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Chemistry

Paper 1

8th July, 2022



BUSOGA COLLEGE MWIRI

Uganda Certificate of Education

CHEMISTRY

1hour and 30 minutes

INSTRUCTIONS TO CANDIDATES

*This paper consists of **50** compulsory objective questions*

*Answer **all** questions by writing the correct alternative in the box on the right side of the question.*

*Copying is **very** bad*

1. Which one of the following nitrates does not give off oxygen when strongly heated?

A: zinc nitrate

B: potassium nitrate

C: calcium nitrate

D: Ammonium nitrate

☐

2. Brass is an alloy of

A: tin and copper

B: zinc and copper

C: lead and tin

D: aluminium and zinc

☐

3. A solution of hydrogen chloride in dry methylbenzene will

A: liberate hydrogen with magnesium

B: form sodium chloride and water with sodium hydroxide

C: liberate carbon dioxide with sodium hydrogen carbonate

D: not conduct an electric current

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4. Which one of the following methods can be used to convert iodide ions I^- , into free iodine I_2

A: evaporating a solution of potassium iodide.

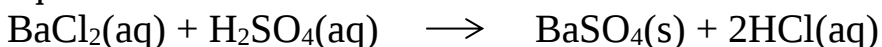
B: passing chlorine through potassium iodide solution

C: passing hydrogen gas through potassium iodide solution

D: reacting potassium iodide solution with lead (II) nitrate solution

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5. Barium chloride reacts with sulphuric acid according to the following equation



The mass of barium sulphate precipitated when 1.2g of barium chloride is treated with excess sulphuric acid is. (Ba = 137.34, Cl = 35.5, S = 32, O = 16)

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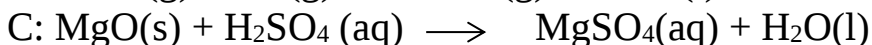
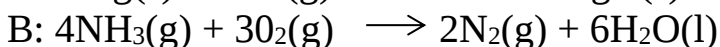
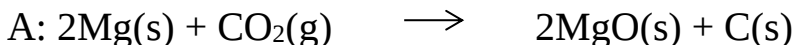
A: $\frac{233.34 \times 1.2}{208.34}$

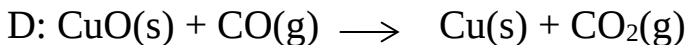
B: $\frac{233.34 \times 208.34}{1.2}$

C: $\frac{208.34 \times 1.2}{233.34}$

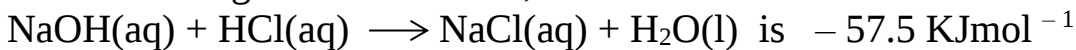
D: $\frac{233.34}{208.34 \times 1.2}$

6. Which one of the following is not an equation for an oxidation reduction reaction?

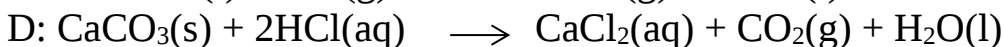

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7. The heat change for the reaction;



Which one of the following equations represents a heat change of the same magnitude?


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8. Which of the following are the raw materials used to manufacture hydrogen gas on a large scale?

A: zinc and dilute sulphuric acid

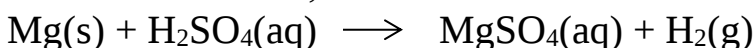
B: carbon and water

C: iron and water

D: sodium and water

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9. Which one of the following can be conveniently used to determine the rate of the reaction;



Measure the amount of

A: magnesium sulphate formed in a given time

B: sulphuric acid used up per minute

C: magnesium ribbon used up per minute

D: hydrogen evolved in a given time.

☐

10. A compound T contains 27.59% oxygen and 72.41% iron by mass. The formula of T is (Fe = 56, O = 16)

A: FeO

B: Fe₃O₄

C: Fe₂O₃

D: Fe(OH)₃

☐

11. Which one of the following will not yield a metal oxide on strong heating?

A: lithium hydroxide

B: sodium carbonate

C: sodium peroxide

D: magnesium sulphate

☐

12. Which one of the following pairs of chemicals can conveniently be used to prepare lead (II) sulphate?

A: lead (II) oxide with dilute sulphuric acid

B: lead (II) carbonate and dilute sulphuric acid

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- C: a mixture of lead and dilute sulphuric acid
 D: lead (II) nitrate solution and dilute sulphuric acid

13. Which one of the following reactions does not take place in practice?

- A: $\text{Pb(s)} + 2\text{HCl(aq)} \rightarrow \text{PbCl}_2\text{(s)} + \text{H}_2\text{(g)}$
 B: $2\text{H}^+\text{(aq)} + \text{Mg(s)} \rightarrow \text{Mg}^{2+}\text{(aq)} + \text{H}_2\text{(g)}$
 C: $\text{M(g)} + \text{Cu}^{2+}\text{(aq)} \rightarrow \text{Mg}^{2+}\text{(aq)} + \text{Cu(s)}$
 D: $3\text{CuO(s)} + 2\text{NH}_3\text{(g)} \rightarrow 3\text{Cu(s)} + \text{N}_2\text{(g)} + 3\text{H}_2\text{O(l)}$

☐

14. Which one of the following pairs of aqueous solutions will give a white precipitate when mixed at room temperature?

- A: barium chloride and lead (II) nitrate
 B: sodium hydroxide and oxalic acid
 C: sodium thiosulphate and iron (III) chloride
 D: barium sulphide and hydrochloric acid

☐

15. The gas obtained when chlorine reacts with excess ammonia gas is

- A: hydrogen
 B: nitrogen
 C: hydrogen chloride
 D: nitrogen dioxide

☐

16. Which one of the following hydrocarbons is unsaturated?

- A: C_3H_8 B: C_4H_{10} C: C_2H_2 D: C_2H_6

☐

17. 20cm^3 of a monobasic acid of unknown molarity needed 25cm^3 of 0.05M sodium carbonate for complete reaction. The molarity of the acid is

- A: $\frac{2 \times 25 \times 0.05}{20}$ B: $\frac{25 \times 0.5}{2 \times 20}$ C: $\frac{20 \times 2 \times 0.05}{25 \times 2}$ D: $\frac{20 \times 2}{25 \times 0.05}$

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18. The main function of limestone in the blast furnace for extraction of iron is to

- A: provide carbon for reducing iron ore
 B: remove impurities like silica
 C: quicken reduction of iron ore to iron
 D: lower the temperature at which iron melts

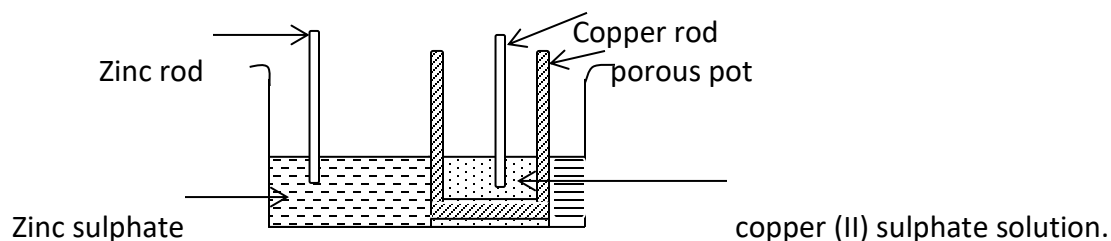
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19. The atomic number of calcium is 20 and the mass number is 40, which one of the following sets best represents the calcium ion, Ca^{2+} ?

	Protons	Neutrons	Electrons	
A:	20	20	18	☐
B:	18	20	20	
C:	20	18	18	
D:	20	20	20	

20. A solution contains 34.2g of anhydrous aluminium sulphate, $\text{Al}_2(\text{SO}_4)_3$ in 1 dm^3 . The concentration of sulphate ions in moles per dm^3 is
- A: 0.10 B: 0.15 C: 0.30 D: 3.00 ☐

21. If the two electrodes in the cell diagram below were joined by a conducting wire, which of the following changes would take place?



- A: $\text{Cu}^{2+}(\text{aq}) + 2\text{e} \rightarrow \text{Cu}(\text{s})$ only ☐
- B: $\text{Zn}(\text{s}) \rightarrow \text{Zn}^{2+}(\text{aq}) + 2\text{e}$ only
- C: Both $\text{Cu}^{2+}(\text{aq}) + 2\text{e} \rightarrow \text{Cu}(\text{s})$ and $\text{Zn}^{2+}(\text{aq}) + 2\text{e} \rightarrow \text{Zn}(\text{s})$
- D: Both $\text{Cu}^{2+}(\text{aq}) + 2\text{e} \rightarrow \text{Cu}(\text{s})$ and $\text{Zn}(\text{s}) \rightarrow \text{Zn}^{2+}(\text{aq}) + 2\text{e}$
22. Which one of the following would lose weight when exposed to the atmosphere?
- A: concentrated sulphuric acid B: solid sodium hydroxide ☐
- C: A saturated solution of carbon dioxide D: Anhydrous sodium carbonate.
23. An essential part of the softening of water made hard by the presence of calcium compounds is
- A: converting the calcium compound into a water soluble form ☐

B: converting the aqueous calcium ions into a water insoluble compound

C: reducing the aqueous calcium ions

D: filtering off the calcium compounds

24. The bleaching action of moist chlorine is best explained by

A: the high reactivity of the element

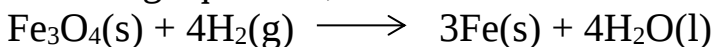
B: the fact that it is an oxidizing agent

C: the fact that hypochlorous acid easily gives up its oxygen.

D: the fact that chlorine combines so readily with hydrogen.

☐

25. Iron (II), (III) oxide can be reduced by hydrogen according to the following equations;



The mass of iron that would be formed when 10.5g iron (II) (III) oxide is reduced by hydrogen is (Fe = 56, O = 16)

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A: $\frac{3 \times 10.5 \times 56}{232}$

B: $\frac{3 \times 10.5 \times 232}{56}$

C: $\frac{10.5 \times 56}{3 \times 232}$

D: $\frac{232 \times 56}{3 \times 10.5}$

26. Which one of the following hydroxides is soluble in aqueous ammonia?

A: $\text{Al}(\text{OH})_3$

B: $\text{Fe}(\text{OH})_2$

C: $\text{Pb}(\text{OH})_2$

D: $\text{Cu}(\text{OH})_2$

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27. The strength of an acid or base is based on

A: its molarity

B: its basicity

C: degree of ionization

D: its concentration

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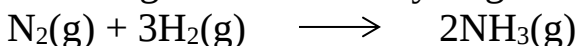
28. Which one of the following substances could be a hydrocarbon?

Substance	Property of substance
A	Burns to form one oxide. The oxide is a gas and its aqueous solution has pH less than 7.
B	Burns to form two oxides. One oxide is a solid and insoluble in water, the other is a gas and its aqueous solution has a pH less than 7.

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C	Burns to form two oxides, one oxide is a liquid which is neutral to litmus; the other is a gas and its aqueous solution has a pH less than 7.
D	Burns to form one oxide. The oxide is a solid and insoluble in water.

29. Nitrogen reacts with hydrogen according to the following equation

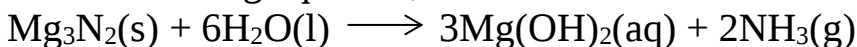


If 15cm³ of nitrogen and 50cm³ of hydrogen are reacted, the volume of residual gas is

A: 5cm³ B: 30cm³ C: 65cm³ D: 35cm³

☐

30. Magnesium nitride can react with water to form ammonia according to the following equation;



If 6.7 dm³ of ammonia measured at s.t.p was produced when magnesium nitride reacted with water, the mass of magnesium nitride that reacted is (H = 1, N = 14, Mg = 24; 1 mole of a gas occupies 22.4 dm³ at s.t.p)

A: 29.91g B: 14.96g C: 0.07g D: 6.69g

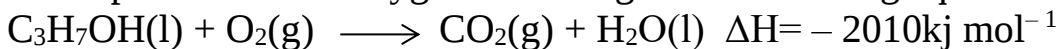
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31. When a concentrated aqueous solution of sodium bromide is electrolyzed, the cathode and the anode products are respectively

A: Na, Br₂ B: H₂, O₂ C: H₂; Br₂ D: Na, O₂

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32. Propanol burns in oxygen according to the following equation



The mass of propanol that is required to raise the temperature of 1000cm³ of water by 100°C is (Density water = 1gcm⁻³, S.H.C of water = 4.2J/g/°C and molar mass of propanol = 60)

A: 25.07g B: 12, 537g C: 12.54g D: 125.37g

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33. The name of the monomer of the polymer shown below is $\left[\overset{\text{CH}_3}{\underset{|}{\text{CH}}}\text{CH}_2 \right]_n$

- A: propene B: Butene C: Ethene D: Ethyne.

☐

34. A substance X was burned in oxygen to produce an oxide which was soluble in water. Which of the following would tell you most effectively whether X was a metal or a nonmetal?

- A: The colour of X
B: The pH of the solution made by dissolving the oxide of x in water
C: Whether the oxide of x was solid, liquid or gas.
D: The density of x

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35. 0.9 KJ are required to vaporize 20g of a liquid of molecular mass 60. The heat of vaporization of the liquid in KJ mol^{-1} is

- A: 2.7 B: 18 C: 54 D: 0.9

☐

36. Which one of the following is the best experiment to do in order to show that carbon has a greater affinity for oxygen than lead?

- A: heat lead in the presence of carbon dioxide
B: heat a mixture of lead (II) oxide and carbon in air
C: heat a mixture of lead and carbon in air
D: pass carbon dioxide over heated lead (II) oxide.

☐

37. The exhaust fumes of a car contain a poisonous gas which has no effect on lime water. This gas burns in air to give a gas which turns lime water milky, but no other products are formed when it burns. This poisonous gas could be

- A: a compound of carbon and hydrogen
B: carbon in vapour form.
C: an oxide of carbon with more oxygen in it than carbon dioxide
D: an oxide of carbon with less oxygen in it than carbon dioxide

☐

38. Which one of the following gases is the major sewerage product?

- A: N_2 B: SO_2 C: C_2H_6 D: CH_4

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39. Which one of the following compounds dissolves in water to give a solution with a pH greater than 7?

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A: CO₂B: SO₂

C: HCOONa

D: NH₄Cl

40. The reaction between dilute sulphuric acid and magnesium ribbon is fast at the beginning and gradually slows down thereafter. This observed gradual decrease in the rate of reaction is due to the
- A: endothermic reaction between magnesium and hydrogen ions ☐
- B: Insolubility of the magnesium sulphate being produced
- C: gradual decrease in the number of hydrogen ions during the reaction.
- D: increase in pressure above the reaction vessel brought about by the hydrogen gas being produced.

For each of the questions 41 – 45, one or more of the statement(s) is/are correct. Read the statements carefully then choose

- A: if statements 1,2,3 are correct
- B: if statements 1,3 are correct
- C: if statements 2,4 are correct
- D: if statement 4 only is correct

Summarized instructions

A	B	C	D
1,2,3 correct	1,3 correct	2,4 correct	4 only correct

41. Pure zinc chloride may be prepared by
1. Neutralizing dilute hydrochloric acid with zinc metal ☐
 2. Heating the zinc oxide in dry chlorine
 3. Neutralizing dilute hydrochloric acid with zinc carbonate
 4. Heating zinc metal in dry chlorine
42. Which of the following change when moving from an element in one period to another element in the same group but in the next period?
1. Mass number
 2. Proton number ☐
 3. Electronic configuration
 4. Valency of the element

43. A white precipitate will result when aqueous magnesium sulphate is added to an aqueous solution of

1. Ammonium nitrate
2. Lead (II) nitrate
3. Sodium chloride
4. Sodium carbonate

☐

44. Which of the following applies to nitrogen?

1. More soluble in water than oxygen at a given temperature
2. Is very reactive towards other non-metals
3. Denser than any other gas
4. Forms a simple molecule of structure $\text{N} \equiv \text{N}$

☐

45. Elements with atomic numbers 15,16 and 17 will

1. Form covalent compounds with oxygen
2. Lose their outer most electrons easily to form ions
3. Not displace aluminium from its salts
4. Attain 2:8, electronic configuration when combined with other elements.

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In each of the questions 46 – 50, there is an assertion (statement) on the left hand side and a reason on the right hand side. Read the statements carefully then answer the questions according to the following instructions. Choose

A: if assertion is true, reason true and correct explanation of the assertion

B: if assertion is true, reason true but not a correct explanation of the assertion

C: if assertion is true, reason is false,

D: if assertion is false, reason is true

SUMMARIZED INSTRUCTIONS

	A	B	C	D
Assertion	True	True	True	False
Reason	True, correct explanation	True, not correct explanation	False	True

- | | | | |
|--|---------|--|--------------------------|
| 46. Castor oil can be readily converted to soap | because | soap is composed of fairly large molecules | ☐ |
| 47. A suitable solvent is required before a substance will behave as an acid | because | a solvent is required to enable the acid to ionize | ☐ |
| 48. The reaction at the positive electrode in electrolysis often involves the liberation of a metal. | because | Metals in aqueous solution frequently exist as positively charged ions | ☐ |
| 49. Ethene is more reactive than ethane | because | Ethene has a lower molecular mass than ethane | ☐ |
| 50. Temporary hardness in water can be removed by boiling | because | Soluble carbonates are formed on boiling | ☐ |

END