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**CEKENAS END OF TERM I EXAM-2022**

**FORM FOUR EXAM**

*Kenya Certificate of Secondary Education.(K.C.S.E)*

**MARKING SCHEME**

**CHEMISTRY 233/1**

**PAPER 1**

1. a) Under constant temperature and pressure, the rate of diffusion of a gas is inversely proportional to the square root of its density.✓

b) ✓1/2

2. – A place where experiment producing poisonous gases are carried out. ✓1

- Storage of substances that produce foul or poisonous fumes.✓1

3. i) Hydrogen bond ✓1mk

ii) Covalent bond ✓1mk

4. i) a) Ca(HCO3)2, Mg(HCO3)2

b) CaSO4, MgSO4  any present ✓1mk

ii) – Ion exchange

- Addition of sodium carbonate any present ✓1mk

- Distillation

5. – Add excess Lead metal to a certain volume of nitric(v) acid. ✓1/2

- Filter to obtain excess lead metal as a residue and lead (ii) nitrate as a filtrate. ✓1/2

- Add distilled water to sodium sulphate to form sodium sulphate solution. ✓1/2

- Add lead (ii) nitrate solution to sodium sulphate solution to precipitate lead (ii) sulphate and form sodium nitrate solution. ✓1/2

-Filter to obtain lead (ii) sulphate as a residue and sodium nitrate as a filtrate. ✓1/2

- Wash the residue and dry it between the filter paper. ✓1/2

6. a) Yield of sulphur(vi) oxide decreases. Increase in temperature favours backward reaction which is endothermic. ✓1

b) No effect on the yield.✓1 Absence of a catalyst makes the equilibrium not to be achieved faster. ✓1

7. a)

|  |  |  |
| --- | --- | --- |
| Element  | Fe | O |
| Mass  | 3.36 | 1.28✓1 |
| Molar mass | 56 | 16 |
| Mole  | 0.06 | 0.08✓1 |
| Mole ratio | 1x3 | 1.333x3 |
|  | 3 | 4 |

 Empirical formula = Fe3O4✓1

b) Reducing property✓1

8. a) Isotopes

b)



9. a) i) –Yellow solution changes to pale green solution.✓1

- Yellow deposit.✓1

ii) 2FeCl3(s)+ H2S(g) 2FeCl2(aq)+ S(s)+ 2HCl(g)

10. – A brown coating/ rust is observed on nail y. ✓1/2Rust occurs on Y because silver is less reactive than iron✓1/2

- No brown coating/ no rust on nail X. ✓1/2This is because magnesium is more reactive than iron✓1/2

11. a) Sodium sulphite/ NaSO3✓1

b)



12. Reactants Products

C-C = 348x1=348 C-C = 348x1=348

C-H = 6x414= 2484 C-H = 5x414= 2070

Cl-Cl = 243x1=243 C-Cl = 432x1=432

 + 3075KJ/mol✓1 H- Cl = 340x1= 340

 -3190KJ/mol✓1

∆H = 3075-3190✓1/2

= - 115kJ/mol✓1/2

13. a) Hydrogen chloride gas ✓1

b) Polymerisation ✓1

c) Polyvinylchloride✓1

14. a)



b) Bubble/ pass the mixture of two gases through sodium hydroxide solution.✓1

- Carbon (iv) oxide is absorbed leaving carbon (ii) oxide.✓1

15. a) Grey solids are deposited Pb2+ ions migrate to the cathode and gain electrons to form lead metal.✓1

b) Electroplating

- Purification of water any one correct ✓1

16. a) Solubility✓1

b) When tap is opened and closed a small drop of water dissolves a large volume ✓1/2 of ammonia gas creating a partial vacuum✓1/2 decreasing pressure inside the flask. When the tap is opened for the second time, water gets in forming a fountain.✓1

c) HCl gas / NO2 gas

17.



18.a) The maximum mass in grams of a solute that saturates 100g of water at a specific temperature.

b) Mass of water = 40 – 15 ✓1/2

 = 25g of H2O✓1/2

15g of salt = 25g of H2O

 ? = 100g of H2O

 ✓1/2 = 60g/100g of H2O✓1/2

19.- Deforestation

- More cars

- More industries

- Sea unable to absorb extra CO2 produces. Any two ✓✓2mks

20. Blue litmus paper remains blue;✓1HCl gas dissolves in methylbenzene but does not dissociate to produce H+ ions. ✓1

21- - The activation energy should be from the reactants to the peak.✓1

-The product should be below the reactants/ products should have less energy than reactants.✓1

22. Water has hydrogen bond✓1/2 as intermolecular forces of attraction while H2S gas has weaker vanderwaal forces✓1/2 of attraction between its molecules. Hydrogen bonds are stronger than weak vanderwaal forces.✓1

23. a) Atomic radius of R is bigger than that of G.✓1

b) Oxide of A is acidic while oxide of E I basic.✓1

c) Indicated in the periodic table before letter C.✓1

24. a) Curve II

b)



25. i) – Melts into a silvery ball✓1

- Darts on the surface of water.✓1

- Ignites spontaneously to produce a lilac flame✓1 Any two

ii) Alkali metal

26. a) Alkynes

b) CxHy(g) + Cl2(g) C(s) +HCl(g)

27. i) Hydrogen gas

ii) To increase surface area for absorption.

iii) – Pricking of metal.

- Treatment of sewerage

- Standardizing of pH in beers and wine. Any one ✓1mk

28. a) ∆H = 50gx4.2Jg-1k-1 x 3K

 = 630J

b) Moles of NaOH = ✓½ = 0.0125 moles✓½

 ✓½  = -50400J✓½

 OR

Moles = -50.4kJ/mol