Joint Admission and Matriculation Board

JAMB

CHEMISTRY

Past Questions

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Years:

- ***2010*** ***2011*** ***2012***
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2010 JAMB CHEMISTRY QUESTIONS

PAPER TYPE: A

1. Which chemistry paper type is given to you

A. Type A
B. Type B
C. Type C
D. Type D

2. Which of the following is an example of a mixture?

A. Common salt
B. Blood
C. Sand
D. Washing soda

3. Calculate the percentage by mass of nitrogen in calcium trioxonitrate (V)
[Ca = 40, N = 14, O = 16]

A. 8.5%
B. 13.1%
C. 17.1%
D. 27.6%

4. The droplets of water observed around a bottle of milk taken out of the refrigerator is due to the fact that the

A. water vapour in the air around the bottle gains some energy from the bottle
B. temperature of the milk drops as it loses heat into the surroundings
C. saturated vapour pressure of the milk is equal to the atmospheric pressure
D. water vapour in the air around the bottle loses some of its energy to the bottle

5. The volume of a given gas is Vcm^3 P mm Hg. what is the new volume of the gas if the pressure is reduced to half at constant temperature?

A. 4 V cm3
B. 2 V cm3
C. $V/2$ cm3
D. V cm3

6. Moving from left to right across a period, the general rise in the first ionization energy can be attributed to the

A. decrease in nuclear charge
B. increase in nuclear charge
C. decrease in screening effect
D. increase in screening effect

7. How many unpaired electron(s) are there in the nitrogen sub-levels?

A. 3
B. 2
C. 1
D. none

8. The stability of the noble gases is due to the fact that they

A. have no electron in their outermost shells
B. have duplet or octet electron configurations
C. belong to group zero of the periodic table
D. are volatile in nature

9. The maximum number of electrons in the L shell of an atom is

A. 2
B. 8
C. 18
D. 32

10. Elements in the same period in the periodic table have the same

A. number of shells
B. atomic number
C. chemical properties
D. physical properties

11. ${}^{2}_{1}D + {}^{3}_{1}T \rightarrow {}^{4}_{2}He + {}^{1}_{0}n$ +energy
The reaction above illustrates

A. alpha decay
B. artificial transmutation
C. nuclear fusion
D. nuclear fission

12. A noble gas with a high power of fog penetration used in aerodrome beacons is

A. krypton
B. argon
C. helium
D. neon

13. Permanent hardness of water can be removed by

A. filtration
B. adding slaked lime
C. adding caustic soda
D. boiling

14. Substance employed as drying agents are usually

A. amphoteric
B. hydroscopic
C. efflorescent
D. acidic

15. Calculate the solubility in mol dm^{-3} of 40g of $CuSO_4$ dissolved in 100g of water at 120°C.
[Cu = 64, S = 32, O = 16]

A. 4.00
B. 2.50
C. 0.40
D. 0.25

16. Coffee stains can best be removed by

A. Kerosene
B. turpentine
C. a solution of borax in water
D. ammonia solution

17. Carbon (II) oxide is considered dangerous if inhaled mainly because it

A. can cause injury to the nervous system
B. competes with oxygen in the blood
C. competes with carbon (IV) oxide in the blood
D. can cause lung cancer

18. The acid that is used to remove rust is

A. boric
B. hydrochloric
C. trioxonitrate (V)
D. tetraoxosulphate (VI)

19. Calculate the volume of 0.5 mol dm^{-3} H_2SO_4 that is neutralized by 25 cm^3 of 0.1 mol dm^{-3} NaOH

A. 5.0 cm^3
B. 2.5 cm^3
C. 0.4 cm^3
D. 0.1 cm^3

20. The colour of methyl orange in alkaline medium is

A. yellow
B. pink
C. orange
D. red

21. Which of the following salts is slightly soluble in water?

A. AgCl
B. $CaSO_4$
C. Na_2CO_3
D. $PbCl_2$

22. $6AgNO_{4(aq)} + PH_{3(g)} + 3H_2O_{(l)} \rightarrow 6Ag_{(s)} + H_3PO_{3(g)} + 6HNO_{3(aq)}$
In the above reaction, the reducing agent is

A. $HNO_{3(aq)}$
B. $H_2O_{(l)}$
C. $PH_{3(g)}$
D. $AgNO_{3(aq)}$

23. The IUPAC nomenclature of the compound LiAlH4 is

A. lithiumtetrahydridoaluminate (III)
B. aluminium tetrahydrido lithium
C. tetrahydrido lithium aluminate (III)
D. lithium aluminium hydride

24. Iron can be protected from corrosion by coating the surface with

A. gold
B. silver
C. copper
D. zinc

25. What quantity of aluminium is deposited when a current of 10A is passed through a solution of an aluminium salt for 1930s?
[Al = 27, F = 96500 C mol-1]

A. 0.2 g

B. 1.8 g

C. 5.4 g

D. 14.2 g

26. In which of the following is the entropy change positive?

A. Thermal dissociation of ammonium chloride

B. Reaction between an acid and a base

C. Addition of concentrated acid to water

D. Dissolution of sodium metal in water

27. If a reaction is exothermic and there is a great disorder, it means that

A. the reaction is static

B. the reaction is in a state of equilibrium

C. there will be a large increase in free energy

D. there will be a large decrease in free energy

28. 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

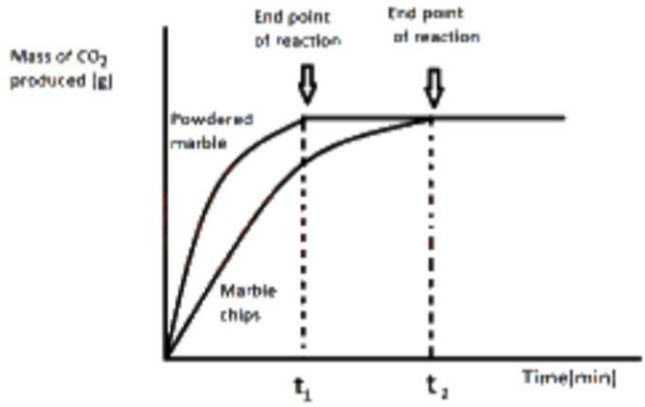
A. lowering the pressure of the reaction

B. increasing the surface area of the reactant

C. increase the rate of the reaction

D. lowering the energy barrier of the reaction

29.



The graph above demonstrate the effect of

A. surface area on the rate of reaction

B. catalyst on the rate of reaction

C. pressure on the rate reaction

D. concentration on the rate of reaction

30. $2H_{2(g)} + O_{2(g)} \leftrightharpoons 2H_2O_{(g)}$ ΔH = -ve. What happens to the equilibrium constant of the reaction above if the temperature is increased?

A. it is unaffected

B. it becomes zero

C. it decrease

D. it increases

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

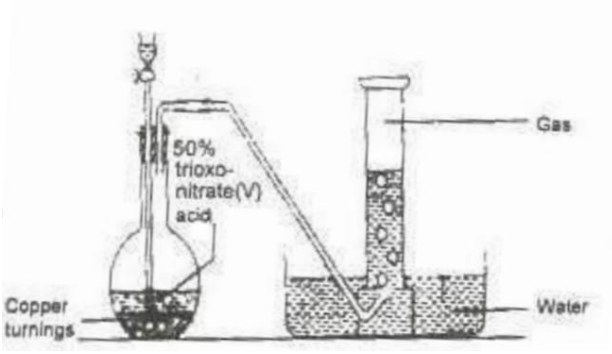
A. CO

B. Cl-

C. SO

D. NO

32.



In the diagram above, the gas produced is

A. NO

B. NO_2

C. N_2O

D. N_2O_4

33. Which of the following is used in rocket fuels?

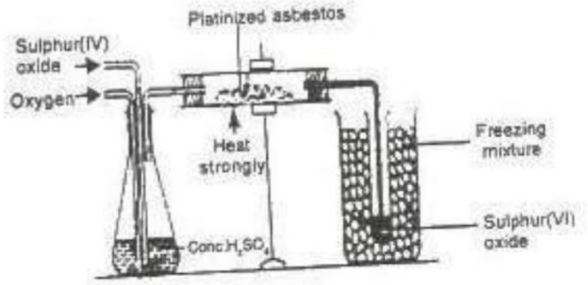
A. HNO_3

B. CH_3COOH

C. H_2SO_4

D. HCl

34. In the diagram below, the purpose of the asbestos to



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

35. A constituent common to bronze and solder is

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

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

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

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

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

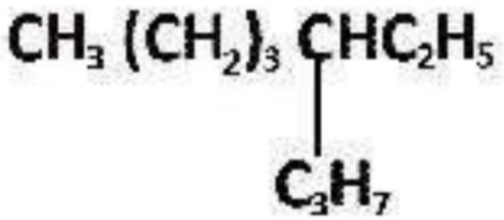
38. Stainless steel is used for making

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

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

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

40.



The IUPAC nomenclature of the compound above is

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

41. Which of the following is used as fuel in miners' lamp?

A. Ethanal
B. Ethyne
C. Ethene
D. Ethane

42. Which of the following organic compounds is very soluble in water?

A. CH_3COOH
B. C_2H_2
C. C_2H_4
D. $CH_3COOC_2H_5$

43. Benzene reacts with hydrogen in the presence of nickel catalyst at 180^{o}C to give

A. xylene
B. toluene
C. cyclopentane
D. cyclohexane

44. Which of the following is used to hasten the ripening of fruit?

A. Ethene
B. Ethanol
C. Ethyne
D. Ethane

45. The final products of the reaction between methane and chlorine in the presence of ultraviolet light are hydrogen chloride and

A. trichloromethane
B. dichloromethane
C. tetrachloromethane
D. chloromethane

46. The correct order of increasing boiling points of the following compounds C_3H_7OH, C_7H_{16} and C_4H_{10} is

A. $C_3H_7OH \rightarrow C_4H_{10} \rightarrow C_7H_{16}$
B. $C_4H_{10} \rightarrow C_7H_{16} \rightarrow C_3H_7OH$
C. $C_7H_{16} \rightarrow C_3H_7OH \rightarrow C_4H_{10}$
D. $C_4H_{10} \rightarrow C_3H_7OH \rightarrow C_7H_{16}$

47. One of the major uses of alkane is

A. as domestic and industrial fuel
B. in the hydrogenation of oils
C. in the textile industries
D. in the production of plastics

48. The haloalkanes used in dry-cleaning industries are

A. trichloromethane and tetrachloromethane
B. chloroethene and dichloroethene
C. trichloroethene and tetrachloroethene
D. chloroethane and dichloroethane

49. Two hydrocarbons X and Y were treated with bromine water. X decolorized the solution and Y did not not. Which class of compound does Y belong?

A. Benzene
B. Alkynes
C. Alkenes
D. Alkanes

50. The compound that is used as an anaesthetic is

A. CCl_4
B. $CH\ Cl_3$
C. CH_2Cl_2
D. CH_3Cl

ANSWER KEYS:

1. A **2.** B **3.** C **4.** D **5.** B **6.** B **7.** A **8.** B **9.** B **10.** A **11.** C **12.** A **13.** C **14.** B **15.** B **16.** D **17.** B **18.** B **19.** B **20.** A **21.** B **22.** C **23.** A **24.** D **25.** B

26. A **27.** C **28.** D **29.** A **30.** C **31.** D **32.** A **33.** A **34.** B **35.** D

36. A **37.** B **38.** C **39.** A **40.** D
41. B **42.** A **43.** D **44.** A **45.** C
46. D **47.** A **48.** A **49.** D **50.** B

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2011 JAMB CHEMISTRY QUESTIONS

PAPER TYPE: B

1. Which question Paper Type of Chemistry is given to you?

A. Type A
B. Type B
C. Type C
D. Type D

2. What is the concentration of a solution containing 2g of NaOH in $100cm^3$ of solution?
[Na = 23, O = 16, H = 1]

A. 0.40 mol dm^{-3}
B. 0.50 mol dm^{-3}
C. 0.05 mol dm^{-3}
D. 0.30 mol dm^{-3}

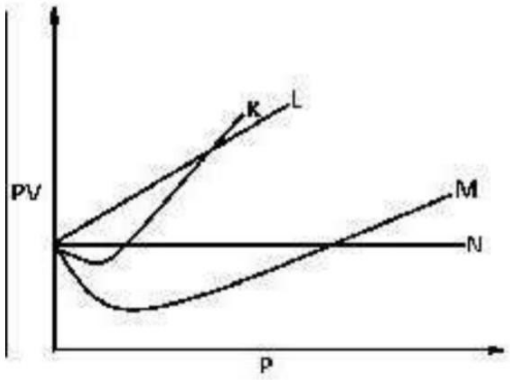
3. Which of the following properties is NOT peculiar to matter?

A. kinetic energy of particles increases from solid to gas
B. Random motion of particles increases from liquid to gas
C. Orderliness of particles increases from gas to liquid
D. Random motion of particles increases from gas to solid

4. The principle of column chromatography is based on the ability of the constituents to

A. move at different speeds in the column
B. dissolve in each other in the column
C. react with the solvent in the column
D. react with each other in the column

5.



From the diagram above, an ideal can be represented by

A. M
B. N
C. K
D. L

6. Which of the following questions is correct about the periodic table?

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

7. The relative atomic mass of a naturally occurring lithium consisting of 90% Li and 10% Li is

A. 6.9
B. 7.1
C. 6.2
D. 6.8

8. An isotope has an atomic number of 15 and a mass number of 31. The number of protons it contain is

A. 16
B. 15
C. 46
D. 31

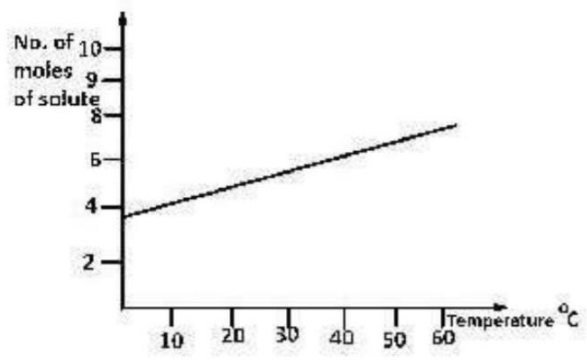
9. The molecular lattice of iodine is held together by

A. dative bond
B. metallic bond
C. hydrogen bond
D. van der Waal's forces

10. The arrangement of particles in crystal lattices can be studied using

A. X - rays
B. γ - rays
C. α - rays
D. β – rays

11.



From the diagram above, find the amount of solute deposited when 200 cm^3 of the solution is cooled from 55ºC to 40ºC

A. 0.10 mole
B. 0.20mole
C. 0.01 mole
D. 0.02 mole

12. The importance of sodium aluminate (III) in the treatment of water is to

A. cause coagulation
B. neutralize acidity
C. prevent goitre and tooth decay
D. kill germs

13. What type of bond exits between an element X with atomic number 12 and Y with atomic number 17?

A. Electrovalent
B. Metallic
C. Covalent
D. Dative

14. Hardness of water is mainly due to the presence of

A. calcium hydroxide or magnesium hydroxide
B. calcium trioxocarbonate (IV) or calcium tetraoxosulphate (VI)
C. sodium hydroxide or magnesium Hydroxide
D. calcium chloride or sodium chloride salts

15. A suitable solvent for iodine and nephthalene is

A. carbon (IV) sulphide
B. ethanol
C. water
D. benzene

16. Which of the following noble gases is commonly found in the atmosphere?

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A. Xenon
B. Neon
C. Helium
D. Argon

17. $N_2O_{4(g)} \leftrightharpoons 2NO_{2(g)}$ ΔH = +ve
In the reaction above, an increase in temperature will

A. increase the value of the equilibrium constant
B. decreases the value of the equilibrium constant
C. increase in the reactant production
D. shift the equilibrium to the left

18. $CH_3COOH_{(aq)} + OH^-_{(aq)} \leftrightharpoons CH_3COO^-_{(aq)} + H_2O_{(l)}$
In the reaction above, $CH_3COO^-_{(aq)}$ is

A. conjugate base
B. acid
C. base
D. conjugate acid

19. How many cations will be produced from a solution of potassium aluminium tetraoxosulphate (VI)?

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

20. Which of the following is **NOT** an alkali?

A. NH_3
B. $Mg(OH)_2$
C. $Ca(OH)_2$
D. NaOH

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

A. volume of water reduces
B. volume of chemical waste increase
C. level of oxides of nitrogen increase
D. level of 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 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. production electrons

D. uses up electrons

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

The major factor that influence 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

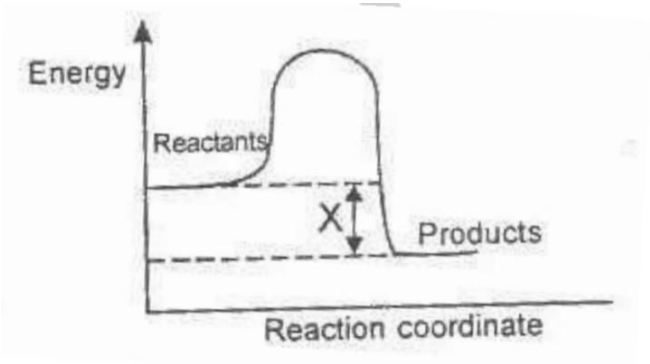
A. water and carbon (IV) oxide

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

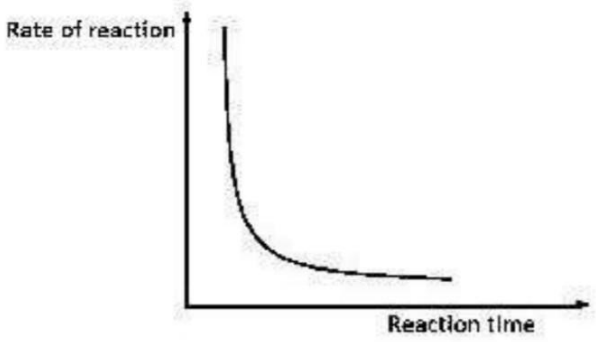
A. enthalpy

B. enthalpy change

C. activation energy

D. activated complex

28. The diagram below best illustrates the effect of decrease in



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 [Electrochemical equivalent]

A. $M = \frac{E}{Q}$
B. $M = EQ$
C. $M = \frac{Q}{E}$
D. $M = \frac{E}{2Q}$

31. The impurities formed during the laboratory preparation of chlorine gas are removed by

A. H_2O
B. NH_3
C. H_2SO_4
D. HCl

32. The effect of the presence of impurities such as carbon and sulphur on iron is that they

A. give it high tensile strength
B. make it malleable and ductile
C. increase its melting point
D. lower its melting point

33. A few drops of concentrated HNO_3 is added to an unknown solution and boiled for a while. If

this produces a brown solution, the cation presents are likely to be

A. Pb^{2+}
B. Cu^{2+}
C. Fe^{3+}
D. Fe^{2+}

34. The bleaching action of chlorine gas is effective due to the presence of

A. hydrogen chloride
B. water
C. air
D. oxygen

35. In the laboratory preparation of oxygen, dried oxygen is usually collected over

A. hydrochloric acid
B. mercury
C. calcium chloride
D. tetraoxosulphate (VI) acid

36. The property of concentrated H_2SO_4 that makes it suitable for preparing HNO_3 is its

A. boiling point
B. density
C. oxidizing properties
D. dehydrating properties

37. Bronze is preferred to copper in the making of medals because it

A. is stronger
B. can withstand low temperature
C. is lighter
D. has low tensile strength

38. The constituents of baking powder that makes the dough to rise is

A. $NaHCO_3$
B. NaOH
C. Na_2CO_3
D. NaCl

39. Which of the following compound is used as a gaseous fuel?

A. $CH_3 - C = CH$

B. $CH_3 - CH_2 - CH_3$

$\quad\quad\quad

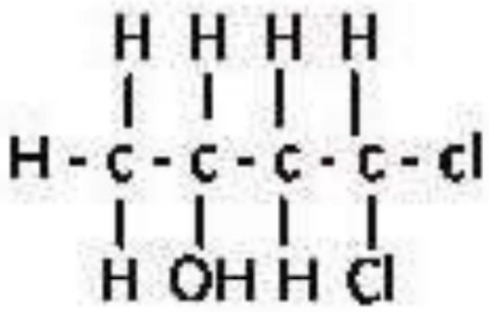
The reaction above represented by the equation above is useful in the production of

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

45. The number of isomers that can be obtained from C_4H_{10} is

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

46.



The functional groups present in the compound above are

A. alkene and halo-group
B. hydroxyl and chloro-group
C. alkene and chloro-group
D. hydroxyl and halo-group

47.

47.
A. $(CH_3)_3N$ B. CH_3NH_2
C. $CH_3C(=O)NH_2$ D. $(CH_3)_2NH$

Which of the following is a primary amine?

A. A
B. B
C. C
D. D

48. Two organic compounds K and L were treated with a few drops of Fehling's solutions respectively. K formed a brick red precipitate while L, remains unaffected. The compound K is an

A. alkanol
B. alkane
C. alkanal
D. alkanone

49. Which of the following statements is true about 2-methylpropane and butane

A. They are members of the same homologous series
B. They have the same boiling point
C. They have different number of carbon atoms
D. They have the same chemical properties

50. $CH_3COOH + C_2H_5OH \xrightarrow[H_2SO_4]{conc} CH_3COOC_2H_5 + H_2O$

The reaction above is best described as

A. esterification
B. Condensation
C. saponification
D. neutralization

ANSWER KEYS:

1. B **2.** B **3.** D **4.** A **5.** B **6.** B **7.** – **8.** B **9.** D **10.** A **11.** B **12.** A **13.** A **14.** B **15.** B **16.** D **17.** A **18.** A **19.** D **20.** A **21.** D **22.** B **23.** C **24.** C **25.** D

26. D **27.** B **28.** A **29.** A **30.** B **31.** A **32.** D **33.** D **34.** B **35.** D **36.** C **37.** C **38.** A **39.** D **40.** C **41.** A **42.** B **43.** C **44.** D **45.** D **46.** B **47.** B **48.** C **49.** A **50.** A

2012 JAMB CHEMISTRY QUESTIONS

PAPER TYPE: RED

1. Which Question Paper Type of Chemistry is given to you?

A. Type Green
B. Type Purple
C. Type Red
D. Type Yellow

2. Which of the following methods can be used to obtain pure water from a mixture of sand, water and methanoic acid?

A. neutralization with NaOH followed by filtration
B. neutralization with NaOH followed by distillation
C. fractional distillation
D. filtration followed by distillation

3. How many atoms are present in 6.0g of magnesium?
[Mg = 24, NA = 6.02 x 10^{23} mol^{-1}]

A. 1.20 x 10^{22}
B. 2.41 x 10^{22}
C. 1.51 x 10^{23}
D. 3.02 x 10^{23}

4. 50 cm3 of gas was collected over water at 10oC and 765 mm Hg. Calculate the volume of the gas at s.t.p. if the saturated vapour pressure of water at 10°C is 5mm Hg

A. 49.19 cm3
B. 48.87 cm3
C. 48.55 cm3
D. 48.23 cm3

5. An increase in the pressure exerted on gas at a constant temperature result in

A. a decrease in the number of effective collisions
B. a decrease in volume
C. an increase in the average intermolecular distance
D. an increase in volume

6. $2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(g)}$

In the reaction above, what volume of hydrogen would be left over when 300 cm3 of oxygen and 1000 cm3 of hydrogen are exploded in a sealed tube?

A. 200 cm3
B. 400 cm3
C. 600 cm3
D. 700 cm3

7. l. Evaporation.
ll. Sublimation.
lll. Diffusion.
IV. Brownian motion.

Which of the above can correctly be listed as evidences for the particulate nature of matter?

A. I and lll only
B. ll and lV only
C. l, ll and lll only
D. l, ll, lll and lV

8. If the elements X and Y have atomic numbers 11 and 17 respectively, what type of bond can they form?

A. Dative
B. Covalent
C. Ionic
D. Metallic

9. A hydrogen atom which has lost an electron contains

A. one proton only
B. one neutron only
C. one proton and one neutron
D. one proton, one electron and one neutron

10. The electronic configuration of Mg^{2+} is

A. $1s^2\ 2s^2\ 2P^6\ 3s^2\ 3P^2$
B. $1s^2\ 2s^2\ 2P^6\ 3s^2$
C. $1s^2\ 2s^2\ 2p^6$
D. $1s^2\ 2s^2\ 2P^4$

11. Group VII elements are

A. monoatomic
B. good oxidizing agents
C. highly electropositive
D. electron donors

12. Which of the following is used to study the arrangement of particles in crystal lattices?

A. Alpha-particles
B. Beta-particles
C. Gamma-rays
D. X-rays

13. I. It has a varied composition from one place to another.
ll. its constituents can be separated by physical means
Ill. It contains unreactive noble gases which of the above shows that air is a mixture?

A. **I** and **ll** only
B. **ll** and **lll** only
C. **l and lll only**
D. **l, ll** and **lll**

14. The chemicals used to soften hard water involves the addition of

A. insoluble sodium compounds which from soluble solutions of calcium and magnesium
B. soluble sodium compounds which from soluble solutions of calcium and magnesium ions
C. soluble sodium compounds which from insoluble precipitates of calcium and magnesium ions
D. insoluble precipitates of calcium and magnesium ions

15. Chlorination of water for town supply is carried out to

A. make the water colourless
B. remove germs from the water
C. make the water tasteful
D. remove odour from the water

16. The solubilities of different solutes in a given solvent can be compared by

A. plotting their solubility curves on separate axes
B. plotting their solubility curves on the same axes
C. plotting some of the solubility curves on the x-axis and others on the y-axis

D. plotting their solubility curves on the x-axis only

17. Potassium trioxochlorate (V) has a solubility of 1.5 $moldm^{-3}$ at 45°C. On cooling this solution to a temperature of 20°C, the solubility was found to be 0.5 mol dm_{-3}. What mass of $KClO_3$ was crystalized out?
[K = 39, Cl = 35.5 O =16]

A. 1.00g
B. 10.00g
C. 12.25g
D. 122.50g

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

A. Carbon (ll) oxide
B. Radioactive fallout
C. Biodegradable waste
D. Sulphur (lV) oxide

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

A. HNO_3 + NaOH
B. H_2SO_4 + KOH
C. HC +$Mg(OH)_2$
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. During a titration experiment, 0.05 moles of carbon (lV) oxide is liberated. What is the volume of gas liberated?

A. 22.40 dm3
B. 11.20 dm3
C. 2.24 dm3
D. 1.12 dm3

22. A major factor considered in selecting a suitable method for preparing a simple salt is its

A. Crystalline form

B. melting point
C. reactivity with dilute acids
D. solubility in water

23. The oxidation number of boron in $NaBH_4$ is

A. -3
B. -1
C. +1
D. +3

24. $2Na_2O_{2(s)} + 2H_2O_{2(l)} \rightarrow 4 NaOH_{(s)} + O_{2(s)}$
The substance that is oxidized in the reaction above is

A. $2NaO_{2(s)}$
B. $NaOH_{(aq)}$
C. $H_2O_{(l)}$
D. $O_{2(g)}$

25. What number of moles of Cu^{2+} will be deposited by 360 coulombs of electricity?
[f = 96500 C mol^{-1}]

A. 5.36 x 10^{-4} mole
B. 1.87 x 10^{-3} mole
C. 9.35 x 10^{-4} mole
D. 3.73 x 10^{-3} mole

26. A metal M displaces zinc from ZnCl, 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

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

A. + 262 KJ mol^{-1}
B. - 262 KJ mol^{-1}
C. + 42 KJ mol^{-1}
D. - 42 KJ mol^{-1}

28. An increase in entropy can best be illustrated by

A. mixing of gases

B. freezing of water

C. the condensation of vapour

D. solidifying candle wax

29. The highest rate of production of carbon (IV) oxide can be achieved using

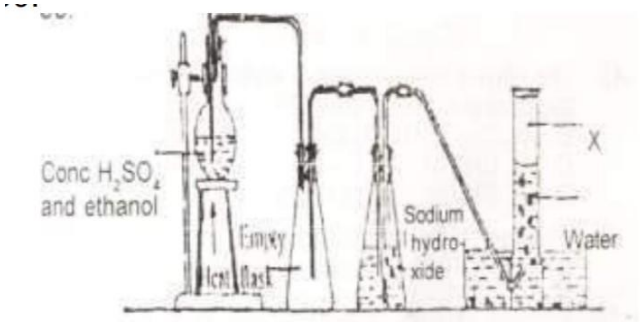
A. 0.05 mol^{-3} HCI and 5g powdered $CaCO_3$

B. 0.05 mol^{-3} HCl and 5g lump $CaCO_3$

C. 0.10 mol^{-3} HCI and 5g powdered $CaCO_3$

D. 0.025 mol^{-3} HCI and 5g powdered $CaCO_3$

30.



$2HCl_{(aq)} + CaCO_{3(S)} \rightarrow CaCl_{2(s)} + CO_{2(g)} + H_2O_{(l)}$

From the reaction above, which of the curves represents the production of CO_2 gas as dilute HCl is added?

A. L

B. M

C. N

D. P

31. $2CO_{(g)} + O_{2(g)} \leftrightharpoons 2CO_{2(g)}$

In the reaction above, high pressure will favour the forward reaction because

A. high pressure favours gas formation

B. the reaction is in dynamic equilibrium

C. the reaction is exothermic

D. the process occurs with a decrease in volume

32. A piece of filter paper moistened with lead (II) ethanoate solution turns black when the paper is dropped into a gas likely to be

A. sulphur (VI) oxide

B. hydrogen chloride
C. sulphur (VI) oxide
D. hydrogen sulphide

33. Which of the following gases has a characteristic pungent smell, turns red litmus paper blue and forms dense white fumes with hydrogen chloride gas?

A. N_2
B. N_2O
C. CI_2
D. NH_3

34. Commercial bleaching can be carried out using

A. sulphur (IV) oxide and ammonia
B. hydrogen sulphide and chlorine
C. chlorine and sulphur (IV) oxide
D. ammonia and chlorine

35. Mineral acids are usually added to commercial hydrogen peroxide to

A. oxidize it
B. decompose it
C. minimize its decomposition
D. reduce it to water and oxygen

36. Which of the following compounds will burn with a brick-red colour in a nonluminous Bunsen flame?

A. LiCI
B. NaCl
C. $CaClN_2$
D. $MgClN_2$

37. The purest form of iron which contains only about 0.1% carbon is

A. pig iron
B. wrought iron
C. cast iron
D. iron pyrite

38. A common characteristic between zinc and the other transition elements is the ability to

A. have variable oxidation states

B. from complex ions
C. act as a catalyst
D. from coloured ions

39. Which of the following metals is the least reactive?

A. Pb
B. Sn
C. Hg
D. Au

40. Geometric isomerism can exist in

A. hex-3-ene
B. hexane
C. prop-1-ene
D. 3-methyl but -1-ene

41. Alkanals can be distinguished from alkanones by the reaction with

A. Sudan lll stain
B. starch iodide paper
C. lithium tetrahydrido aluminate (lll)
D. Fehling's solution

42. The isomers of C_3H_8O are

A. 1 - propanol and 2 - propanol
B. 1 - propanol and 1 - propanol
C. 2 - propanol and 2 - propanone
D. 2 - propanol and 1 - propanol

43. Carbohydrates are large molecules with the molecular formula $Cx(H_2O)y$. In which of the following pairs is x not equal to y?

A. glucose and starch
B. maltose and starch
C. sucrose and fructose
D. maltose and starch

44. A compound contains 40.0% C, 6.7% H 53.3% O. If the molecular mass of the compound is 180, its molecular formula is [C =12, H =1, 0]

A. CH_2O
B. $C_3H_6O_3$
C. $C_6H_6O_3$
D. $C_6H_{12}O_6$

45. The alkyne that will give a white precipitate silver trioxonitrate (V) is

A. $CH_3CH_2C \equiv CCH_2CH_3$
B. $CH_3C \equiv CCH_2CH_2CH_3$
C. $CH_3CH_2CH_2CH_2C \equiv CH$
D. $CH_3CH_2CH_2C \equiv CCH_2CH_3$

46. The saponification of an alkanoate to produce soap and alkanol involves

A. dehydration
B. esterification
C. hydrolysis
D. oxidation

47. 2 - methyl propan -2- ol is an example of a

A. primary alkanol
B. secondary alkanol
C. tertiary alkanol
D. quaternary alkanol

48. The final oxidation product of alkanol, alkanal and alkanoes is

A. alkanoic acid
B. alkanoyyl halide
C. alkanoate
D. alkanamide

49. Ethanol reacts with concentrated tetraoxosulphate (V) acid at a temperature above 170^{0}C to form

A. ethanone
B. ethene
C. ethyne
D. ethanal

50. An example of oxidation – reduction enzyme is

A. amylase
B. protease
C. lipase
D. dehydrogenase

ANSWER KEYS:

1. C **2.** D **3.** C **4.** D **5.** B **6.** B **7.** D **8.** C **9.** C **10.** C **11.** B **12.** D **13.** A **14.** C **15.** B **16.** B **17.** D **18.** B

19. C **20.** B **21.** D **22.** D **23.** D **24.** A **25.** B

26. B **27.** C **28.** A **29.** C **30.** No answer **31.** D **32.** D **33.** D **34.** C **35.** C **36.** C **37.** B **38.** B **39.** D **40.** A **41.** D **42.** A **43.** A **44.** D **45.** C **46.** C **47.** C **48.** A **49.** B **50.** D

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2013 JAMB CHEMISTRY QUESTIONS

PAPER TYPE: I

1. Which Question Paper Type of Chemistry is given to you?

A. Type D
B. Type I
C. Type B
D. Type U

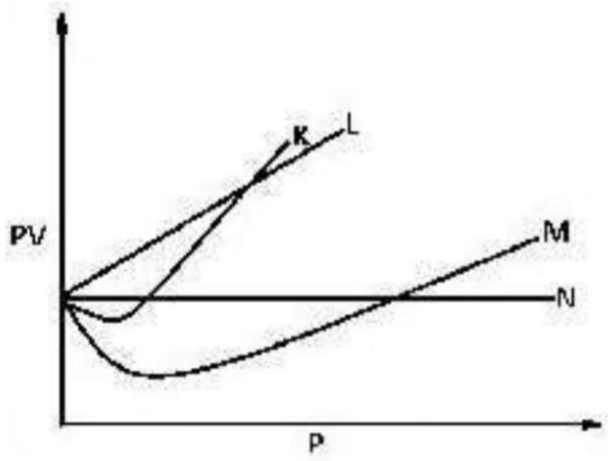
2. The presence of an impurity in substance will cause the melting point to

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

3. What volume of carbon (ll) oxide is produced by reacting excess carbon with $10dm^3$ of oxygen?

A. 5 dm^3
B. 20 dm^3
C. 15 dm^3
D. 10 dm^3

4.



From the diagram above, an ideal gas is represented by

A. M
B. N
C. K
D. L

5. The rate of diffusion of a gas Y is twice that of Z If the relative molecular mass of Y is 64 and the two gases diffuse under the same conditions, find the relative molecular mass of Z

A. 32
B. 4
C. 8
D. 16

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

A. Carbon-14
B. phosphorus-32
C. cobalt-60
D. iodine-131

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

A. 3
B. 0
C. 1
D. 2

8. The radioactive emission with the least ionization power is

A. α-particles
B. X-rays
C. γ-rays
D. β-particles

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

A. pyramidal
B. linear
C. angular
D. tetrahedral

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

A. $CH4$
B. HBr
C. H_2SO_4
D. HF

11. The bond formed between two elements with electron configurations $1s^2\ 2s^2\ 2p^6\ 3s^2$ and $1s^2\ 2s^2\ 2p^4$ is

A. metallic
B. covalent
C. dative
D. ionic

12. The constituent of air that acts as a diluent is

A. nitrogen
B. carbon (IV) oxide

C. noble gases
D. oxygen

13. Steam changes the colour of anhydrous cobalt (ll) chloride from

A. white to red
B. blue to white
C. blue to pink
D. white to blue

14. An example of a hygroscopic substance is

A. $CuO_{(S)}$.
B. $MgCl_{2(S)}$.
C. $CaCl_{2(S)}$.
D. $NaOH_{(S)}$.

15. If 24.4g of lead (ll) trioxonitrate (V) were dissolved in 42 g of distilled water at 20°C; calculate the solubility of the solute in gdm^{-3}.

A. 581.000
B. 0.581
C. 5.810
D. 58.100

16. The solvent used for removing grease stain is

A. turpentine
B. ammonia solution
C. ethanol
D. solution of borax in water

17. In a water body, too much sewage leads to

A. a decrease in the temperature of the water which cause in death of aquatic animals
B. an increase in the number of aquatic animals in the water
C. an increase in the bacterial population which reduces the level of oxygen in the water
D. a decrease in the bacterial population which increases the level of oxygen in the water

18. 10.0 dm^3 of water was added to 2.0 $moldm^{-3}$ of 2.5dm^3 solution of HCl. What is the concentration of the final solution in mol dm^{-3}?

A. 0.4
B. 8.0
C. 2.0
D. 0.5

19. Three drops of a 1.0 mol dm^{-3} solution of HCl was added to 20cm^3 of a solution of pH6.4. The pH of the resulting solution will be

A. close to that of pure water
B. less than 6.4
C. greater than 6.4
D. unaltered

20. Which of the following substances is not a salt?

A. Aluminium oxide
B. Sodium hydrogen trioxosulphate (V)
C. Sodium trioxocarbonate (V)
D. Zinc chloride

21. An insoluble salt can be prepared by

A. the reaction of trioxocarbonate (V) with an acid
B. double decomposition
C. the action of dilute acid on an insoluble base
D. the reaction of metals with an acid

22. $2H_2O_{(l)} + 2F_{2(g)} \rightarrow 4HF_{(aq)} + O_{2(g)}$

In the reaction above, the substance that is being reduced is

A. $O_{2(g)}$
B. $H_2O_{(l)}$
C. $F_{2(g)}$
D. $HF_{(aq)}$

23. $Zn_{(s)} + CuSO_{4(aq)} \rightarrow ZnSO_{4(aq)} + Cu_{(s)}$

In the reaction above, the oxidizing agent is

A. $CuSO_{4(aq)}$
B. $ZnSO_{4(aq)}$
C. $Cu_{(s)}$
D. $Zn_{(s)}$

24. In an electrochemical cell, polarization is caused by

A. chlorine
B. oxygen
C. tetraoxosulphate (Vl) acid
D. hydrogen

25. Calculate the volume in cm^3 of oxygen evolved as s.t.p. when a current of 5 A is passed through acidified water for 193s
{F = 96500 $Cmol^{-1}$, Molar volume of a gas at s.t.p. = 22.4 dm^3}

A. 224.000 dm3
B. 0.056 dm3
C. 0.224 dm3
D. 56.000 dm3

26. In an endothermic reaction, if there is a loss in entropy the reaction will

A. be indeterminate
B. be spontaneous
C. not be spontaneous
D. be at equilibrium

27. $2SO_{2(g)} + O_{2(g)} \leftrightharpoons 2SO_{3(g)}$
$\Delta H = -395.7 kJmol^{-1}$

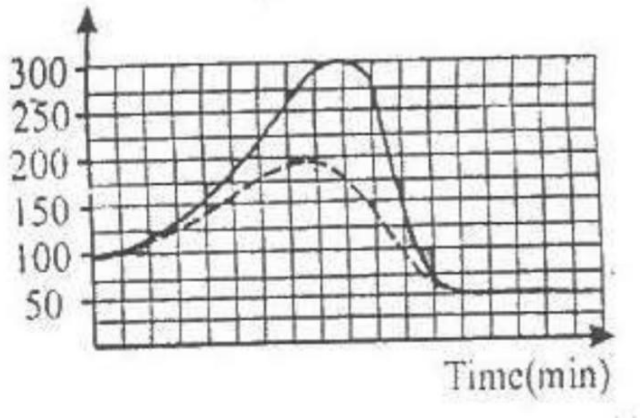
In the reaction above, the concentration of $SO_{3(g)}$ can be increased by

A. decreasing the pressure
B. decreasing the temperature
C. increasing the temperature
D. the addition of catalyst

28. The minimum amount of energy required for a reaction to take place is

A. lattice energy
B. ionization energy
C. activation energy
D. kinetic energy

29.



In the graph above, the activation energy of the catalyzed reaction is

A. 100KJ

B. 300KJ

C. 250KJ

D. 200KJ

30. $3Fe_{(S)} + 4H_2O_{(g)} \rightleftharpoons Fe_3O_{4(s)} + 4H_{2(g)}$.

The equilibrium constant, K, of the reaction above is represented as

A. $\frac{[Fe_3O_4][H_2]}{[Fe][H_2O]}$

B. $\frac{[H_2O]^4}{[H_2]^4}$

C. $\frac{[H_2]^4}{[H_2O]^4}$

D. $\frac{[Fe]^3[H_2O]^2}{[Fe_3O_4][H_2]^4}$

31. Which of the following compounds is a neutral oxide?

A. Carbon (IV) oxide

B. Sulphur (Vl) oxide

C. Sulphur (IV) oxide

D. Carbon (ll) oxide

32. In the laboratory preparation of ammonia, the flask is placed in a slanting position so as to

A. prevent condensed water from breaking the reaction flask

B. enable the proper mixing of the reactions in the flask

C. enhance the speed of the reaction

D. prevent formation of precipitate

33. Which of the gases is employed as an anaesthesia?

A. N_2O

B. NO_2

C. NH_3

D. NO

34. Sulphur (IV) oxide is a strong reducing agent in the presence of water due to the formation of

A. hydroxide ion

B. sulphur (Vl) oxide

C. hydrogen sulphide

D. trioxosulphate (IV) salt

35. A metal that forms soluble trioxosulphate (IV) ion is

A. barium
B. potassium
C. manganese
D. aluminium

36. Copper is displaced from the solution of its salts by most metals because it

A. is a transition element
B. is at the bottom of the activity series
C. is very reactive
D. has completely filled 3d-orbitals

37. 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

38. Aluminium containers are frequently used to transport trioxonitrate (V) acid because aluminium

A. has a silvery-white appearance
B. has a low density
C. does not react with the acid
D. does not corrode

39. 2-methylbutan-2-ol is an example of a

A. dihydric alkanol
B. tertiary alkanol
C. secondary alkanol
D. primary alkanol

40. The reaction between ammonia and ethyl ethanoate produces

A. propanol and ethanamide
B. propanol and propanamide
C. ethanol and propanamide
D. ethanol and ethanamide

41. The decarboxylation of ethanoic acid will produce carbon (IV) oxide and

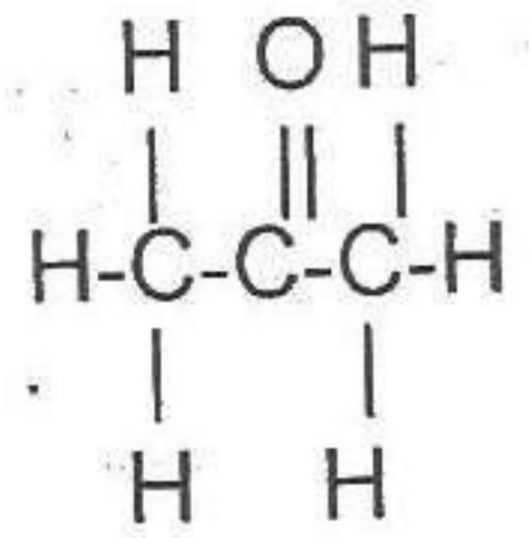
A. methane

B. ethane

C. propane

D. butane

42.



The compound above is an

A. alkanone

B. alkanoate

C. alkanal

D. alkanol

43. The compound that will react with sodium hydroxide to form salt and water is

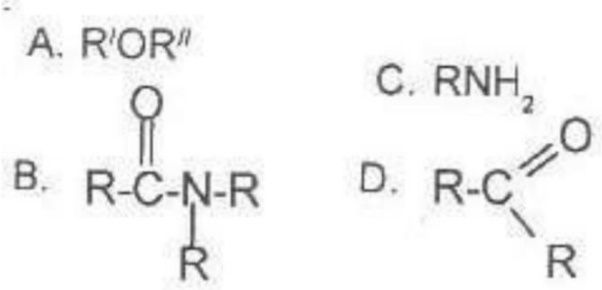
A. $C_6H_{12}O_6$

B. $(CH_3)_3COH$

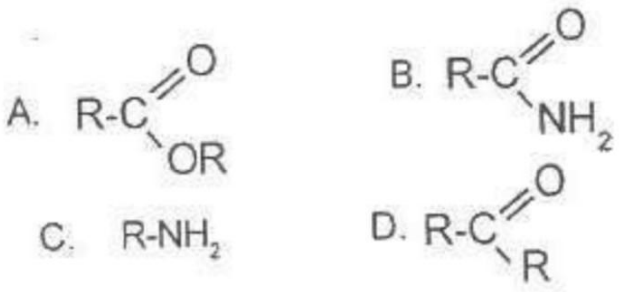
C. $CH_3CH=CH_2$

D. CH_3CH_2COOH

44. Which of the following compounds in solution will turn red litmus paper blue?



45. The dehydration of ammonium salt of alkanoic acids produces a compound with the general formula



46. Which of the following fraction is used as raw material for the cracking process?

A. kerosene

B. lubricating oil

C. bitumen

D. diesel oils

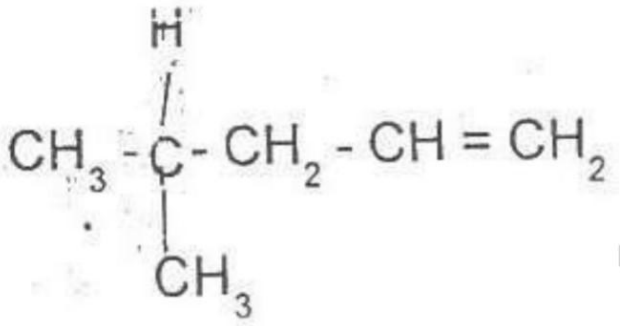
47. An organic compound with a pleasant smell is likely to have a general formula

A. $C_nH_{2n+1}CHO$
B. $C_nH_{2n+1}COOH$
C. $C_nH_{2n+1}COOC_nH_{2n+1}$
D. $C_nH_{2n+1}COC_nH_{2n+1}$

48. A primary amide is generally represented by the formula

A. RCOOR
B. $RCONH_2$
C. RCONHR
D. $RCONR_2$

49.



The IUPAC nomenclature for the compound above is

A. 4-methylpent-1-ene
B. 3-methylpent-2-ene
C. 2-methylpent-1-ene
D. 2-methylpent-4-ene

50. An organic compound contains 60% carbon, 13.3% hydrogen and 26.7% oxygen. Calculate the empirical formula (C=12, H =1, O=16)

A. $C_5H_{12}O$
B. C_3H_8O
C. $C_6H_{13}O_2$
D. C_4H_9O

ANSWER KEYS:

1. B **2.** B **3.** B **4.** A **5.** D **6.** C **7.** C **8.** C **9.** B **10.** D **11.** D **12.** A **13.** C **14.** A **15.** A **16.** B **17.** C **18.** A **19.** B **20.** A **21.** B **22.** C **23.** A **24.** D **25.** B

26. C **27.** B **28.** C **29.** A **30.** C **31.** D **32.** A **33.** A **34.** D **35.** B **36.** A **37.** D **38.** B **39.** D **40.** D **41.** A **42.** A **43.** D **44.** C **45.** B **46.** B **47.** B **48.** B **49.** A **50.** B

2014 JAMB CHEMISTRY QUESTIONS

PAPER TYPE: E

1. Which Question Paper Type of Chemistry is given to you?

A. Type F
B. Type E
C. Type L
D. Type S

2. A mixture is different from a compound because

A. the properties of a compound are those of its individual constituents while those of a mixture differ from its constituents
B. a mixture is always homogeneous while a compound is not
C. the constituent of a compound are chemically bound together while those of a mixture are not
D. a mixture can be represented by a chemical formula while a compound cannot

3. What is the percentage of sulphur in sulphur (IV) oxide?

A. 66%
B. 25%
C. 40%
D. 50%

4. A gas X diffuses twice as fast as gas Y. If the relative molecular mass of X is 32, calculate the relative molecular mass of Y.

A. 128
B. 8
C. 16
D. 64

5. 200cm^3 of a gas at 25^{o}C exerts a pressure of 700 mmHg. Calculate its pressure if its volume increases 350 cm^3 at 75^{o}C.

A. 342.53 mmHg
B. 1430.54 mmHg
C. 467.11 mmHg
D. 400.00 mmHg

6. An element X has electron configuration $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^5$. Which of the following statements is correct about the element?

A. It has a completely filled p-orbital
B. It has 5 electrons in its outermost shell.
C. It belongs to group II on the periodic table
D. It is a halogen

7. 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

8. If the difference in electronegativity of elements P and Q is 3.0. The bond that will be formed between them is

A. metallic
B. covalent
C. co-ordinate
D. ionic

9. How many protons, neutrons and electrons respectively are present in the element $^{60}_{27}Co$?

A. 27, 33 and 33
B. 33, 27 and 27
C. 27, 33, and 27
D. 60, 33 and 60

10. The radioactive radiation used in studying the arrangement of particles in giant organic molecules is

A. γ- rays
B. α- particles
C. X- rays
D. β – particles

11. A silicon-containing ore has 92% ^{28}Si, 5% ^{29}Si and 3% ^{30}Si. Calculate the relative atomic mass of the silicon.

A. 14.00
B. 29.00

C. 28.11

D. 28.00

12. The nitrogen obtained from air has a density higher than the one from nitrogen-containing compounds because the one from air is contaminated with

A. water vapour

B. oxygen

C. rare gases

D. carbon (IV) oxide

13. Water is said to be temporarily hard when it contains

A. $Ca(HCO_3)_2$ and $Mg(HCO_3)_2$ salts

B. $Ca(HCO_3)_2$ and $CaCO_3$ salts

C. $Mg(HCO_3)_2$ and $CaSO_4$ salts

D. $CaSO_4$ and $Ca(HCO_3)_2$ salts

14. On exposure to the atmosphere, a hydrated salt loses its water of crystallization to become anhydrous. This phenomenon is referred to as

A. efflorescence

B. deliquescence

C. hygroscopy

D. hydrolysis

15. 16.55g of lead (ll) trioxonitrate (V) was dissolved in 100g of distilled water at 20^{0}C, calculate the solubility of the solute in moldm^{-3}

[Pb = 207, N = 14, O = 16]

A. 0.05 g

B. 2.00 g

C. 1.00 g

D. 0.50 g

16. The dispersion of a liquid in a liquid medium will give

A. an emulsion

B. a fog

C. a gel

D. an aerosol

17. The major and most effective way of controlling pollution is to

A. improve machinery so that the substances released from combustion are less harmful

B. pass strict laws against it by individuals and companies

C. educate people on the causes and effects of pollution

D. convert chemical wastes to harmless substances before releasing them into the environment

18. The basicity of CH_3COOH is

A. 4

B. 1

C. 2

D. 3

19. The colour of litmus in a neutral medium is

A. purple

B. pink

C. yellow

D. orange

20. The mathematical expression of pH is

A. $\log_{10} [OH^-]$

B. $\log_{10} \frac{1}{H_3O^+}$

C. $\log_{10} [H_3O^+]$

D. $\log_{10} \frac{1}{[OH^-]}$

21. Which of the following salts will turn blue litmus red?

A. Sodium tetrahydroxozincate (ll)

B. Potassium hydrogen tetraoxosulphate (lV)

C. Sodium trioxocarbonate (lV)

D. Zinc chloride hydroxide

22. $Zn_{(s)} + CuSO_{4(aq)} \rightarrow ZnSO_{4(aq)} + Cu_{(s)}$

In the reaction above, the oxidation number of the reducing agent changes from

A. 0 to +4

B. 0 to +2

C. +1 to +2

D. +1 to +3

23. $H_2O_{(g)} + C_{(s)} \rightarrow H_{2(g)} + CO_{(g)}$

The oxidizing agent in the reaction above is

A. $CO_{(g)}$

B. $C_{(s)}$

C. $H_2O_{(g)}$

D. $H_{2(g)}$

24. Calculate the quantity of electricity in coulombs required to liberate 10g of copper from a copper compound
[Cu=64, F = 96500 Cmol-1]

A. 32395.5

B. 30156.3

C. 60784.5

D. 15196.5

25. How many faraday of electricity is required to produce 0.25 mole of copper?

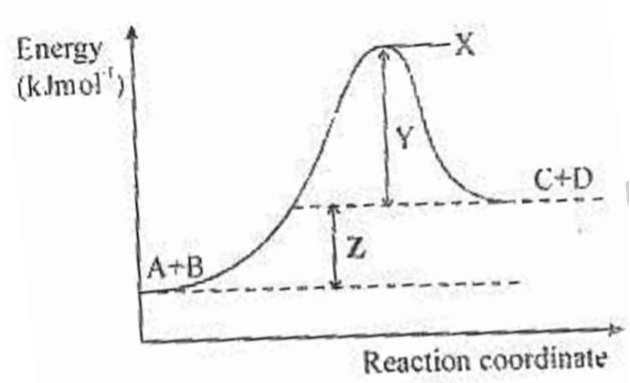
A. 1.00F

B. 0.01F

C. 0.05F

D. 0.50F

26. **Z** in diagram below represents...



A. heat of reaction

B. activation energy

C. free energy

D. entropy of reaction

27. If the change in free energy of a system is -899 $Jmol^{-1}$ and the entropy change is $10Jmol^{-1}k^{-1}$ at 25°C, calculate the enthalpy change.

A. +2081 $Jmol^{-1}$

B. -2081 $Jmol^{-1}$

C. -649 $Jmol^{-1}$

D. +649 $Jmol^{-1}$

28. In an equilibrium reaction, which of the following conditions indicates that maximum yield of the product will be obtained?

A. Equilibrium constant is very large

B. $\Delta H - T\Delta S = 0$

C. $\Delta H > T \Delta S$

D. Equilibrium constant is less than zero

29. In a chemical reaction, the change in concentration of a reactant with time is

A. entropy of reaction

B. enthalpy of reaction

C. rate of reaction

D. order of reaction

30. $Cr_2O^{2-}_{7(aq)} + H_2O_{(l)} \rightleftharpoons 2CrO^{2}_{4(aq)} + 2H^{+}_{(aq)}$

What happens to the reaction above when the hydrogen ion concentration is increased?

A. more of the products will be formed

B. the reaction will not proceed

C. the equilibrium position will shift to the right

D. the equilibrium position will shift to the left.

31. Which of the following will liberate hydrogen from dilute tetraoxosulphate (VI) acid?

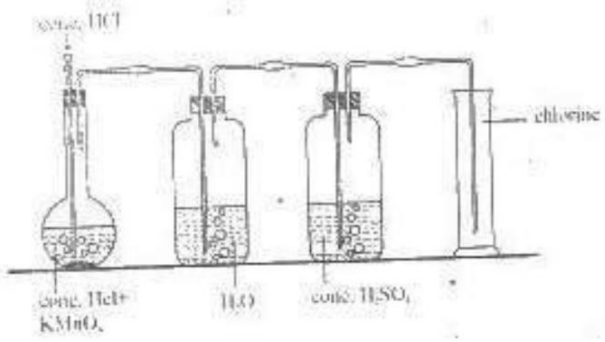
A. Lead

B. Magnesium

C. Copper

D. Gold

Use the diagram below to answer question 32 and 33.



32. In the diagram, the function of the concentrated H_2SO_4 is to

A. purify the gas

B. dry the gas

C. liquefy the gas

D. remove odour

33. The gas that is removed by the water in the flask is

A. O_2

B. SO_2

C. HCl
D. H_2

34. Fluorine does not occur in the free state in nature because

A. it is a poisonous gas
B. it belongs to the halogen family
C. it is inert
D. of its high reactivity

35. In the extraction of sodium from fused sodium chloride, the anode is made of platinum because

A. sodium is formed at the anode
B. chlorine is formed at the anode
C. sodium does not react with platinum
D. chlorine does not react with platinum

36. A compound that gives a brick-red colour to a non-luminous flame is likely to contain

A. copper ions
B. sodium ions
C. calcium ions
D. aluminium ions

37. In the electrolytic extraction of calcium from calcium chloride, the cathode is

A. zinc
B. graphite
C. platinum
D. iron

38. A few drops of NaOH solution was added to an unknown salt forming a white precipitate which is insoluble in excess solution. The cation likely present is

A. Zn^{2+}
B. Pb^{2+}
C. Ca^{2+}
D. Al^{3+}

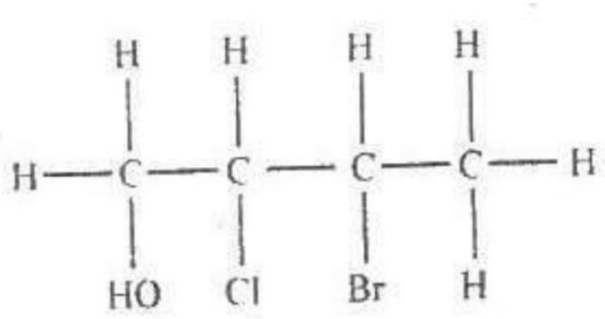
39. The general formula of haloalkanes where X represents the halide is

A. $C_nH_{2n-1}X$.
B. $C_nH_{2n}X$.

C. $C_nH_{2n+2}X$

D. $CnH_{2n+1}X$

40.



The IUPAC nomenclature of the compound above is

A. 2-bromo-3-chlorobutanol

B. 3-bromo-2-chlorobutanol

C. 3-chloro-2-bromobutanol

D. 2-chloro-3-bromobutanol

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. ethanol

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. polyacrylonitrile

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

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 the 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.
[C = 12, H = 1]

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 a 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

ANSWER KEYS:

1. B **2.** C **3.** D **4.** A **5.** C **6.** D **7.** A **8.** D **9.** C **10.** C **11.** D **12.** C **13.** A **14.** A **15.** No Answer **16.** C **17.** C **18.** B **19.** B **20.** B **21.** B **22.** B **23.** C **24.** B **25.** D

26. A **27.** A **28.** A **29.** C **30.** D **31.** B **32.** B **33.** C **34.** D **35.** C **36.** C **37.** D **38.** C **39.** D **40.** D **41.** C **42.** D **43.** D **44.** C **45.** D **46.** A **47.** D **48.** B **49.** C **50.** A

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2015 JAMB CHEMISTRY QUESTIONS

1. Which of the following statements is correct?

A. The average kinetic enemy of a gas is directly proportional to its temperature
B. At constant temperature, the volume of a gas increases as the pressure increases.
C. The pressure of a gas is inversely proportional to its volume.
D. The temperature of gas is directly proportional to its volume.

2. Which are the correct IUPAC names for $H–CO_2\,CH_3$ and $CH{\equiv}CH$

A. Methyl methanoate and ethene
B. Metanoic acid and ethyne
C. Ethyl methanoate and ethyne
D. Methyl methanoate and ethyne

3. A solution X on mixing with $AgNO_3$ solution, gives a white precipitate soluble in $NH_{3(aq)}$. A solution Y, when added to X, also gives a white precipitate which is soluble on boiling. Solution Y contains

A. Ag^+ ion
B. Pb^{2+} ion
C. Pb^{4+} ion
D. Zn^{2+} ion

4. Methane is a member of the homologous series called

A. alkenes
B. alcohols
C. esters
D. alkanes

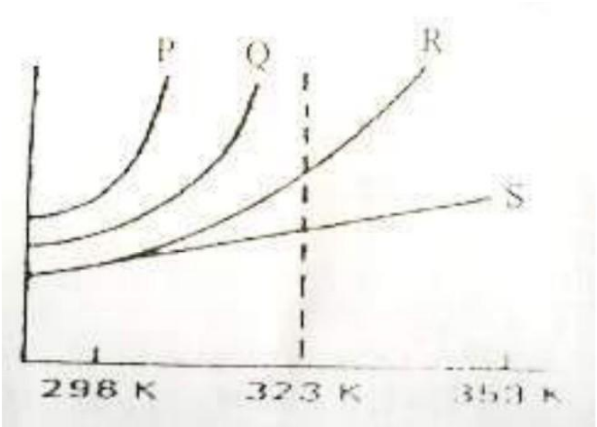
5. Which of the following bonds exists in crystalline ammonium chloride (NH_4CL)?

A. ionic covalent
B. ionic and co-ordinate
C. ionic, covalent and co- ordinate
D. covalent, co-ordinate and metallic

6. Some copper (II) sulphate pentahydrate ($CuSO_4$ $5H_2O$), was heated at 120°C with the following results: Wt of crucible = 10.00 g; Wt of crucible + $CuSO_4.5H_2O$ = 14.98g; Wt of crucible + residue = 13.54g. How many molecules of water of crystallization were lost? [H= 1, Cu = 63.5, O =16, S = 32]

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

7.



Which of the curves shown above represents the relationships between the volume (v) and pressure (p) of an ideal gas at constant temperature?

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

8. 12.0g of a mixture of potassium carbonate and potassium chloride were dissolved in a 250cm3 standard flask. 25cm3 of this solution required 40.00cm3 of 0.1M HCI neutralization. What is the percentage by weight of K_2CO_3 in the mixture
(K = 39, O = 16, C = 12)

A. 60
B. 72
C. 82
D. 92

9. Which of the following, groups of physical properties increases from left to right of the Periodic Table?

1. Ionization energy
2. Atomic radius
3. Electronegativity

4. Electron affinity

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

10. An element Z, contained 90% of 8Z 16 and 10% of 8Z 18 . its relative atomic mass is

A. 16.0
B. 16.2
C. 17.0
D. 17.8

11. What are the possible oxidation numbers for an element if its atomic number is 17?

A. -1 and 7
B. -1 and 6
C. -3 and 5
D. -2 and 6

12. How many valence electrons are contained in the element represented by $^{31}_{15}P$?

A. 3
B. 5
C. 15
D. 31

13. 10.0 dm3 of air containing H_2S as an impurity was passed through a solution of $Pb(NO_3)_2$ until all the H_2S had reacted. The precipitate of PbS was found to weigh 5.02 g. According to the equation:
$Pb(NO_3)_2 + H_2S \rightarrow PbS + 2HNO_3$
the percentage by volume of hydrogen sulphide in the air is

A. 50.2
B. 47.0
C. 4.70
D. 0.47

14. A quantity of air was passed through a weighed amount of alkaline pyrogallol. An increase in the weight of the pyrogallol would result from the absorption of

A. nitrogen
B. neon

C. argon
D. oxygen

15. Water for town supply is chlorinated to make it free from

A. bad odour
B. bacteria
C. temporary hardness
D. permanent hardness

16. 4.0 g of sodium hydroxide in 250cm^3 of solution contains

A. 0.40 moles per dm^3
B. 0.10 moles per dm^3
C. 0.04 moles per dm^3
D. 0.02 moles per dm^3

17. A major effect of oil pollution in coastal waters is the

A. destruction of marine life
B. desalination of the water
C. increase in the acidity of the water
D. detoxification of the water

18. In general, an increase in temperature increases the solubility of a solute in water because

A. more solute molecules collide with each other
B. most solutes dissolve with the evolution of heat
C. more solute molecules dissociate at higher temperatures
D. most solutes dissolve with absorption of heat.

19. The relatively high boiling points of alkanols are due to

A. ionic bonding
B. aromatic character
C. covalent bonding
D. hydrogen bonding.

20. Given that 15.00cm^3 of H_2SO_4 was required to completely neutralize 25.00cm^3 of 0.125 mol dm3 NaOH, calculate the molar concentration of the acid solution

A. 0.925 mol dm^3

B. 0.156 mol dm^3

C. 0.104 mol dm^3

D. 0.023 mol dm^3

21. What volume of 0.1 mol dm3 solution of tetraoxosulphate (VI) acid would be needed to dissolve 2.86g of sodium trioxocarbonate (IV) decahydrate crystals?

A. 20cm3

B. 40cm3

C. 80cm3

D. 100cm3

[H = 1, C = 12, O = 16, S= 32, Na 23].

22. The solution with the lowest pH value is

A. 5 ml of M/10 HCL

B. 10 ml of M/10 HCL

C. 15 ml of M/5 HCL

D. 20 ml of M/8 HCL

23. In which order are the following salts sensitive to light?

A. Agl > AgCl > AgBr

B. AgCl> Agl > AgBr

C. AgBr > AgCI > Agl

D. AgCI > AgBr > Agl

24. A metal m displaces Zinc from Zinc chloride solution. This shows that

A. M is more electronegative than Zinc

B. Zinc is above hydrogen in the series.

C. M is more electropositive than zinc.

D. electrons flow from zinc to m.

25. Steam changes the colour of anhydrous cobalt (II) chloride from

(A) blue to pink

(B) white to red

(C) white to green

(D) blue to white

26. When at equilibrium, which of the reactions below will shift to the right if the pressure is

increased and the temperature is kept constant?

A. $2SO_{3(g)} === 2SO_{2(g)} + O_{2(g)}$
B. $2CO_{2(g)} === 2CO_{(g)} + O_{2(g)}$
C. $2H_{2(g)} + O_{2(g)} === 2H_2O_{(g)}$
D. $2NO_{(g)} === N_{2(g)} + O_{2(g)}$

27. $2CO_{(g)} + O_{2(g)} \rightarrow 2Co_{2(g)}$
Given that ΔH [CO] is -110.4 $kJmol^{-1}$ and ΔH [CO_2] is -393.0 $kJmol^{-1}$, the energy change for the reaction above is

A. -503.7 kJ
B. -282.6 kJ
C. +282.6 kJ
D. +503.7 kJ

28. Which of these properties gives a solid its definite shape?

A. Strong intermolecular attraction
B. High melting point
C. High boiling point
D. Weak intermolecular attraction

29. When a crystal was added to the clear solution of its salt, the crystal did not dissolve and the solution remained unchanged. This showed that the solution was

A. supersaturated
B. concentrated
C. unsaturated
D. saturated

30. 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

31. The substance that is used in the steel industry for the removal of carbon, sulphur and phosphorus impurities from pig iron is

A. oxygen
B. chlorine

C. nitrogen
D. hydrogen

32. Hydrogen sulphide gas can act as

A. an oxidizing agent
B. a dehydrating agent
C. a bleaching agent
D. a precipitating agent.

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

A. HNO_3
B. CH_3COOH
C. H_2SO_4
D. HCI.

34. The bleaching action of chlorine is effective due to the presence of

A. Hydrogen chloride
B. Water
C. Air
D. Oxygen

35. Mineral acids are usually added to commercial hydrogen peroxide to

A. Oxidize it
B. decompose it
C. minimize its decomposition
D. reduce it to water and oxygen.

36. Aluminium containers are frequently used to transport trioxonitrate (v) acid because aluminium

A. has a low density
B. does not react with the acid
C. does not corrode
D. has a silvery - white appearance

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

A. Isoprene
B. polythene
C. ethanol
D. benzene

38. The process of converting starch to ethanol is

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

39. An endothermic reaction is one during which heat is _____and can be represented by the symbol_____. Which of the following combinations can be used accurately to complete the above definition?

A. liberated -ΔH
B. liberated +ΔH
C. absorbed -ΔH
D. absorbed +ΔH

40. Consider the following exothermic reaction $2SO_{2(g)} + O_{2(g)} = 2SO_{3(g)}$. If the temperature of the reaction is reduced from 800ºC to 500°C, and no other change takes place, then

A. the reaction rate increases
B. concentration of SO_2 decreases
C. concentration of SO_2 increases
D. SO_2 gas becomes unreactive

ANSWER KEYS:

1. A **2.** D **3.** B **4.** D **5.** C **6.** D **7.** C **8.** D **9.** C **10.** B **11.** A **12.** B **13.** C **14.** D **15.** B **16.** A **17.** C **18.** C **19.** D **20.** C

21. D **22.** D **23.** D **24.** C **25.** A **26.** C **27.** B **28.** A **29.** D **30.** C **31.** A **32.** D **33.** A **34.** B **35.** C **36.** B **37.** D **38.** C **39.** D **40.** C

2016 JAMB CHEMISTRY QUESTIONS

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

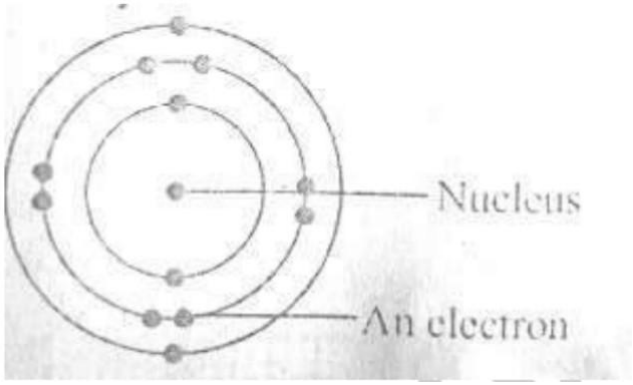
2. $200cm^3$ of oxygen diffuse through a porous plug in 50 seconds. How long, will 80cm3 of methane (CH_4) take to diffuse through the same porous plug under the same conditions?

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

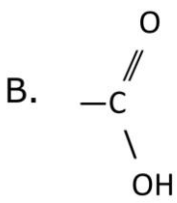
B. using aerobic bacteria

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

The substance that is oxidized in the reaction above is

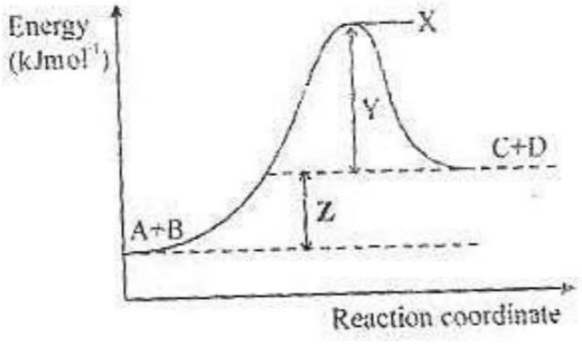
A. $2Na_2O_{2(s)}$

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-i-ene and but-i-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 146cm3 at 18^{0}c and 0.971 atm, its volume in cm3 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

ANSWER KEYS:

1. C **2.** C **3.** B **4.** A **5.** D **6.** C **7.** A **8.** B **9.** B **10.** A **11.** A **12.** D **13.** A **14.** D **15.** D **16.** B **17.** B **18.** B **19.** C **20.** D

21. D **22.** B **23.** C **24.** D **25.** D **26.** C **27.** C **28.** B **29.** C **30.** B **31.** D **32.** B **33.** B **34.** B **35.** B **36.** B **37.** D **38.** A **39.** C **40.** C

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2017 JAMB CHEMISTRY QUESTIONS

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

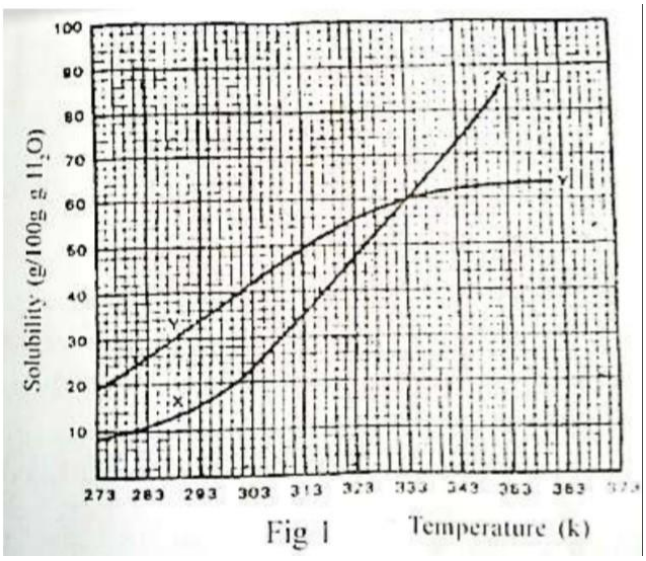


Fig 1

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?

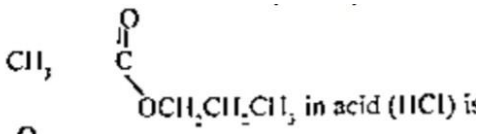
A. fractional distillation without a dehydrant

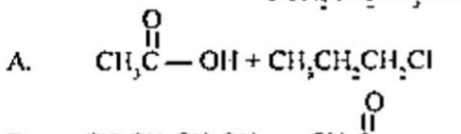
B. simple distillation with a dehydrant

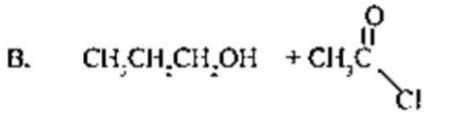
C. fractional distillation with a dehydrant

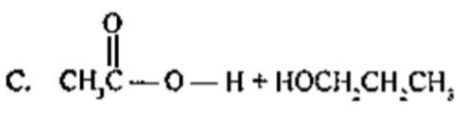
D. column chromatography

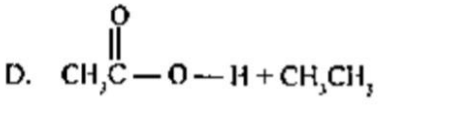
22. The products formed on hydrolysis of











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

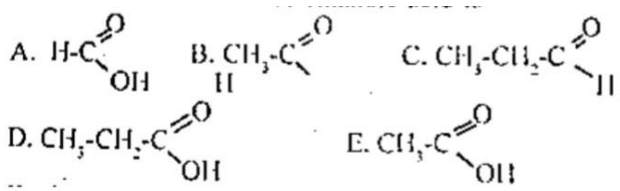
32. The number of atoms in one mole of a substance is equal to

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 cm3
B. 5.0 cm3
C. 6.8 cm3
D. 8.3 cm3

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

ANSWER KEYS:

1. D **2.** A **3.** B **4.** C **5.** B **6.** B **7.** B
8. C **9.** C **10.** A **11.** C **12.** C **13.** B
14. C **15.** C **16.** B **17.** B **18.** C
19. B **20.** D

21. B **22.** C **23.** C **24.** C **25.** A
26. D **27.** B **28.** A **29.** A **30.** B
31. D **32.** B **33.** B **34.** D **35.** C
36. A **37.** B **38.** D **39.** D **40.** B

2018 JAMB CHEMISTRY QUESTIONS

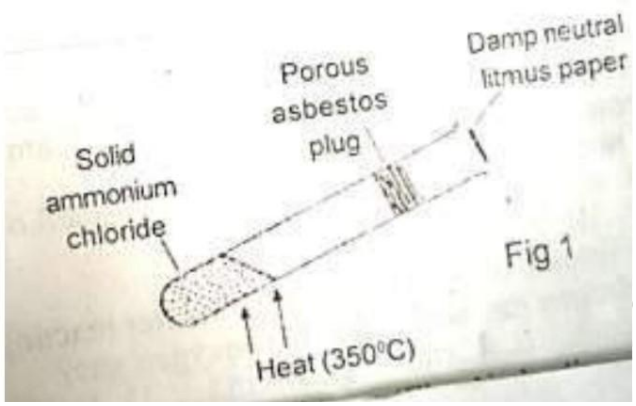
1. The periodic classification of the elements is an arrangement of the elements in order of their

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

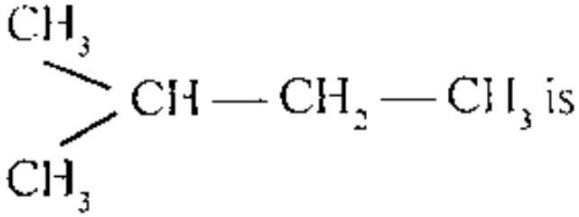
15. What volume of oxygen will remain after reacting 8cm3 of hydrogen gas with 20cm3 of oxygen gas?

A. 10cm3
B. 12cm3
C. 14cm3
D. 16cm3

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 =6.02×10^{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

ANSWER KEYS:

1. D **2.** C **3.** D **4.** A **5.** B **6.** D **7.** D **8.** D **9.** D **10.** D **11.** A **12.** D **13.** A **14.** D **15.** D **16.** B **17.** C **18.** A **19.** B **20.** C

21. C **22.** A **23.** C **24.** C **25.** B **26.** A **27.** A **28.** A **29.** A **30.** C **31.** A **32.** D **33.** D **34.** A **35.** B **36.** D **37.** B **38.** D **39.** B **40.** B

APPRECIATION

If you found these past questions **helpful**, here are some ways you can **contribute** to the exam success of other TOPPERS:

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- **Update** this past question
- **Submit a past question** for another subject

Are you interested in contributing?

Yes, I am!

