass of more than 10,000. The type of reaction that has taken place is;
A) Cracking B) Saponification
C) Polymerization D) Fermentation

40. When sodium hydrogen carbonate is heated, it decomposes according to the equation below;

$2NaHCO_3(s) \longrightarrow Na_2CO_3(s) + H_2O(l) + CO_2(g)$

21.0g of the hydrogen carbonate were completely decomposed. The volume in litres of carbon dioxide evolved at s.t.p was (H=1, C=12, O=16, Na=23, 1 mole of a gas occupies 22.41)

A) $\left(\frac{21.0 \times 22.4}{168 \times 2}\right)$ *litres*

B) $\left(\frac{168 \times 2}{21 \times 22.4}\right)$ *litres*

C) $\left(\frac{21 \times 22.4}{84 \times 2}\right)$ *litres*

D) $\left(\frac{84 \times 2}{21 \times 22.4}\right)$ *litres*

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 the reason are **true** statements and the reason is a correct explanation of the assertion.

B: If both the assertion and the 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 summarized

Assertion	**Reason**
A: True	True and is a correct explanation
B: True	True but is not a correct explanation
C: True	Incorrect
D: True	Correct

41. When concentrated nitric acid is added to a solution of iron (II) sulphate, the colour changes from pale green to brown.	***because***	Nitric acid oxidizes iron(ii) ions to iron(iii) ions.
42. During formation of chloride ion, the chlorine atom attains the electronic configuration of a noble gas.	***because***	Noble gases have stable electronic configurations.
43. When iron powder is added to a solution of copper(II) sulphate, a brown precipitate is formed.	***because***	Iron(III) oxide which is brown is formed.

44. Ehene and ethane undergo addition reaction with bromine	***because***	Ethene and ethane are hydrocarbons.	
45. When a fixed mass of zinc granules is reacted with excess dilute Sulphuric acid in the presence of copper(II) sulphate solution, the total volume of hydrogen produced is greater than when no copper (II) sulphate solution is used.	***because***	Copper (II) sulphate solution catalyzes the reaction	

In each of the questions 46 to 50 one or more of the answers given may be correct. Read each question carefully and then indicate the correct answer according to the following;

A: If 1, 2 and 3 only are correct
B: If 1 and 3 only are correct
C: If 2 and 4 are correct
D: If 4 only is correct

Summary of instructions:

A	**B**	**C**	**D**
1, 2 and 3 only	1 and 3 only	2 and 4 only	4 only

46. Sodium carbonate solution was added into test tubes containing metal ions. In which of the following was no precipitate formed.
1. Copper(II) ions
2. Aluminium ions
3. Zinc ions
4. Iron(III) ions

47. Which of the following statements is / are true about the atoms ${}^{12}_{6}C$ and ${}^{14}_{6}C$.
1. They have the same valency
2. They are known as allotropes
3. They have different numbers of neutrons
4. They have same mass number

48. Which of the following are formed when rain water dissolves limestone?
1. Calcium sulphate
2. Calcium carbonate
3. Calcium hydrogen sulphate
4. Calcium hydrogen carbonate

49. Which of the following compounds will react with hydrogen sulphide to produce a precipitate of sulphur?
1. Iron(II) chloride solution
2. Concentrated Sulphuric acid
3. Sulphuric (IV) oxide
4. Concentrated hydrochloric acid

50. Methane, ethane, propane and butane **all** are hydrocarbons which;
1. Have high boiling points
2. Are obtained by dehydration of alcohols
3. Have high solubility in water
4. Burn producing heat energy

END