JAMB

Chemistry

Past questions

Paper Type: **Objective (PT. 6-10)**

JAMB CHEMISTRY PAST QUESTIONS (PT.6)

1. An element X has two isotopes $^{20}_{10}X$ and $^{22}_{10}X$ present in the ratio 1:3. The relative atomic mass of x would be _____

A. 20.5
B. 21.0
C. 21.5
D. 22.0

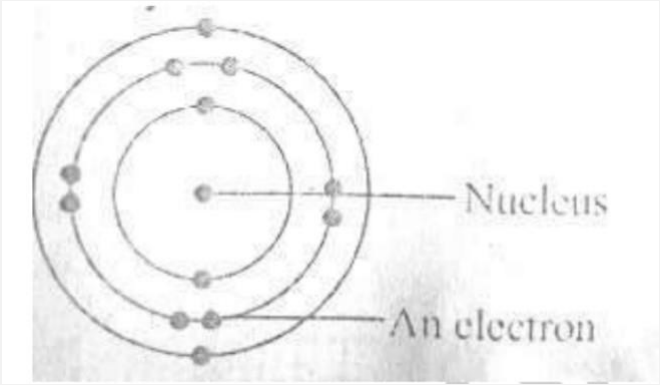
2. $200cm^3$ of oxygen diffuse through a porous plug in 50 seconds. How long, will 80cm3 of methane (CH_4) take to diffuse through the same porous plug under the same conditions?

A. 40sec
B. 20sec
C. 14sec
D. 7sec

3. Which of the following terms indicates the number of bonds that can be formed by an atom?

A. oxidation number
B. Valence
C. Atomic number
D. Electronegativity

4.



The diagram above represents an atom of _____

A. magnesium
B. helium
C. chlorine
D. neon

5. Which of the following gases is the most dangerous pollutant?

A. Hydrogen sulphide.
B. Carbon Monoxide
C. Sulphur (IV) oxide
D. Carbon Dioxide

6. A Side effect or Soft water is that _____

A. It gives offensive taste

B. excess calcium is precipitated

C. it attacks lead contained in pipes

D. it encourages the growth of bacteria

7. Farmlands affected by crude oil spillage can be decontaminated by _____

A. adding acidic solutions

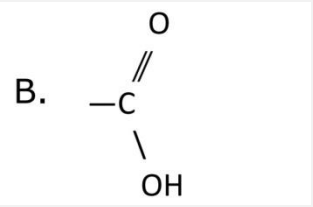
B. using aerobic bacteria

C. pouring water on the affected area

D. burning off the oil from the area

8. Which of the following functional groups will give gas bubbles when treated with a saturated solution of sodium hydrogen trioxocarbonate(iv)?

A. —NH3

B. 

C. —OH

D. >C = 0

9. The oxidation state of Cr in $K_2Cr_2O_7$ is _____

A. +7

B. +6

C. +5

D. 4

10. $2Na_2O_{2(s)} + 2H_2O_{(l)} \rightarrow 4Na0H_{(s)} + O_2$

The substance that is oxidized in the reaction above is _____

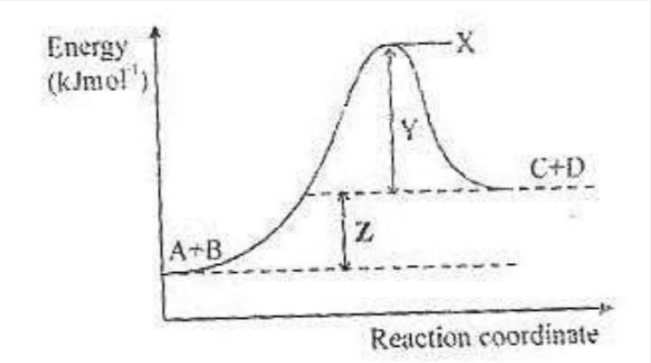
A. $2Na_2O_{2(s)}$

B. $NaOH_{(aq)}$

C. $H_2O_{(l)}$

D. $O_{2(g)}$

11.



Z in diagram above represents _____

A. heat of reaction
B. activation energy
C. free energy
D. entropy of reaction

12. The nucleus of an atom contains _____

A. protons only
B. neutrons only
C. protons and electrons
D. protons and neutrons

13. Which of the following does NOT happen when a Zinc rod is introduced into a solution of Copper (II) sulphate?

A. Electrons flow towards the zinc rod
B. The Zinc rod dissolves
C. The temperature of the soil chances
D. The blue colour of the solution gradually disappears

14. Which of the following statements is correct during the electrolysis of a caustic soda solution using platinum electrodes?

A. Oxygen gas is given off at the cathode
B. Hydrogen gas is given off at the anode
C. Sodium metal is deposited at the cathode
D. Alkalinity at the cathode increases

15. Which of the following statements is **INCORRECT**?

A. Fractional distillation of crude petroleum will give the following

hydrocarbon fuels in order of increasing boiling point. Butane < Petrol < Kerosene

B. $H_2C = CH_2$ will serve as a monomer in the preparation of polythene

C. both but-1-ene and but-1-yne will decolourize bromine readily

D. Calcium carbide will react with water to form any alkyne

16. The iron (iii) oxide impurity in bauxite can be removed by _____

A. fractional crystallization in acid solution

B. dissolution in sodium hydroxide and filtration

C. extraction with concentrated ammonia and reprecipitation

D. electrolysis of molten mixture

17. Aluminium is extracted commercially from its ore by _____

A. heating aluminium oxide with coke in a furnace

B. the electrolysis of fused aluminium oxide in cryolite

C. treating cryolite with sodium hydroxide solution under pressure

D. heating sodium aluminium silicate to a high temperature.

18. Which of the following compounds gives a yellow residue when heated and also reacts with aqueous sodium hydroxide to give a white gelatinous precipitate soluble in excess sodium hydroxide solution?

A. $(NH_4)_2CO_3$

B. $ZnCO_3$

C. $Al_2(SO_4)_3$

D. $PbCO_3$

19. The least easily oxidized of the metals below is _____

A. Cu

B. Na

C. Zn

D. Al

20. Which of the following chlorides would exhibit the least ionic character?

A. $MgCl_2$
B. $CaCl_2$
C. LiCl
D. $AlCl_3$

21. Which of the following CANNOT be obtained by fractional distillation of petroleum?

A. Ether
B. Methane
C. Butane
D. Hydrogen

22. Which of the following is used as an antiknock in automobile engines?

A. tetramethylsilane
B. lead tetraethyl
C. Glycerol
D. n-heptane

23. The Avogadro number of 24g of magnesium is the same as that of _____

A. 1g of hydrogen molecules
B. 16g of oxygen molecules
C. 32g of oxygen molecules
D. 35.5g of chlorine molecules.

24. In an electrolyte set-up to protect iron from corrosion, the iron is _____

A. made the cathode
B. made the anode
C. used with a metal of lower electropositive potential
D. initially coated with tin

25. The removal of rust from iron by treatment with tetraoxosulphate (vi) acid is based on the _____

A. hydrolysis of the iron
B. reaction of acid with base
C. oxidation of the rust
D. dehydration of the iron

26. The substance often used for vulcanization of rubber is _____

A. Chlorine
B. hydrogen peroxide
C. Sulphur

D. tetraoxosulphate (vi) acid

27. Metals of the first transition series have special properties which are different from those of groups I and II elements because they have partially filled _____

A. s-orbitals
B. p-orbitals
C. d-orbitals
D. f-orbitals

28. A particle that contains 11 protons, 12 neutrons and 10 electrons is probably a _____

A. Neutral non-metal
B. metallic ion
C. non-metallic ion
D. neutral metal

29. A catalyst increases the rate of a chemical reaction by providing a path that _____

A. raises the activation energy
B. increases the temperature
C. lowers the activation energy
D. increases the concentration

30. A metal M displaces Zinc from $ZnCl_2$ solution. This shows that _____

A. electrons flow from Zinc to M
B. M is more electropositive than Zinc
C. M is more electronegative than Zinc
D. Zinc is more electropositive than M

31. Calculate the quantity of electricity in coulombs required to liberate 10g of copper from a copper compound.

A. 32395.5
B. 30156.3
C. 60784.5
D. 15196.6

[Cu 64 F = 96500c]

32. The IUPAC names for the compounds CH_3COOH and $CH_2=CH_2$ are respectively _____

A. acetic acid and ethane
B. ethanoic- acid and ethene
C. methanoic acid and ethylene
D. ethanol and ethene

33. The boiling point of water is higher than that of methanol because _____

A. water is an oxide while methanol is an alcohol
B. inter-molecular forces in water are stronger than those in methanol
C. Water is an inorganic compound while methanol is organic
D. Water is a compound while methanol is a covalent compound

34. If an element x of atomic number Z and mass number y is irradiated by an intense concentration of neutrons, the relevant nuclear equation is _____

A. $^{Z}_{Y}x + {}^{1}_{0}n \rightarrow {}^{y-1}_{z+1}x$
B. $^{Y}_{Z}x + {}^{1}_{0}n \rightarrow {}^{y+1}_{z}x$
C. $^{Y}_{Z}x + {}^{1}_{0}n \rightarrow {}^{y}_{z+1}x$
D. $^{Y}_{Z}x + {}^{1}_{0}n \rightarrow {}^{y+1}_{z-1}x$

35. Which combination of the following statements is correct?

1. Lowering the activation energy
2. conducting the reaction in a gaseous state.
3. Increasing the temperature.
4. removing the products as soon as they are formed.
5. Powdering the reactant if solid

A. 1, 2 and 3
B. 1, 3 and 5
C. 2, 3 and 5
D. 3 and 4

36. An element with atomic number twelve is likely to be _____

A. electrovalent with a valency of 1
B. electrovalent with a valency of 2
C. covalent with a valency of 2.
D. covalent with valency of 4.

37. Which of the following physical properties decreases across the periodic Table?

A. ionization potential
B. Electron affinity
C. Electronegativity
D. Atomic radius

38. If a gas occupies a container of volume 146cm^3 at 18^{o}C and 0.971 atm, its volume in cm^3 at s.t.p is _____

A. 133
B. 146
C. 266
D. 292

39. 50cm3 of carbon (ii) oxide was exploded with 150cm3 of air containing 20% oxygen by volume, which of the reactants was in excess?

A. Carbon (ii) oxide
B. Carbon (iv) oxide
C. Oxygen
D. Nitrogen

40. The formula CH_2O for ethanoic acid is regarded as its _____

A. molecular formula
B. general formula
C. empirical formula
D. Structural formula

JAMB CHEMISTRY PAST QUESTIONS (PT.7)

1. The flame used by welders in cutting metals is _____

A. butane has flame
B. acetylene flame
C. Kerosene flame
D. Oxy-acetylene flame

2. At room temperature (300k) in fig 1 below

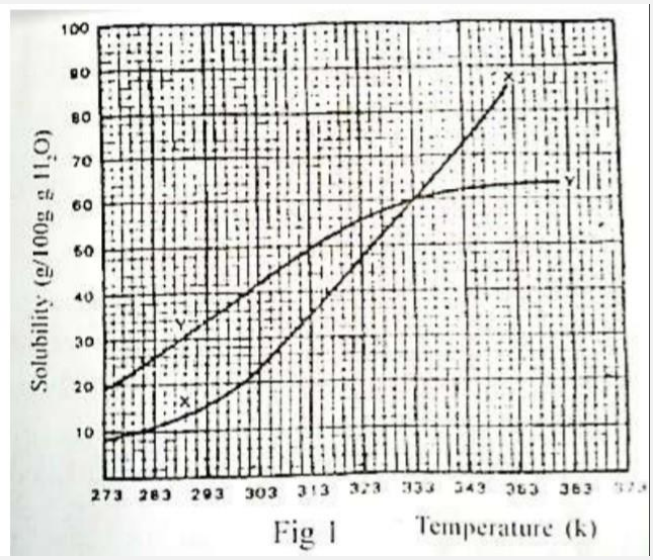


Fig 1

A. Y is twice as soluble as X
B. X is twice as soluble as Y
C. X and Y are soluble to the same extent
D. X is three times as soluble as Y

3. Tetraoxosulphate (vi) acid is prepared using the chemical reaction $SO_{3(g)} + H_2O_{(s)} \rightarrow H_2SO_{4(l)}$. Given the heats of formation for $SO_{3(g)}$, $H_2O_{(l)}$ and $H_2SO_{4(l)}$ as $-395KJmol^{-1}$, $-286KJmol^{-1}$ and $-811KJmol^{-1}$ respectively, the enthalpy change accompanying this reaction is _____

A. -1032KJ
B. -130KJ
C. +130KJ
D. +1032KJ.

4. In two separate experiments 0.36g and 0.71g of chlorine combined with a metal X to give Y and Z, an analysis showed that Y and Z contain 0.20g and 0.40g of X respectively. The data above represents the law of _____

A. multiple proportion
B. conservation of mass
C. constant composition
D. reciprocal proportion

5. If an element x of atomic number z and mass number y is

irradiated by an intense concentration of neutrons, the relevant nuclear equation is _____

A. ${}^{y}_{z}x + {}^{1}_{0}n \rightarrow {}^{y-1}_{z+1}x$

B. ${}^{Y}_{Z}x + {}^{1}_{0}n \rightarrow {}^{y+1}_{z}x$

C. ${}^{Y}_{Z}x + {}^{1}_{0}n \rightarrow {}^{y}_{z+1}x$

D. ${}^{Y}_{Z}x + {}^{1}_{0}n \rightarrow {}^{y+1}_{z-1}x$

6. The vapour density of a gas may be defined as _____

A. the mass of a unit volume of the gas compared to an equal volume of water vapour.

B. the mass of a unit volume of the gas compared to an equal volume of hydrogen.

C. the mass of a unit volume of the gas compared to an equal volume of oxygen.

D. The mass of a unit volume of the gas minus the vapour pressure of water.

7. $30cm^3$ of oxygen at 10 atmosphere pressure is placed in a $20dm^3$ container. Calculate the new pressure if temperature is kept constant.

A. 6.7 atm

B. 15.0 atm

C. 60.0 atm

D. 66.0 atm

8. A liquid begins to boil when _____

A. its vapour pressure is equal to the vapour pressure of its solid at the given temperature

B. molecules start escaping its surface

C. its vapour pressure equals the atmospheric pressure

D. its volume is slightly increased

9. Four elements W, X, Y and Z have atomic numbers 2, 6, 16 and 20 respectively. Which of these elements is a metal?

A. X

B. W

C. Z

D. Y

10. When cathode rays are deflected unto the electrode of an electrometer, the instrument becomes _____

A. negatively charged
B. positively charged
C. neutral
D. bipolar

11. When large hydrocarbon molecules are heated at high temperature in the presence of a catalyst to give smaller molecules, the process is known as _____

A. disintegration
B. Polymerization
C. cracking
D. degradation

12. If concentrated sulphuric acid is added to sugar and warmed gently, the sugar changes from white to brown and finally to a black mass of carbon. In this reaction, concentrated sulphuric acid is acting as _____

A. a drying agent
B. an oxidizing agent
C. a dehydrating agent
D. a reducing agent.

13. Smoke consists of _____

A. solid particles dispersed in liquid
B. solid or liquid particles dispersed in gas
C. gas or liquid particles dispersed in liquid
D. Liquid particles dispersed in liquid

14. In the electrolysis of dilute sulphuric acid using platinum electrodes, the products obtained at the anode and cathode are _____

Anode	**Cathode**
A. sulphur	hydrogen
B. hydrogen	oxygen
C. oxygen	hydrogen
D. hydrogen	sulphate ions

15. $P_{(g)} + Q_{(g)} \leftrightharpoons 3R_{(s)} + S_{(g)}$ ΔH is negative.
Which of the following will increase the yield of R?

A. using a larger closed vessel
B. increasing the temperature
C. Removing some **S**
D. Adding a positive catalyst

16. The mass of silver deposited when a current of 10A passed through a solution of silver salt for 4830s is _____

A. 108.0g
B. 54. 0g
C. 27.0g
D. 13.5g

17. $CO_{(g)} + H_2O_{(g)} \rightarrow CO_{2(g)} + H_{2(g)}$ from the reaction above, calculate the standard heat change if the standard enthalpies of formation of $CO_{2(g)}$, $H_2O_{(g)}$ and $CO_{2(g)}$ in $KJmol^{-1}$ are -394, -242 and -110 respectively.

A. $-282KJmol^{-1}$
B. $-42KJmol^{-1}$
C. $+42KJmol^{-1}$
D. $+262KJmol^{-1}$

18. If the electron configuration of an element is $1S^2\ 2S^2\ 2p^5$, how many unpaired electrons are there?

A. 2
B. 5
C. 1
D. 4

19. Which of the following gases can best be used for demonstrating the fountain experiment?

(i) Nitrogen
(ii) Ammonia
(iii) Nitrogen (i) oxide
(iv) Hydrogen chloride

A. (ii) and (iii)
B. (i) and (iii)
C. (ii) and (iv)
D. (ii) only

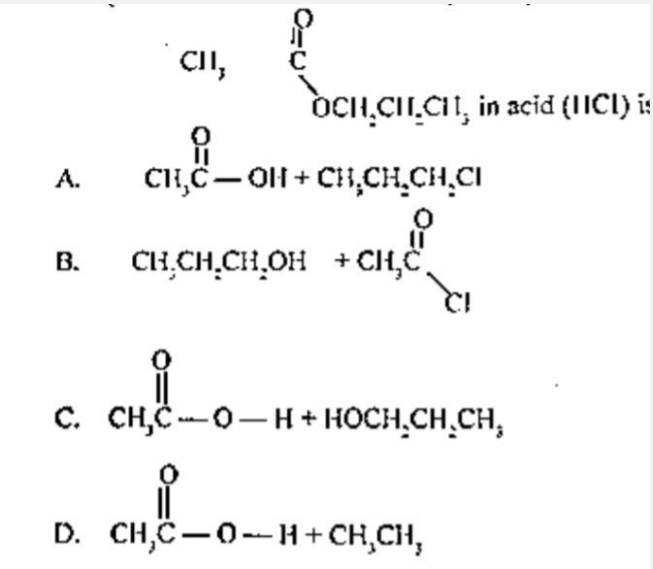
20. The coloured nature of transition metal ions are associated with their partially filled _____

A. f-orbital
B. S-orbital
C. P-orbital
D. d-orbital

21. Which of the following separation processes is most likely to yield high quality ethanol (≥ 95%) from palm wine?

A. fractional distillation without a dehydrant
B. simple distillation with a dehydrant
C. fractional distillation with a dehydrant
D. column chromatography

22. The products formed on hydrolysis of



23. In the reaction: $3CuO + 2NH_3 \rightarrow 3Cu + 3H_2O + N_2$ how many electrons are transferred for each mole of copper produced?

A. 4.0×10^{-23}
B. 3.0×10^{-23}
C. 1.2×10^{24}
D. 6.0×10^{24}

24. The electronic configuration of an element is $1s^2\ 2s^2\ 2p^6\ 3S^2\ 3p^3$. How many unpaired electrons are there in the element?

A. 5
B. 4
C. 3

D. 2

25. 8.0 g of an element X reacted with an excess of copper (II) tetraoxosulphate (VI) solution to deposit 21.3g of copper.
The correct equation for the reaction is _____

A. $X_{(s)} + CuSO_{4(aq)} \rightarrow Cu_{(s)} + XSO_{4(aq)}$

B. $X_{(s)} + 2CuSO_{4(aq)} \rightarrow 2Cu_{(s)} + X(SO_4)_{2(aq)}$

C. $2X_{(s)} + CuSO_{4(aq)} \rightarrow Cu_{(s)} + X_2SO_{4(aq)}$

D. $2X_{(s)} + 3CuSO_{4(aq)} \rightarrow 3Cu_{(s)} + X_2(SO_4)_{3(aq)}$

[Cu = 64]

26. In the manufacture of iron in the blast furnace, iron (III) oxide is mixed with coke and limestone, and different reactions occur in the process. Which of the following, statements are true with respect to these reactions?

A. The coke is a powerful reducing agent and easily converts the iron oxide to iron.

B. The calcium carbonate reacts with SiO_2, an earthly impurity in the ore, to form calcium silicate

C. The coke will react with the iron produced to form steel

D. The calcium carbonate decomposes to give calcium oxide, which then forms calcium silicate with the earthly impurity.

27.

The electrons of two atoms Y and Z are arranged in shells as shown above. The bond formed between the atoms of Y and Z is _____

A. ionic

B. covalent

C. dative

D. metallic

28. A gas sample with an initial volume of 3.25 dm^3 is heated and allowed to expand to 9.75 dm3 at constant pressure. What is the ratio of the final absolute temperature to the initial absolute temperature?

A. 3:1
B. 5:2
C. 5:4
D. 8:3

29. The chemical used for coagulation in water purification is _____

A. aluminium tetraoxosulphate (VI)
B. copper tetraoxosulphate (VI)
C. sodium tetraoxosulphate (VI)
D. calcium tetraoxosulphate (VI)

30. A liquid that will dissolve fat is _____

A. hydrochloric acid
B. calcium hydroxide
C. kerosene
D. water

31. When air, which contains the gases: oxygen, nitrogen. carbon dioxide, water vapour and the rare gases, is passed through alkaline pyrogallol and then over quicklime, the only gases left are _____

A. nitrogen and carbon dioxide
B. the rare gases
C. nitrogen and oxygen
D. nitrogen and the rare gases

32. The number of atoms in one mole of a substance is equal to _____

A. the atomic number
B. the Avogadro number
C. the gas constant
D. the number of electrons

33. Which of the following terms indicates the number of bonds that can be formed by an atom?

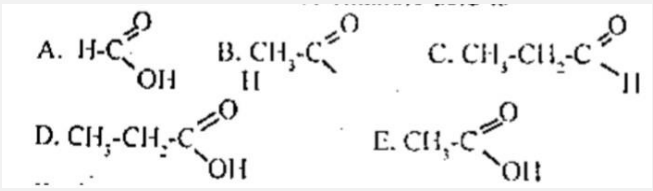
A. Oxidation number

B. Valence

C. Atomic number

D. Electronegativity

34. The structural formula of ethanoic acid is _____



35. Environmental pollution is worsened by the release from automobile exhausts of _____

A. water vapour

B. steam

C. smoke

D. heavy metals

36. What volume of 0.5 mol dm^{-3} H_2SO_4 will exactly neutralize 20cm^3 of 0.1 mol dm^{-1} NaOH solution?

A. 2.0 cm^3

B. 5.0 cm^3

C. 6.8 cm^3

D. 8.3 cm^3

37. Which of the following is an electrolyte?

A. Alcohol

B. Sodium acetate solution

C. Solid potassium in hydroxide

D. Mercury

38. $Na_2S_2O_{3(aq)} + 2HCl_{(aq)} \rightarrow 2NaCI_{(aq)} + H_2O_{(l)} + SO_{2(g)} + S_{(s)}$

Which of the following would introduce the greatest increase in the rate of the chemical reaction above?

A. An increase in temperature and a decrease in the concentration of the reactants.

B. A decrease in volume and an increase in the pressure of the reactants.

C. A decrease in temperature and an increase in the concentration of the reactants.

D. An increase in temperature and an increase in the concentration of the reactants.

39. Which of the following substances has the lowest vapour density?

A. Ethanoic acid
B. Propanol
C. Dichloromethane
D. Ethanal.
[O=16, CI = 35.5, H = 1, C = 12]

40. The presence of an impurity in a substance will cause the melting point to _____

A. be zero
B. reduce
C. increase
D. be stable

JAMB CHEMISTRY PAST QUESTIONS (PT.8)

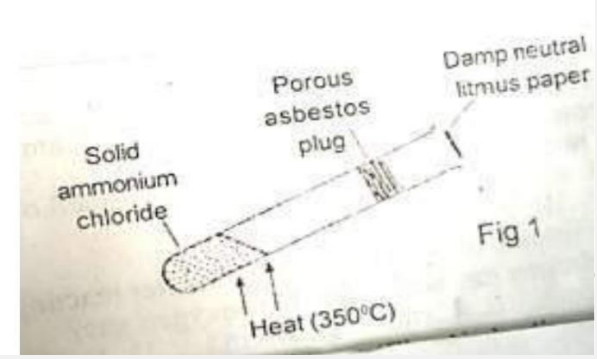
1. The periodic classification of the elements is an arrangement of the elements in order of their _____

A. atomic weights
B. isotopic weights
C. molecular weights
D. atomic numbers

2. If 1 litre of 2.2M sulphuric acid is poured into a bucket containing 10 litres of water, and the resulting solution mixed thoroughly, the resulting sulphuric acid concentration will be _____

A. 2.2 M
B. 1.1 M
C. 0.22 M
D. 0.11 M

3.



In the above experiment (Fig. 1) the litmus paper will initially _____

A. be bleached
B. turn green
C. turn red
D. turn blue

4. A correct electrochemical series can be obtained from K, Na, Ca, Al, Mg. Zn, Fe, Pb, H, Cu, Hg, Ag, Au by interchanging _____

A. Al and Mg
B. Zn and Fe
C. Zn and Pb
D. Pb and H

5. A basic postulate of the kinetic theory of gases is that the molecules of a gas move in straight lines between collisions. This implies that _____

A. collisions are perfectly elastic
B. forces of repulsion exist

C. forces of repulsion and attraction are in equilibrium
D. collisions are inelastic

6. On which of the following is the solubility of a gaseous substance dependent?

I. *Nature of solvent*
II. *Nature of solute*
III. *Temperature*
IV. *Pressure*

A. I, II, III and IV
B. I and II only
C. II only
D. I, III and IV only

7. Which of the following statements is correct about the periodic table?

A. Elements in the same period have the same number of valence electrons
B. The valence electrons of the elements in the same period increase progressively across the period
C. Elements in the same group have the same number of electron shells
D. The non-metallic properties of the elements tend to decrease across each period

8. The boiling of fat and aqueous caustic soda is referred to as _____

A. hydrolysis
B. esterification
C. acidification
D. saponification

9. Which of the following pairs of substances will react further with oxygen to form a higher oxide?

A. CO_2 and H_2O
B. NO and H_2O
C. CO and CO_2
D. SO_2 and NO

10. In the preparation of oxygen by heating $KClO_3$ in the presence of MnO_2, only moderate heat is

needed because the catalyst acts by _____

A. lowering the pressure of the reaction
B. increasing the surface area of the reaction
C. increasing the rate of the reaction
D. lowering the energy barrier of the reaction

11. Methanoic acid mixes with water in all proportions and has about the same boiling point as water. Which of the following methods would you adopt to obtain pure water from a mixture of sand, water and methanoic acid?

A. Fractional distillation
B. Filtration followed by distillation
C. Neutralization with sodium hydroxide followed by distillation
D. Neutralization with sodium hydroxide followed by filtration

12. A quantity of electricity liberates 3.6 g of silver from its salt. What mass of aluminium will be liberated from its salt by the same quantity of electricity?

A. 2.7 g
B. 1.2 g
C. 0.9 g
D. 0.3 g

[Al = 27, Ag = 108]

13. Suitable reagents for the laboratory preparation of nitrogen are _____

A. sodium dioxonitrate (III) and ammonium chloride
B. sodium trioxonitrate (V) and ammonium chloride
C. sodium chloride and ammonium trioxonitrate (V)
D. sodium chloride and ammonium diozonitrate (III)

14. The number of electrons in the valence shell of an element of atomic number 14 is _____

A. 1

B. 2

C. 3

D. 4

15. What volume of oxygen will remain after reacting $8cm^3$ of hydrogen gas with $20cm^3$ of oxygen gas?

A. $10cm^3$

B. $12cm^3$

C. $14cm^3$

D. $16cm^3$

16. If one of the following oxides is heated with hydrogen or carbon using a Bunsen burner, it is not reduced to the metal. Which one is it?

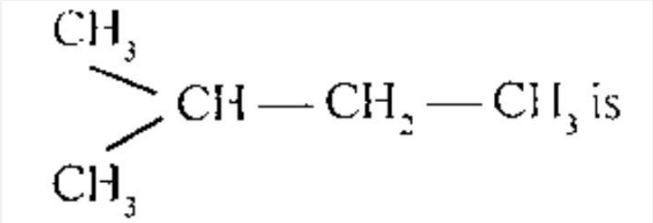
A. lead oxide

B. Magnesium oxide

C. Copper oxide

D. Tin oxide

17. The name for



A. 1 -methylpentane

B. 3-methylbutane

C. 2-methylbutane

D. 1 -dimethylpropane

18. An aqueous solution of a metal salt M, gives a white precipitate with NaOH which dissolves in excess NaOH. With aqueous ammonia, the solution of M also gives a white precipitate which dissolves in excess ammonia. Therefore, the cation in M is _____

A. Zn^{2+}

B. Ca^{2+}

C. Al^{3+}

D. Pb^{2+}

19. What is the concentration of a solution containing 2g of NaOH in $100cm^3$ of solution?

A. 0.40 mol dm^{-3}

B. 0.50 mol dm^{-3}

C. 0.05 mol dm^{-3}

D. 0.30 mol dm^{-3}

[Na = 23, O =16, H =1]

20. How many atoms are present in 6.0g, of magnesium?

A. 1.20×10^{22}

B. 2.41×10^{22}

C. 1.51×10^{23}

D. 3.02×10^{23}

[Mg =24, NA =6.02 x 10^{23} mol^{-1}]

21. The radio isotope used in industrial radiography for the rapid checking of faults in welds and casting is _____

A. carbon - 14

B. Phosphorus - 32

C. Cobalt

D. Iodine - 131

22. Beryllium and Aluminium have similar properties because they _____

A. are both metals

B. belong to the same group

C. belong to the same period

D. are positioned diagonally to each other

23. $mE + Nf \rightleftarrows pG + qH$

In the equation above, the equilibrium constant is given by _____

A. $\frac{[E]^m[F]^n}{[G]^p[H]^q}$

B. $\frac{[E][F]}{[G][H]}$

C. $\frac{[G]^p[H]^2}{[E]^m[F]^n}$

D. $\frac{[G][H]}{[E][F]}$

24.

(i) $3CuO_{(s)} + 2NH_{3(g)} \rightleftarrows 3Cu_{(s)} + 3H_2O_{(l)} + N_{2(g)}$

(ii) $2NH_{3(g)} + 3CI_{2(g)} \rightleftarrows 6HCI_{(g)} + N_{2(g)}$

(iii) $4NH_{3(g)} + 3O_{2(g)} \rightleftarrows 6H_2O_{(l)} + 2N_{2(g)}$.

The reactions represented by the equations above demonstrate the _____

A. basic properties of ammonia
B. acidic properties of ammonia
C. reducing properties of ammonia
D. oxidizing properties of ammonia

25. The salt that reacts with dilute hydrochloric acid to produce a pungent smelling gas which decolourizes acidified purple potassium tetraoxomanganate (VII) solution is _____

A. Na_2SO_4
B. Na_2SO_3
C. Na_2S
D. Na_2CO_3

26. The refreshing and characteristic taste of soda water and other soft drinks is as a result of the presence in them of _____

A. carbon (IV) oxide
B. carbon (II) oxide
C. soda
D. glucose

27. Which of the following are mixtures?

i. Petroleum
ii. Rubber latex.
iii. Vulcanizer's solution
iv. Carbon (II) sulphide

A. i, ii and iii
B. i, ii and iv
C. i and ii only
D. i and iv.

28. A balanced chemical equation obeys the law of _____

A. conservation of mass
B. definite proportions
C. multiple proportions
D. conservation of energy

29. A given amount of gas occupies 10.0 dm^3 at 4 atm and 273°C. The number of moles of the gas present is _____

A. 0.89 mol
B. 1.90 mol
C. 3.80 mol

D. 5.70 mol

[Molar volume of a gas at stp. = 22.4 dm^3]

30. According to Charles' law, the volume of a gas becomes zero at _____

A. 0°C
B. -100°C
C. -273°C
D. -373°C

31. A substance that is used as a ripening agent for fruits is _____

A. ethene
B. propane
C. methane
D. butane

32. The Sulphide which is insoluble in dilute hydrochloric acid is _____

A. FeS
B. CuS
C. ZnS
D. Na_2S

33. What is the pH of 0.001 $moldm^{-3}$ solution of the sodium hydroxide?

A. 14
B. 13
C. 12
D. 11

34. The type of bonding in $[Cu(NH_3)_4]^{2+}$ is _____

A. coordinate
B. electrovalent
C. metallic
D. covalent

35. Which of the following is an example of a chemical change?

A. dissolution of salt in water
B. rusting of iron
C. melting of ice
D. separating a mixture by distillation

36. To what temperature must a gas at 273K be heated in order to

double both its volume and pressure?

A. 298K
B. 546K
C. 819K
D. 1092K

37. According to the Kinetic Theory, an increase in temperature causes the kinetic energy of particles to _____

A. decrease
B. increase
C. be zero
D. remain constant

38. An element used in the production of matches is _____

A. nitrogen
B. aluminium
C. copper
D. Sulphur

39. Which of the following gases may not be dried with concentrated sulphuric acid?

A. $HCl_{(g)}$
B. NH_3
C. CI_2
D. SO_2

40. Consecutive members of an alkane homologous series differ by _____

A. CH
B. CH_2
C. CH_3
D. C_nH_n

JAMB CHEMISTRY PAST QUESTIONS (PT.9)

1. Pollution of water by crude oil can lead to _____

A. a decrease in carbon (IV) oxide content
B. an increase in oxygen content
C. a decrease in oxygen content
D. an increase in growth of aquatic animal

2. When a few drops of barium chloride is added to an unknown sample of acidified with hydrochloric acid, a whit precipitate insoluble in excess of the acid was obtained. The likely anion in the sample is _____

A. SO_4^{-2}
B. Cl^-
C. S^{2-}
D. CO_3^{2-}

3. Oxygen in air can be removed using _____

A. limewater
B. caustic soda solution
C. pyrogallol solution
D. slaked lime

4. Calculate the pH of a solution of 0.0001 mol/dm^{-3} hydrochloric acid.

A. 2
B. 4
C. 3
D. 1

5. Which of the following drying agents is NOT suitable for drying hydrogen sulphide?

A. CaO
B. P_4O_{10}
C. $CaCl_2$
D. H_2SO_4

6. The radioistotope used in industrial radiography for the rapid checking of faults in welds casting is _____

A. cobalt-60
B. Iodine-131

C. carbon-14

D. phosphorus-32

7. How many unpaired electrons are in the p-orbitals of a fluorine atom?

A. 1

B. 2

C. 3

D. 0

8. The radioactive emission with the least ionization power is _____

A. Y-rays

B. β-particules

C. $\propto$-particules

D. X-rays

9. The shape of the carbon (IV) oxide molecule is _____

A. angular

B. tetrahydral

C. pyramidal

D. linear

10. Which of the following molecules is held together by hydrogen bond?

A. H_2SO_4

B. HF

C. CH_4

D. HBr

11. The monomer of natural rubber is _____

A. 2-methylbuta-1,3-diene

B. 1-buten-3-yne

C. buta-1,3-diene

D. 2-chlorobuta-1,3-diene

12. The oxidation number of boron in NaBH is _____

A. -3

B. -1

C. +1

D. +3

13. $PCl_{5(l)} \leftrightharpoons PCl_{3(l)} + Cl_{2(g)}$

$\Delta H = +ve$

In the above reaction, the forward reaction is favoured by _____

A. increasing the size of the containing vessel
B. increasing the pressure
C. adding a catalyst
D. increasing the temperature

14. Which of the following halogens is the most reactive?

A. Cl_2
B. I_2
C. Br_2
D. F_2

15. A gas that forms a black precipitate with lead (II) ethanoate is _____

A. Cl_2
B. NH_3
C. H_2
D. H_2S

16. The common ore of iron is _____

A. bauxite
B. galena
C. cassiterite
D. magnetite

17. The difference between colloids and suspensions is brought out clearly by the fact that while colloids _____

A. do not scatter light, suspension do
B. can be separated by filtration, suspension cannot be separated
C. can be separated by a membrane, suspension cannot
D. do not settle out on standing, suspension do

18. Which of the following pollutants is associated with brain damage?

A. Carbon (II) oxide
B. Reactive fallout
C. Biodegradable waste
D. Sulphur (IV) oxide

19. Which of the following will produce a solution with pH less than 7 at equivalent point?

A. HNO_2 + NaOH
B. H_2SO_4 + KOH
C. HCl + $Mg(OH)_2$
D. HNO_3 + KOH

20. The number of hydroxonium ions produced by one molecule of an acid in aqueous solution is its _____

A. basicity
B. acid strength
C. pH
D. concentration

21. An effect of thermal pollution on water bodies is that the _____

A. volume of water reduces
B. volume of chemical waste increases
C. level of oxides of nitrogen increases
D. level oxygen reduces

22. Which of the following is a deliquescent compound?

A. Na_2CO_3
B. $CaCl_2$
C. CuO
D. $Na_2CO_3.10H_2O$

23. A chemical reaction in which the hydration energy is greater than the lattice energy is referred to as _____

A. a spontaneous reaction
B. an endothermic reaction
C. an exothermic reaction
D. a reversible reaction

24. The function of zinc electrode in a galvanic cell is that it _____

A. undergoes reduction
B. serves as the positive electrode
C. produces electrons
D. uses up electrons

25. $CH_{4(g)} + Cl_{2(g)} \rightarrow CH_3Cl_{(g)} + HCl_{(g)}$

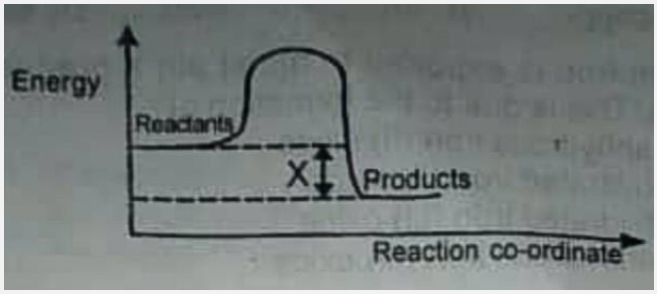
The major factor that influences the rate of the reaction above is _____

A. catalyst
B. temperature
C. concentration
D. light

26. The condition required for corrosion to take place is the presence of _____

A. water and carbon (IV) oxide
B. water, carbon (IV) oxide and oxygen
C. oxygen and carbon (IV) oxide
D. water and oxygen

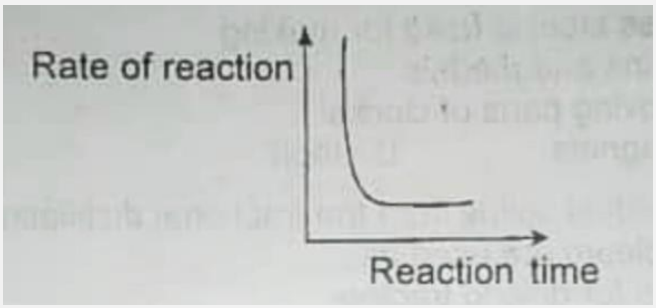
27.



In the diagram above, X is the _____

A. enthalpy
B. enthalpy change
C. activation energy
D. activated complex

28.



The diagram above best illustrates the effect of decrease in _____

A. concentration
B. temperature
C. surface area
D. pressure

29. $MnO_{4(aq)} + Y + 5Fe^{2+}_{(aq)} \rightarrow Mn^{2+}_{(aq)} + 5Fe^{2+}_{(aq)} + 4H_2O_{(l)}$

In the equation above, Y is _____

A. $5H^{+}_{(aq)}$
B. $4H^{+}_{(aq)}$
C. $10H^{+}_{(aq)}$
D. $8H^{+}_{(aq)}$

30. Given that M is the mass of a substance deposited during electrolysis and Q is the quantity of electricity consumed, then Faraday's first law can be written as _____

[E=Electrochmeical equivalent]

A. $M = \frac{E}{Q}$

B. M=EQ

C. $M = \frac{Q}{E}$

D. $M = \frac{E}{2Q}$

31. To a solution of an unknown compound, a little dilute tetraoxosulphate (VI) acid was added with some freshly prepared iron (II) tetraoxosuphate (VI) solution. The brown ring observed after the addition of a stream of concentrated tetraoxosulphate (VI) acid confirmed the presence of _____

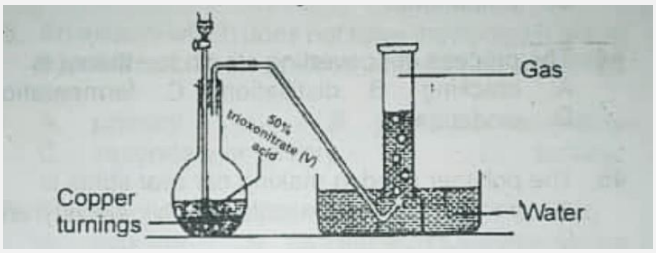
A. SO^{2-}_3

B. NO^{-}_3

C. CO^{2-}_3

D. Cl^{-}

32.



In the diagram above, the gas produced is _____

A. N_2O

B. N_2O_4

C. NO

D. NO_2

33. Which of the following is used as a rocket fuel?

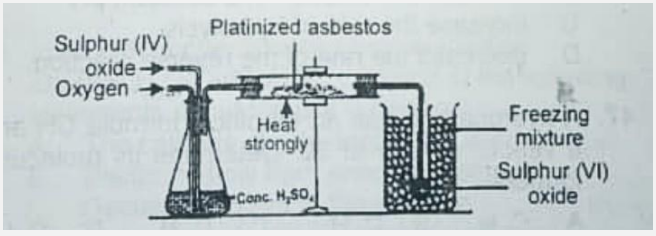
A. H_2SO_4

B. HCl

C. HNO_3

D. CH_3COOH

34.



In the diagram above, the purpose of the asbestos is to _____

A. solidify the gas
B. dry the gas
C. absorb impurities
D. catalyze the reaction

35. A constituent common to bronze and solder is _____

A. copper
B. tin
C. lead
D. silver

36. When iron is exposed to moist air, it gradually rusts. This is due to the formation of _____

A. anhydrous iron (II) oxide
B. hydrated iron (II) oxide
C. hydrated iron (III) oxide
D. anhydrous iron (III) oxide

37. a compound gives an orange-red colour to a non-luminous flame. This compound is likely to contain _____

A. Fe^{3+}
B. Fe^{2+}
C. Na^{+}
D. Ca^{2+}

38. Stainless steel is used for making _____

A. coins and medals
B. moving parts of clocks
C. magnets
D. tools

39. The residual solids from the fractional distillation of petroleum are used as _____

A. fuel for driving tractors
B. fuel for jet engines
C. coating for pipes
D. raw materials for the cracking process

40. $CH_3 (CH_2)_3 CH - C_2H_5$
$|$
C_3H_7

The IUPAC nomenclature of the compound above is _____

A. 5-propylheptane

B. 3-propylheptane
C. 4-ethyloctane
D. 5-ethyloctane

41. The alkanol obtained from the production of soap is _____

A. propanol
B. ethanol
C. glycerol
D. methanol

42. Ethyne is passed through a hot tube containing organo-nickel catalyst to produce _____

A. isoprene
B. polythene
C. ethanal
D. benzene

43. Due to the unstable nature of ethyne, it is stored by dissolving in _____

A. ethane-1,2-diol
B. propanol
C. ethanoic acid
D. propanone

44. The process of converting starch to ethanol is _____

A. cracking
B. distillation
C. fermentation
D. oxidation

45. The polymer used in making car rear lights is _____

A. Perspex
B. Bakelite
C. polystyrene
D. polyacrylonitrite

46. $CH_3COOC_2H_{5(l)} + H_2O_{(l)} + H^+ \rightarrow CH_3COOH_{(aq)} + C_2H_5OH_{(aq)}$

The purpose of H^+ in the reaction above is to _____

A. increase the yield of products
B. maintain the solution at a constant pH
C. increase the rate of hydrolysis
D. decrease the rate of the reverse reaction

47. A hydrocarbon has an empirical formula CH and a vapour density of 39. Determine its molecular formula.

A. C_2H_6
B. C_3H_8
C. C_3H_4
D. C_6H_6

48. Polystyrene is widely used as packaging materials for fragile objects during transportation because of its _____

A. lightness
B. low density
C. high density
D. high compressibility

49. The process of converting linear alkanes to branched chain and cyclic hydrocarbons by heating in the presence of catalyst to improve the quality of petrol is referred to as _____

A. refining
B. cracking
C. reforming
D. blending

50. The petroleum fraction that is used in heating furnaces in industries is _____

A. diesel oil
B. gasoline
C. kerosene
D. lubricating oil

JAMB CHEMISTRY PAST QUESTIONS (PT.10)

1. Which of the following acid is a weak acid?

A. H_3PO_4
B. $HClO_4$
C. H_2SO_4
D. HNO_3

2. To what volume should 250cm^3 of 2.00 mol/dm^3 HCl be diluted in order to obtain 0.100 mol/dm^{-3} HCl?

A. 0.5 dm^3
B. 1.5 dm^3
C. 3.5 dm^3
D. 5.0 dm^3

3. Which of the following factors would not affect the rate of a chemical reaction?

A. addition of a catalyst
B. density of reactants
C. change in temperature of the reaction system
D. physical states of reactants

4. Consider the process represented by the following chemical equation:

$2NaCl_{(s)} + H_2O_{(l)} \leftrightharpoons Na^+_{(aq)} + Cl^-_{(aq)} + NaCl_{(s)}$

The equation represents _____

A. saturated solution
B. unsaturated solution
C. solute dissolving in a solvent
D. fully dissociated solute

5. What volume of steam is produced by burning excess hydrogen in 8.0g of oxygen?

A. 4.48 dm^3
B. 11.2 dm^3
C. 22.4 dm^3
D. 44.8 dm^3

6. The following prevents iron from rusting except _____

A. tin plating
B. galvanizing

C. electroplating
D. vulcanizing

7. Which of the following processes does not involve redox reaction?

A. rusting of iron
B. combustion of fuels
C. decomposition of limestone
D. bleaching of dye

8. Which of the following quantities represent 965c of electricity?

A. 96500 moles of electrons
B. 965 moles of electrons
C. 1.0 mole of electron
D. 0.01 mole of electron

9. Sulphur (IV) oxide differs from Carbon (IV) oxide in that it _____

A. is denser than air
B. dissolve in water to give an acid
C. react with alkaline solution to form salts
D. combine with oxygen to form a higher oxide

10. Which of the following turns wet starch-iodide paper to blue-black?

A. CO_2
B. Cl_2
C. NH_3
D. H_2S

11. Elements S and T have half-lives of 3.0×10^{-3} minutes and 3.0×10^{2} minutes respectively. This means that _____

A. S is more stable than T
B. T is more stable than S
C. S and T have equal stability
D. S is slightly stable than T

12. The nuclear process responsible for limiting the build-up of heavy isotopes is _____

A. gamma decay
B. electron capture
C. nuclear fusion

D. position decay

13. Sodium hydroxide is industrially used in the manufacture of _____

A. sodium chloride
B. plastics
C. soap
D. margarine

14. Which of the following is an air pollutant commonly found in industrial areas?

A. ozone
B. sulphur (IV) oxide
C. lead dust
D. hydrogen chloride gas

15. The greenhouse effect is associated with the presence of excess _____

A. hydrogen sulphide
B. nitrogen (II) oxide
C. carbon (IV) oxide
D. carbon (II) oxide

16. In which group of the periodic table would an atom with electronic configuration $1s^2$ $2s^2$ $2p^5$ be found?

A. I
B. II
C. V
D. VII

17. Which of the following process(es) take(s) place during distillation?

I. Absorption
II. Desorption
III. Condensation
IV. Evaporation

A. I only
B. I and II only
C. II and III only
D. III and IV only

18. The oxidation number of Mn in $ZnMn_2O_4$ is _____

A. +3
B. +4

C. +6

D. +7

19. Covalency is enhanced between atoms with _____

A. widely different electronegativity

B. very close electronegativity

C. high electron affinities

D. low ionization potentials

20. Alkali metals _____

A. form covalent bonds with halogens

B. have their meeting points decrease down the group

C. form oxides when reacted with water

D. have their reactivities decrease down the group

21. The gas produced when dil HCl reacts with $BaSO_3$ could be identified by its _____

A. characteristic odour

B. ability to change blue litmus paper to red

C. ability to turn limewater milky

D. ability to turn acidified $KMnO_4$ colourless

22. Consider the reaction represented by the following equation: $5Fe^{2+} + MnO^{-}_4 + 8H^{+} \rightarrow 5Fe^{3+} + Mn^{2+} + 4H_2O$, which of the species is reduced?

A. Fe^{2+}

B. MnO_4

C. H^{+}

D. H_2O

23. If $100cm^3$ of a saturated solution of $CuSO_4$ at 120°C gives 40g of the salt on evaporation, calculate its solubility.

[Cu =64, S =32, O =16]

A. 0.25 mol/dm^{-3}

B. 0.40 mol/dm^{-3}

C. 2.50 mol/dm^{-3}

D. 4.00 mol/dm^{-3}

24. Consider the reaction represented by the following equation:

$2H_2S + SO_2 \rightarrow 2H_2O + 3S$

SO_2 is acting as _____

A. dehydrating agent
B. reducing agent
C. precipitating agent
D. oxidizing agent

25. In which of the following processes is the knowledge of solubility required?

A. Extraction of metals from their ore
B. Extraction of organic compounds from natural products
C. Separation of mixtures by sublimation
D. Separation of mixtures by sieving

26. An alkanol which does not have the hydroxyl group bonded to carbon position one can be classified as _____

A. primary
B. primary or secondary
C. secondary or tertiary
D. tertiary

27. The reaction between alkane and halogen is by _____

A. addition
B. reduction
C. polymerization
D. substitution

28. The separation technique which depends mainly on the solubilities of solutes at different temperatures is _____

A. sublimation
B. distillation
C. evaporation
D. crystallization

29. In an electrochemical cell represented as $Zn/ZnSO_{4(aq)}//Cu/CuSO_{4(aq)}$. Which

of the following statements about the cell is correct?

A. The cathode slowly decreases in size
B. Electrons flow from anode to cathode
C. Oxidation occurs at the cathode
D. The anode slowly increases in size

30. What is the IUPAC name of the following compound? CH_3-CHCl-CH-CH_3CH_3

A. 3-methyl, 2-chlorobutane
B. 3-chloro, 3-methylbutane
C. 2-methyl, 3-chlorobutane
D. 2-chloro, 3-methylbutane

31. What is the concentration of the solution containing 1.40g of potassium hydroxide in 250cm^3?

[K=39, H=1, O=16]

A. 0.025 mol/dm^3
B. 0.5 mol/dm^3
C. 0.100 mol/dm^3
D. 0.244 mol/dm^3

32. Which of the following species is the strongest reducing agent?

A. F^-
B. F_2
C. I^-
D. I_2

33. Which of the following solutions would turn blue litmus paper red?

A. $KCl_{(aq)}$
B. $Na_2CO_{3(aq)}$
C. $CH_2COONa_{(aq)}$
D. $CuSO_{4(aq)}$

34. Which of the following compounds have an octare number of hundred?

A. n-heptane
B. 2,2,4-tromethylpentane
C. 2-methyloctane
D. 3-methyloctane

35. Which of the following oxides can be reduced to the metal by hydrogen?

A. calcium oxide
B. copper (II) oxide
C. magnesium oxide
D. sodium oxide

36. An organic compound contains 53.3% oxygen, 6.7% hydrogen and 40.0% carbon. What is the empirical formula of the compound?

[H=1, C=12, O=16]

A. C_2HO
B. CHO
C. CH_2O
D. CHO_2

37. Consider the following reaction equation: $4Al_{(s)} + 3O_{2(g)} \rightarrow 2Al_2O_{3(s)}$. How many moles of Al_2O_3 would be formed when 27g of Al reacts completely with O_2? [O=16.0, Al=27.0]

A. 0.5
B. 1.0
C. 2.0
D. 4.0

38. Which of the following periodic properties increases down the group?

A. ionic radius
B. electron affinity
C. electronegativity
D. ionization energy

39. What volume of oxygen of s.t.p would be evolved when 9650C of electricity is passed through dilute tetraoxosulphate IV acid?

[1F =96500C, molar volume of a gas at s.t.p = 22.4 dm^3]

A. 0.56 dm^3
B. 1.12 dm^3
C. 2.24 dm^3
D. 22.4 dm^3

40. Which of the following properties of alkanes does not

increase as the relative molecular mass increases?

A. Boiling point
B. Flammability
C. Melting point
D. Viscosity

41. Which of the following reactions would benzene readily undergo?

A. polymerization
B. addition
C. substitution
D. hydrolysis

42. Which of the following polymers is thermoplastic?

A. Perspex
B. Cellulose
C. Bakelite
D. Proteins

43. Which of the following bond is/are broken when ethanol boils?

I. Hydrogen bonds
II. Ionic bonds
III. Covalent bonds

A. I only
B. II only
C. I and II only
D. II and III only

44. Consider the reaction:
$H^+_{(aq)} + OH_{(aq)} \rightarrow H_2O_{(l)}$.
The energy change taking place in the reaction is enthalpy of _____

A. formation
B. hydration
C. neutralization
D. solution

45. Group VII elements in their combined states are _____

A. halogens
B. anions
C. halides
D. cations

46. Consider the reaction represented by the following

equation: $AgNO_{3(aq)} + NaCl_{(aq)} \rightarrow AgCl_{(s)} + NaNO_{3(aq)}$.
The steps that could be taken to obtain pure dry sample of $AgCl_{(s)}$ from the mixture includes _____

A. heating to saturation and drying
B. filtering and evaporating to dryness
C. filtering, washing, and drying
D. crystallizing and allowing to cool

47. Electrons always occupy the lowest empty energy level is a statement of _____

A. Aufbau principle
B. Hund's principle
C. Periodic law
D. Pauli Exclusion principle

48. Which of the following class of compounds can exist as dipolar ions in a solution?

A. Alkanoic acid
B. Amino acids
C. Carbohydrates
D. Dialkanoic acid

49. Which of the following gases will diffuse fastest when passed through a prous plug?
[H = 1.0, C = 12.0, N = 14.0, O = 16.0]

A. Propane
B. Oxygen
C. Methane
D. Ammonia

50. 56.00cm^3 of a gas at s.t.p weighed 0.11g. What is the vapour density of the gas?
[Molar volume of a gas at s.t.p = 22.4 dm^3]

A. 11.00
B. 22.00
C. 33.00
D. 44.00

~~DISCLAIMER~~

These are **not** JAMB expo questions for this year, but past questions of previous years.

You are advised to study these past questions and know their **correct answers** as well as how the answer to each question was gotten to be well-prepared for your JAMB exam.

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