**CHEMISTRY**

1. CUO(s) + H2(g) CU(s) + H2O(g)

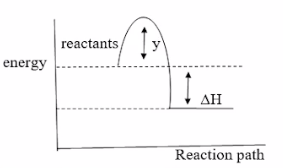
**In the equation above, the effect of increased pressure on the equilibrium position is** that **A.** the equilibrium is shifted to the left **B.** the equilibrium is shifted to the right **C.** there is no effect **D.** more H2(g) is produced

**2. Which of these is the most preferred separation technique for the isolation of solutes where the purity of the constituents is of utmost importance?** **A.** Sieving **B.** Distillation **C.** Recrystallization **D.** Precipitation

**3. How many moles of CO2 are produced when ethanol is burnt with 6 g of oxygen? A.** 0.125 **B.** 0. 250 **C.** 0.375 **D.** 0.750

**4. For a chemical reaction to be spontaneous, must be A.** positive **B.** negative **C.** zero **D.** equal to the enthalpy change

5.



**In the graph above, y represents** **A.** endothermic reaction **B.** activation energy **C.** ionization energy **D.** exothermic reaction

**6. What method is suitable for the separation of the gases present in air?** **A.** Catalytic cracking of liquid air **B.** Fractional distillation of liquid air **C.** Thermal decomposition of air **D.** Catalytic decomposition of air

**7. The ions responsible for permanent hardness in water are sulphate o**f **A.** Fe3+ and Mg2+ **B.** Ca2+ and Mg2+ **C.** Fe2+ and Fe3+ **D.** Na+ and Ca2+

**8. The chemical formula for potassiumhexacyanoferrate(II) is** **A.** [Fe(CN)6]4- **B.** K3Fe(CN)6 **C.** Fe(CN)6 **D.** K4Fe(CN)6

**9. One of the following is not a water pollutant?** **A.** Inorganic fertilizers **B.** Warm water affluent **C.** Oxygen gas **D.** Biodegradable waste

**10. The quantity of electricity required to deposit 180 g of Ag from a molten silver trioxonitrate(V) is [Ag = 108**] **A.** 1. 08 F **B.** 3.30 F **C.** 1.67 F **D.** 1. 80 F

**11. What would be the order of the electrolytic cell in an industry intending the production of silver plated spoons?** **A.** Cathode is spoon, anode is a silver rod; electricity is a soluble silver salt **B.** Cathode is silver rod, anode is the spoon; electricity is a soluble silver salt **C.** Cathode is spoon, anode is any rod; electricity is a soluble silver salt **D.** Cathode is any rod, anode is the spoon; electricity is a soluble salt

**12. The lightest isotope of hydrogen is** **A.** deuterium **B.** protium **C.** tritium **D.** positron

**13. When Sulphur(IV) oxide is passed into solution of acidified tetraoxomanganate(VII), the colour changes from** **A.** blue to green **B.** pink to yellow **C.** purple to colourless **D.** orange to green

**14. Water gas obtained from the gasification of coke is made up of** **A.** Nitrogen and carbon(II) oxide **B.** Nitrogen and hydrogen **C.** hydrogen and carbon(II) oxide **D.** Carbon(IV)oxide and carbon(IV) oxide

**15. Sulphur (IV) oxide can be used as** **a** **A.** coating agent **B.** dehydrating agent **C.** refrigerant **D.** drying agent

**16. The constituent of petroleum fraction used in surfacing road is A.** petrol **B.** diesel **C.** lubricating oil **D.** bitumen

**17. During the fractional distillation of crude oil, the fraction that distils at 200-250o is A.** bitumen **B.** diesel **C.** kerosene **D.** petrol

**18. A liquid hydrocarbon obtained from fractional distillation of coal tar that is used in the pharmaceutical industry is** **A.** xylene **B.** benzene **C.** hexane **D.** toluene

**19. An organic compound contains 53.1 Carbon, 6.2 Hydrogen, 12.4 Nitrogen and 28.3 Oxygen by mass. What is the molecular formula if its vapour density is 56.5? [C = 12, H = 1, N = 14. O =16] A.** C5H7NO2 **B.** C5H6NO2 **C.** C3H6NO2 **D.** C3H7NO2

**20. The empirical formula of an organic liquid hydrocarbon is XY, if the relative molar masses of X and Y are 72 and 6 respectively, its vapour density is likely to be** **A.** 33 **B.** 66 **C.** 39 **D.** 78

**21. Biuret test is a chemical test used for detecting the presence of** **A.** carbohydrates **B.** proteins **C.** amines **D.** alkanoates

**22. A gas when mixed with oxygen, it produces a very hot and early controllable flame, what is the name of the flame and where is it used?** **A.** Acetylene flame; miners’ lamp **B.** Oxy-ethylene flame; hunters’ torch **C.** Oxy-ethylene flame; miners’ lamp **D.** Oxy-ethylene flame; cutting and welding metals

**23. The number of geometrical isomers of butane** **are** **A.** 2 **B.** 4 **C.** 3 **D.** 5

**24. How** **many isomers has the organic compound represented by the formula C8H8O**? **A.** 2 **B.** 3 **C.** 4 **D.** 5

**25. When a few drops of Millon reagents is added to egg-white solution in a test tube, the white precipitate changes to** **A.** orange **B.** brick red **C.** reddish brown **D.** blue

26.



**The table above shows the formulae of some ions. In which of these compounds is the formula not correct?** **A.** Aluminumtetraoxosulphate(VI), Al2(S04)3 **B.** Calcuimtrioxonitrate(V), Ca(NO3)2 **C.** Iron(III)bromide, Fe3Br **D.** Potassiumsulphide, K2S

**27. The PH of a 0.001 mol dm-3 of H2SO4 is [Log102 = 0.3]** **A.** 2.7 **B.** 3.0 **C.** 3.3 **D.** 2.0

**28. Strong acids can be distinguished from weak acids by any of the following methods, EXCEPT** **A.** Conductivity measurement **B.** The use of litmus paper **C.** Measurement of the PH **D.** Measurement of heat of reaction

**29. The principle which states that two electrons in the same orbitals of an atom have same values for all four quantum numbers is the A.** Aufbau principle **B.** Hund’s rule **C.** Pauli Exclusion principle **D.** Dilution principle

**30. How much of 5 g of radioactive element whose half-life is 50 days remains after 200 days? A.** 2.50 g **B.** 1.25 g **C.** 0. 63 g **D.** 0. 31 g

**31. The group VIII elements are the inert gases because they A.** have lone pair of electrons on their valence shells **B.** all have completely filled valence shells **C.** are all sold **D.** are all polyatomic molecules

**32. Na2X 2Na+ + X2- The bond between Na and X is likely to be** **A.** covalent **B.** dative **C.** ionic **D.** metallic

**33. At a given temperature and pressure, a gas X diffuses twice as fast as gas Y, it follows** **that** **A.** Gas Y is two times as heavy as gas X **B.** Gas Y is four times as heavy as gas X **B.** Gas Y is monoatomic **D.** Gas X is diatomic

**34. The number of molecules of helium gas contained in 11.5 g of the gas is A.** 1. 73 X 1023 **B.** 1. 73 X 1022 **C.** 1. 73 X 1024 **D.** 1. 73 X 1021

**35. If the solubility of KNO3 at 30oC is 3.10 moldm-3, a solution containing 303 gdm-3 KNO3 is likely to be A.** saturated **B.** unsaturated **C.** supersaturated **D.** at saturation point

**36. 127 g of sodium chloride was dissolved in 1. 0 dm3 of distilled water at 25oC. Determine the solubility in mol dm-3 of sodium chloride at that temperature. [Na = 23, Cl = 35.5]** **A.** 1.0 **B.** 2.0 **C.** 2.2 **D.** 4.1

**37. The constituents of Alnico are aluminium, nickel and** **A.** Mg **B.** Co **C.** Mn **D.** Cu

**38. Silver and gold are metals found as free uncombined elements in the earth’s crust, which makes them to be referred to as** **A.** corrosive metals **B.** reactive metals **C.** natural metals **D.** noble metals

**39. In the extraction of aluminum, the silica impurity is removed by** **A.** electrolysis **B.** filtration **C.** reaction with H2SO4 **D.** precipitation

**40. When calcium ethynide is decomposed by water. The gas produced is** **A.** CO **B.** H2 **C.** C2H2 **D.** CH4

**CHEMISTRY 2**

**1. Which of these samples of gases would occupy a volume of 22.4dm3** **at stp?** **[O = 16, H = 1, C = 12**] **A.** 32g of O2 **B.** 4g of H2 **C.** 22.4g of O2 **D.** 12g of CO2

**2. The mass in (Kg) of oxygen that would be required to combust 1300 g of butane gas is A.** 4.27 **B.** 4270 **C.** 8450 **D.** 4.67

**3**. **The constituent of water gas are equal volumes of A.** CO2 and H2 **B.** CO and H2 **C.** CO and N2 **D.** CO2 and N2

**4**. **The only product which is not from the destructive distillation of coal is A.** Coal tar **B.** Phenol **C.** Coal gas **D.** Coke

**5**. **Hydrogen is used in** **A.** bleaching **B.** treatment of goiter **C.** plastic production **D.** filling balloons

**6**. **Nitrogen gas is produced industrially from liquefied air by** **A.** distillation **B.** adsorption **C.** electrolysis **D.** condensation

**7**. **Which of these compounds is not an isomer of pentan-1-ol, C5H11OH? A.** Pentan-2-ol **B.** Ethoxypropane **C.** 2,2-dimethlpropropan-1-ol **C.** 2,2-butan-1-ol

**8**. **The removal of phosphine in the laboratory preparation of ethyne is achieved by passing it through solution of A.** CuSO4 **B.** Cu(NO3)2 **C.** CuCl2 **D.** CuSO3

**9**. **The product of decarboxylation of ethanoic acid is A.** ethene **B.** methane **C.** ethane **D.** methanol

**10**. **The empirical formula of an organic liquid hydrocarbon is XY, if the relative molar masses of X and Y are 72 and 6 respectively, its vapour density is likely to be A.** 33 **B.** 66 **C.** 39 **D.** 78

**11**. **In the homologous series, each consecutive member differ by a mass of A.** 13 **B.** 14 **C.** 12 **D.** 15

**12**. **Vulcanization of rubber is a process by which** **A.** Isoprene units are joined to produce rubber **B.** rubber latex is coagulated **C.** rubber is chemically toughed **D.** water is removed from the rubber

**13**. **Ethyne is used for** **A.** ripening of fruit **B.** production of detergents **C.** as an anesthetia **D.** making Polyvinyl chloride

**14**. **The general formula for an ether is** **A.** RCHO **B.** RCOOR’ **C.** ROR’ **D.** R2CO

**15**. **Benzene formed nitrobenzene at temperature at temperature of 60oC when it reacts with mixture of concentration trioxonitrate (V) acid and concentration** **A.** phosphoric acid **B.** hydrochloric acid **C.** tetraoxosulphate (VI) acid **D.** hydrogen iodide

**16**. **Which of these classes of not a component of petroleum?** **A.** Cycloalknaes **B.** Aromatic hydrocarbons **C.** Alkanes **D.** Alkanoic acids

**17**. **A glass cup of orange juice is found to have POH of 10.50. Calculate the PH A.** 1.2 **B.** 3.5 **C.** 7.5 **D.** 4.2

**18**. **Find the hydrogen ion H+ and hydroxide ion OH- concentration in 0.06 moldm-3 solution of H2SO4(aq)****A.** 1.2 x 10-1 moldm-3; 8.3 x 10-14 moldm-3 **B.** 1.2 x 10-2 moldm-3; 8.3 x 10-14 moldm-3 **C.** 1.2 x 10-1 moldm-3; 8.3 x 10-14 moldm-3 **D.** 1.2 x 10-2 moldm-3; 8.3 x 10-14 moldm-3

**19**. **An example of a deliquescent salt is A.** CaO **B.** CuO **C.** NaNO3 **D.** P2O5

**20**. **The principle which states that two electrons in the same orbitals of an atom have same values for all four quantum numbers is the A.** Aufbau principle **B.** Hund’s rule **C.** Pauli Exclusion principle **D.** Dilution principle

**21**. **The group VIII elements are the inert gases because they A.** have lone pair of electrons on their valence shells **B.** all have completely filled valence shells **C.** are all solid **D.** are all polyatomic molecules

**22**. **Which of the following experiments was performed by Henry Moseley? A.** Experiments on discharged tubes **B.** Experiments on electrolysis **C.** X-ray experiments **D.** Gold foil experiments

**23. The correct trend in electronegativity in the periodic table is** **A.** decreases across the period and decreases down the group **B.** increases across the period and increases down the group **C.** increases across the period and decreases down the group **D.** decreases across the period and increases down the group

**24. The mass in grams of K2SO4 in 100 cm3 of 0.15 mol dm-3 is [K = 39, S = 32, O = 16] A.** 2.61 **B.** 1.5 **C.** 15 **D.**

**25.** **If 10.5 g of lead(II) trioxonitrate(V) is dissolved in 20 cm3 of distilled water at 180C, the solubility of the solute in mol dm-3 is [Pb = 207, N = 14, O = 16]** **A.** 525.00 **B.** 16.00 **C.** 5.25 **D.** 1.60

**26. Zn(s) + 2HCl(aq)  ZnCl2(aq) + H2(g)**

**Calculate the volume of hydrogen gas that can be produced from 32 g of zinc at s.t.p. [Zn = 65, H = 1, Cl = 36] A.** 30.11 dm3 **B.** O.31 dm3 **C.** 3.01 dm3 **D.** 11.03 dm3

**27. 3Cu(s) + 8HNO3(aq) 3Cu(NO3)2(aq) + 4H2O(l) + 2NO(g)**

**From the equation above, the specie that is oxidized is A.** Cu(s) **B.** Cu(NO3)2(aq) **C.** HNO3(aq) **D.** NO(g)

**28.** **The substance that reacts with sodium to form alkali and changes white anhydrous copper(II) tetraoxosulphate(VI) to blue is** **A.** base **B.** acid **C.** water **D.** solvent

**29**. **When is water said to be polluted?** **A.** Boils at 100 0C **B.** Freezes at 00C **C.** Basic to litmus **D.** Maximum density of 1 gcm-3 at 40C

**30**. **The rise in concentration of dissolved oxygen in water rich in aquatic plant is through** **A.** respiration **B.** photosynthesis **C.** decomposition **D.** transpiration



**31. The table above shows the results of an experiment carried out by reacting 6 g of magnesium with 10 cm3 of a 0,5 moldm-3 HCl. How long does it take the reaction to occur?** **A.** 4 minutes **B.** 5 minutes **C.** 6 minutes **D.** 7 minutes

**32.** **The separation of air into its constituents can be carried out by** **A.** fractional crystallization **B.** fractional distillation **C.** simple distillation **D.** crystallization

**33.** **The introduction of catalyst to a reaction medium will generally** **A.** increase activation energy **B.** lower the activation energy **C.** increase the enthalpy of reaction **D.** allows reaction to take place at higher temperature

**34.** C(s) + H2O(g) CO(g) + H2(g)

**The above equation represents the reaction of steam with carbon, if the forward reaction is endothermic, which conditions of temperature and pressure would give the largest yield of hydrogen?** **A.** High temperature and high pressure **B.** Low temperature and low pressure **C.** Low temperature and high pressure **D.** High temperature and low pressure

**35. The oxidation number of manganese in MnO and MnO2 respectively are A.** +2 and +2 **B.** +2 and +4 **C.** +4 and +2 **D.** +1 and +2

**36**. **Iron(III) ion is more stable than iron(II) ion due to its** **A.** Oxidizing property **B.** Reducing property **C.** Relative density **D.** Electron configuration

**37**. **One metallic trioxocarbonate(IV) that does not produce carbon(IV) oxide when heated with a Bunsen burner is A.** Copper(II)trioxocarbonate(IV) **B.** Sodiumtrioxocarbonate(IV) **C.** Magnessiumtrioxocarbonate(IV) **D.** Zinctrioxocarbonate(IV)

**38**. **Transition metals are metals that** **A.** Form compounds with partially filled d-orbitals **B.** Have atoms with partially filled d-orbitals **C.** Have atoms with completely filled d-orbitals **D.** Form compound with filled d-orbitals

**39**. **In electrolysis, the quantity of products liberated at the electrodes is dependent on the A.** magnitude of the steady current passed **B.** volume of electrolyte used **C.** position of the element in the periodic table **D.** number of elecrons present in the element

**40**. **m = KQ is the mathematical representation of first law of Faraday, where Q which is the quantity of electricity can also be expressed as** **A.** k x 1 x t **B.** 1 x t **C.** t x v **D.** k x p x v

**CHEMISTRY 3**

**1. The dispersion of dust particles in air is an example of A.** emulsion **B.** suspension **C.** aerosois **D.** colloid

**2.** **Emulsions is an example of colloids in which A.** liquid particles are dispersed in a liquid medium **B.** liquid particles are dispersed in a gaseous medium **C.** gaseous particles are dispersed in a liquid medium **D.** gaseous particles are dispersed in a solid medium

**3. Hydrogen chloride gas and ammonia can be used to demonstrate the fountain experiment because they are A.** light **B.** volatile **C.** very soluble in water **D.** heavy gases

**4.** **The catalyst used in the industrial preparation of hydrogen from natural gas is A.** manganese(IV) oxide **B.** vanadium(V) oxide **C.** finely divided iron **D.** nickel metal

**5.** **Hydrogen is used in A.** bleaching **B.** treatment of goiter **C.** plastic production **D.** filling balloons

**6. The electron configuration of Cl- is A.** 1s2 2s2 2p3 **B.** 1s2 2s2 2p6 3s1 **C.** 1s2 2s2 2p6 3s2 3p5 **D.** 1s2 2s2 2p6 3s2 3p6

7. **Octane number in petrol measures the amount of A.** 2-methypentane **B.** 2,4-dimethylpentane **C.** 2,2,4-trimethylpentane **D.** Octane

**8.** **Catalytic hydrogenation of alkenes produces** **A.** alkanone **B.** alkanes **C.** alkynes **D.** alkanals

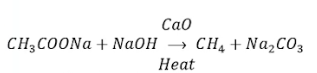
**9. The product formed when ethyne is passed through a hot tube containing finely divided iron is A.** polymeric **B.** saturated **C.** hydrated **D.** aromatic

**10. A gas commonly produced when ethane burns in air is A.** O2 **B.** CO2 **C.** CO **D.** H2

**11. Which one of these reactions of ethene is not an addition reaction A. R**eaction with oxygen **B.** Reaction with steam **C.** Reaction with bromine **D.** Reaction with hydrogen

**12. The fifth member of the alkyne series can be represented as A.** C4H10 **B.** C5H8 **C.** C6H10 **D.** C7H12

**13. Ethyne is used for** **A.** ripening of fruit **B.** production of detergents **C.** as an anesthesia **D.** making Polyvinyl Chloride

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**14. The reaction above is A.** neutralization **B.** decarboxylation **C.** alkaline hydrolysis **D.** thermal decomposition

**15. The petroleum crude from Nigeria is commonly described as light crude because it A.** is volatile **B.** is Sulphur free **C.** contains highly branched hydrocarbons **D.** is associated with natural gas

**16. The process of heating rubber with Sulphur is known as A.** polymerization **B.** saponification **C.** esterification **D.** vulcanization

**17.** **2FeCl3(s) + SO2(g) + 2H2O(l) 2FeCl2(s) + H2SO4(aq) + 2HCl(aq)**. **In the equation above, the specie that is oxidized is** **A.** H2SO4 **B.** FeCl2 **C.** FeCl3 **D.** SO2

**18. The strength of an alkali is measured on A.** its corrosiveness to the skin **B.** The number of hydroxyl ions **C.** its degree of ionization in water **D.** its rate of reaction with acids

**19. One of the hydroxides that is not referred to as an alkali is A.** potassium hydroxide **B.** copper hydroxide **C.** calcium hydroxide **D.** sodium hydroxide

**20**. **What is the mass of copper deposited at the cathode when copper(II) tetraoxosulphate(VI) is electrolyzed using graphite electrodes with a current of 0.193A for 2 hours?[Cu = 65.5gmol-1, F = 96,500 C]** **A.** 0. 4716 g **B.** 90972 g **C.** 1389.6 g **D.** 0.0965 g

**21**. **In the electrolysis of sodium chloride, the formation of sodium amalgam at the cathode is due to the A.** position of the ion in the electrochemical series **B.** use of dilute sodium chloride solution **C.** use of concentrated sodium chloride solution **D.** nature of electrode used at the cathode

**22**. **All the periodic properties of elements on the periodic table are based** on **A.** volume **B.** mass number **C.** atomic number **D.** density

**23**. **The** **number of bond pairs and lone pairs in a methane-molecules are** **respectively** **A.** 0 and 4 **B.** 4 and 0 **C.** 2 and 2 **D.** 1 and 3

**24. The ground state electron configuration of element Z is 1s2 2s2 2p6 3s2, what would be the atomic number of Z2+ cation** **A.** 22 **B.** 12 **C.** 24 **D.** 10

**25. The shape of the molecule of carbon(IV) oxide is A.** Tetrahedral **B.** pyramidal **C.** Planar **D.** Linear

**26.** **In a flame test, the metal that produces golden yellow is A.** K **B.** Na **C.** Cs **D.** Rb

**27.** **The suitable reagent to test for the presence of Sn2+ is** **A.** sodium hydroxide **B.** hydrogen sulphide **C.** ammonium chloride **D.** bromine water

**28. Duralumin is an alloy of aluminium, copper, magnesium and A.** manganese **B.** zinc **C.** tin **D.** nickel

**29.** **The property of metal that makes it suitable as a catalyst is** **A.** filled d-orbital **B.** partially filled d-orbital **C.** partially filled f-orbital **D.** filled f-orbital

**30.** **The mixture of gases used in a photography’s flash tube is A.** krypton and xenon **B.** helium and argon **C.** argon and xenon **D.** argon and krypton

**31.** **A gas that has vapour density of 14 is [H = 1, Cl = 35.5, N = 14, C = 12, O = 16, S = 32]** **A.** Cl2 **B.** H2S **C.** NH3 **D.** CO

**Cr2O72- + XH+**  **2Cr3+ + yH2O**

**32. In the equation above, x and y respectively** **A.** 5 and 8 **B.** 8 and 5 **C.** 7 and 14 **D.** 14 and 7

**33. Temporary hardness of water can be removed by A.** boiling **B.** Na2CO3 **C.** NaOH **D.** permutit

**34.** **A factor that does not affect the rate of a chemical reaction is** **A.** surface area **B.** temperature **C.** volume **D.** catalyst

**35.** **Neutralization is an example of** **A.** endothermic reaction **B.** exothermic reaction **C.** ionization reaction **D.** decomposition reaction

**36**. **A mixture is a substance whose constituents are combined A.** physically **B.** chemically **C.** industrially **D.** proportionally

**37. The air around a coal powered plant is likely to be polluted with oxide of A.** Sulphur **B.** nitrogen **C.** carbon **D.** lead

**2HI(g)**  **H2(g) + I2(g)**

**38. From the reaction above, the concentration of iodine in the equilibrium mixture can be increased by A.** addition of catalyst **B.** raising the pressure **C.** lowering the pressure **D.** raising the temperature

**39**. **If 79 g of a gas at s.t.p occupies a volume of 25 cm3, what is the relative molecular mass of the gas? (G.M.V 7 s.t.p = 22.4dm3)** **A.** 17 **B.** 32 **C.** 64 **D.** 71

**40**. **The volume occupied by 1 mole of an ideal gas at a temperature of 130C and a pressure of 1.58 atm is [R = 0.082 atm dm3 K-1 mol-1]** **A.** 14.84dm3 **B.** 14.84cm3 **C.** 0.64dm3 **D.** 0.64cm3

**CHEMISTRY 4**

**1. The constituents common to permallory and alnico are iron and A. Co B. AI C. NI D. Cr**

**2.** **The metal used as a packaging material is A.** Na **B.** AI **C.** Cu **D.** Fe

**3.** **Al(OH)3(s) + NaOH(aq) → NaAl(OH)4(aq) In the reaction above, Al(OH)3 exhibited the property of a A.** basic substance **B.** acidic substance **C.** amphoteric substance **D.** neutral substance

**4.** **The formation of a white precipitate on addition of ethanedioate solution soluble in dilute HCI but insoluble in ethanoic acid indicate the presence of A.** Ca2+ **B.** Mg2+ **C.** Be2+ **D.** Ba2+

**5.** **When the same quantity of electricity is passed to a solution of AgNO3, Cu(NO3), and Al(OH)3 The mass of the three cations produced at cathode respectively are[Al = 27. Cu = 63.5, Ag = 108]** **A.** 27, 63.5 and 108 **B.** 95.25, 108 and 13.5 **C.** 54, 63.5 and 27 **D.** 108, 63.5 and 9

**6. What current would be required to deposit 2.4 g of zinc in 3 hours at the cathode during the electrolysis of molten ZnCl2? [Zn = 65, F = 96500C, CI = 35.5] A.** 0.66 A **B.** 0.90 A **C.** 0.11 A **D.** 0.52 A

**7. The gas that is commonly used to demonstrate the fountain experiment is A.** hydrogen chloride **B.** hydrogen sulphide **C.** nitrogen(II) oxide **D.** dinitrogen(1) oxide

**8. The formation of mud particles at river banks by mixing of river and sea water can be described as A.** precipitation **B.** decantation **C.** sedimentation **D.** filtration

**9.** **X + [O] → RCOR¹ + H2O** **In the reaction above, X can be said to be a** **A.** Primary alkanol **B.** Secondary alkanol **C.** Tertiary alkanol **D.** polyhydric alkanol

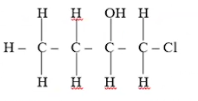
**10. The IUPAC nomenclature of HOCH2CH2CH2OH is A.** propan-1,3-diol **B.** propan-2,3-diol **C.** propan-1,2-diol **D.** propan-1,1-diol

**11. A gas when mixed with oxygen, it produces a very hot and early controllable flame, what is the name of the flame and where is it used? A.** Acetylene flame; miners' lamp **B.** Oxy-ethylene flame, hunters' torch **C.** Oxyethylene flame, miners lamp **D.** Oxy-ethylene flame, cutting and welding metals

**12. Arrange these alkanamines according to their increasing basicity A.** NH3 < RNH2 < R₂NH < R3N **B.** RNH2 **<** NH3 **<** R2NH < R3N **C.** RNH2 < R₂NH < NH3 < R3N **D.** RNH₂ < R₂NH < R3N < NH3

**13.** **The value of x in CxH12 of an alkyne is A.** 5 **B.** 6 **C.** 7 **D.** 8

**14**. **Functional groups in organic compounds A.** determine their physical and chemical properties **B.** determine the chemical properties of the homologous series **C.** determine their physical properties only **D.** are insignificant in their reactivity



**15. The IUPAC nomenclature of the compound above is A.** 1-chloro butan-2-ol **B.** 4-chloro butan-3-01 **C.** 2-hydroxylchloro butane **D.** 1-chloro-2hydroxyl butane

**16.** **The product of oxidation of a secondary alkanol is A.** alkanoate **B.** alkanoic acid **C.** alkanone **D.** alkanal

**17. The reaction by which methane is converted to tetrachloromethane and hydrogen chloride gas is referred to A.** combustion **B.** polymerization **C.** addition **D.** substitution

**18. In** **which of the following is large molecule degraded into smaller molecules? A.** Vulcanization of rubber **B.** Esterification **C.** Hydrolysis of cellulose **D.** Condensation of monosaccharide

**19**. **The major component of Plaster of Paris is A.** calcium(II) tetraoxosulphate(VI) **B.** calcium(II) trioxonitrate(V) **C.** calcium(II) chloride **D.** calcium(II) trioxophosphate(V)

**20**. **A method that can be used to prepare salt is A.** heating metals with oxygen **B.** direct action of metals with acid **C.** decomposition of trioxocarbonate (IV) **D.** dissolution of soluble base in water

**21**. **The alkali used in the manufacture of mortar is A.** NaOH **B.** KOH **C.** Mg(OH)2 **D.** Ca(OH)2

**22**. **2S02(g) + O2(g) 2S03(g)** **∆H = -395.7 kjmol-¹ The reaction above is A.** Haber process **B.** Bosch process **C.** Contact process **D.** Solvay process

**23. The disadvantage associated with the production of hydrogen in commercial quantity from water gas is that A.** much steam is generated **B.** carbon(IV) oxide is produced **C.** carbon(IV) oxide is absorbed **D.** less steam is generated

**24. Nitrogen gas is produced industrially from liquefied air by A.** distillation **B.** adsorption **C.** electrolysis **D.** condensation

**25. Graphite is referred to as a crystalline allotrope of carbon because it A.** Has a definite shape **B.** Conducts electricity **C.** Can be used as a lubricant **D.** Is used in making pencils

**26. Zn(s) + 2HCl(aq) → ZnCl2(aq) + H2(g) Calculate the volume of hydrogen gas that can be produced from 32 g of zinc at s.tp.[Zn = 65; H = 1; CI=36] A.** 30.11 dm³ **B.** 0.31 dm³ **C.** 3.01 dm³ **D.** 11.03 dm³

**27. Zn(aq) + FeO(s) → ZnO(s) + Fe(aq) The species that is oxidized in the above reaction** is **A.** zinc **B.** iron(II) oxide **C.** zinc(II) oxide **D.** iron

**28. Heat of solution involves two steps that is accompanied by heat change. The energies involved in this steps are A.** Lattice energy and hydration energy **B.** Lattice energy and ionic energy **C.** Heat energy and lattice energy **D.** Hydration energy and heat energy

**29.** **In a clock experiment, if it takes 2minutes 15seconds for 64 g of sulphur to be deposited, what time will it takes to deposit one mole of Sulphur? [S = 32] A.** 67.7s **B.** 6.77 s **C.** 4.74 s **D.** 0.47 s

**30.** **H2(g) + 12(g) 2HI(g) ∆H = -ve KJmol-1** **In the equation above, the amount of hydrogen iodide will reduce by A.** an increase in temperature **B.** an increase in pressure **C.** a decrease in temperature **D.** a decrease in pressure

**31**. **Which of the following is incorrect about water pollution? A.** Harvesting of fish using chemicals **B.** Indiscriminate dumping of refuse in streams and rivers **C.** Use of herbicides on farm land **D.** Causing global warming

**32.** **A mixture containing PbCl2 and NH4Cl can best be separated based on their A.** density **B.** miscibility **C.** solubility **D.** particle size

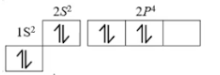
**33.** **The constituent of air with the least percentage by volume is A.** carbon(IV) oxide **B.** nitrogen **C.** noble gases **D.** oxygen

**34. Which of the following represent the treatment order of pipe- borne water? A.** Coagulation, sedimentation, filtration, disinfection **B.** Sedimentation, coagulation, disinfection, filtration **C.** Filtration, sedimentation, coagulation, disinfection **D.** Disinfection, sedimentation, coagulation, filtration

**35.** **In the demonstration of diffusion of liquid, the choice of copper(II) tetraoxosulphate(VI) is based on the fact that A.** diffusion of a solid in a liquid is always against gravity **B.** diffusion takes place in liquids against gravity **D.** copper(II) tetraoxosulphate(VI) spreads upwards against gravity **D.** copper(II) tetraoxosulphate(VI) in concentrated or dilute form diffuses against gravity

**36.** **The volume of oxygen required for the complete combustion of 3.2 moles of methane is [molar volume of a gas at s.tp. 22.4 dm³]** **A.** 71.68 dm³ **B.** 34.84 dm³ **C.** 143.36 dm³ **D.** 107.50 dm³

**37. The number of bond pairs and lone pairs in a methane-molecules are respectively A.** 0 and 4 **B.** 4 and 0 **C.** 2 and 2 **D.** 1 and 3

**38.** 

**The diagram above represents the distribution of electrons in the atom of oxygen. Which of the principles/rules below is violated? A.** Aufbau principle **B.** Hund's rule of maximum multiplicity **C.** Pauli's exclusion principal **D.** Graham's law of diffusion

**39. The formation of a compound XY2 from atoms of X and Y is due to difference in their A.** electron affinity **B.** lonization energies **C.** electronegativities **D.** atomic radii

**40. All the periodic properties of elements on the periodic table are based** on **A.** volume **B.** mass number **C.** atomic number **D.** density

**CHEMISTRY 5**

**1. An example of a physical change is A.** exposing sodium metal to air **B.** boiling water **C.** dissolving calcium metal in water **D.** burning of kerosene

**2**. **Calculate the mass of substance left when 80 g of calcium trioxocarbonate (IV) is heated in air [Ca = 40, C = 12, O = 16**] **A.** 4.48 g **B.** 44.8 g **C.** 22.4 g **D.** 40.0 g

**3**. **Boyle’s law can be expressed mathematically as A.** PV = K **B.** PV = RT **C.** V = KT **D.** V/T = K

**4**. **What is the vapour density of 560 cm3 of gas that weighs 0.4 g at s.t.p?** **[Molar volume at s.t.p is 22.4 dm3]** **A.** 6.0 **B.** 8.0 **C.** 16.0 **D.** 32.0

**5**. **When the subsidiary quantum number(I) equals 1, the shape of the orbital is A.** spherical **B.** dumb-bell **C.** flat **D.** round

**6**. **Half-life of a radioactive element is 2days what fractions has decays after 4days A.** ¼ **B.** ½ **C.** ¾ **D.** 1/3

**7**. **The electron configuration of an atom of nitrogen is 1s2 2s2 2p 2p 2p because the atom is** **A.** In an excited state **B.** undergoing energy changes **C.** unstable and ready to combine with another **D.** simply obeying rules governing electron configuration

**8**. **The shape of ammonia molecule is A.** V-shaped or bent **B.** Tetrahedral **C.** co-plannar **D.** trigonal

**9**. **The** **percentage of carbon(IV) oxide in air is A.** 0.01 **B.** 0.03 **C.** 0.06 **D.** 0.02

**10**. **When sodium trioxocarbonate (IV) dehydrate loses its water of crystallization to the atmosphere, the process is A.** efflorescence **B.** effervescence **C.** deliquescence **D.** hygroscopy

**11**. **What would be the mass of the crystal of KCl that would be obtained when 1000 cm3 of the solution containing 1.5 moldm-3 is cooled from 850C to 200C? [K = 39, Cl = 35.5, take solubility of KCl at 200C = 0.6 moldm-3] A.** 67 g **B.** 51 g **C.** 50 g **D.** 65 g

**12**. **Solid particles dispersed in liquid medium are called A.** aerosols **B.** emulsion **C.** fog **D.** sets

**13**. **Which of the following is an air pollutant? A.** O2 **B.** CO **C.** H2O(g) **D.** O3

**14**. **Calculate the pH in 0.001 moldm-3 NaOH A.** 9 **B.** 10 **C.** 11 **D.** 12

**15**. **In a double salt with formula X(SO4).12H2O, X is a A.** monovalent metallic **B.** divalent metal ion **C.** trivalent metal ion **D.** tetravalent metal ion

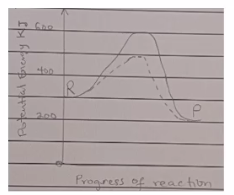
**16**. **A suitable indicator for the titration between ethanedioic acid and potassium hydroxide is A.** methyl red **B.** methyl blue **C.** methyl orange **D.** phenolphthalein

**17**. **A substance which remain unchanged in a redox reaction is likely to be A.** oxidizing agent **B.** catalyst **C.** reducing agent **D.** inhibitor

**18**. **How many coulombs of electricity would be produced if a current of 0.4 flows for 1 hour? [F = 96500 C]** **A.** 9650 C **B.** 1440 C **C.** 965 C **D.** 144 C

**19**. **Cr2O72-(aq)  2Cr3+(aq) In the equation above, the change in oxidation number of chromium is A.** +6 to +3 **B.** +2 to +6 **B.** +12 to +6 **D.** +7 to +6

**20**. **The energy change required to melt one mole of sodium chloride crystals is A.** heat of fusion **B.** heat of combustion **C.** heat of neutralization **D.** heat of formation



**21**. **In the diagram above, H of the reaction is A.** -300 kJ **B.** -400 KJ **C.** -100 KJ **D.** -500 kJ

**22**. **NH4CI NH3 + HCI In the reaction above, increasing the temperature will A.** forward reaction is favoured **B.** backward reaction is favoured **C.** position of the equilibrium is not affected **D.** position of the equilibrium is constant

**23**. **The only product which is not from the destructive distillation of coal is A.** Coal tar **B.** Phenol **C.** Coal gas **D.** Coke

**24**. **The bleaching action of chlorine is due to its** **A.** oxidizing ability **B.** reducing ability **C.** corrosive nature **D.** antiseptic nature

**25**. **One of the oxides of nitrogen referred to as "laughing gas" is A.** Nitrogen(I) oxide **B.** Nitrogen (II) oxide **C.** Nitrogen(IV) oxide **D.** Dinitrogen (IV) oxide

**26**. **The reaction between marble chips and hydrochloric acid can be made to proceed faster by A.** Grinding the marble chips **B.** Cooling the reaction system **C.** Introducing water into the HCl acid **D.** Carrying out the reaction in the dark

**27**. **The property of aluminium that makes it suitable for use in building vehicles is its A.** metallic lustre **B.** resistance to attack **C.** malleability **D.** lightness

**28**. **Metals are good conductors of heat and electricity because they A.** are hard **B.** have mobile electrons **C.** can be drawn into thin wires **D.** have high melting points

**29**. **In metallurgy industry, the metal used as deoxidant is A.** Al **B.** Mg **C.** Ca **D.** Na

**30. A deep blue colouration was formed by the addition of excess aqueous ammonia to a solution of an unknown salt. This indicates the presences of A.** Fe2+ **B.** Cu²+ **C.** Zn2+ **D.** Fe3+

**31. CH3-CH2-OH and CH3-O-CH3 The relationship between the two compounds above is that, they are A.** allotropes **B.** isotopes **C.** isomers **D.** isobars

**32.** **Phenol-methanal polymer is used for making A.** utensil handle **B.** contact lens **C.** plastic pipe **D.** mattress

**33.** **Which of these reagents can be used to distinguish between the classes of amines in the laboratory? A.** Concentrated H2SO4 **B.** Sodiumdioxonitrate(III) **C.** Calcium Oxide **D.** Aqueous ammonia

**34.** **How many isomers are present in C2H6O? A.** 1 **B.** 2 **C.** 3 **D.** 4

**35.** **The property of the final substitution product of methane that makes it suitable for its use in laundry is due to the fact that it is A.** very soluble **B.** less volatile **C.** highly volatile **D.** inflammable



**36.** **The reaction above illustrates A.** esterification **B.** dehydration **C.** oxidation **D.** polymerization

**37**. **The IUPAC nomenclature of CH3CH2C(CH3)=C(CH3)2 for the compound is A.** 2,3-dimethylpentene **B.** 2,3-dimethylpent-2-ene **C.** 3,4-dimethylpent-3-ene **D.** 3,4-dimethylpentene

**38**. **Esterification reaction is analogous to A.** oxidation reaction **B.** neutralization reaction **C.** addition reaction **D.** hydrolysis reaction

**39**. **Lubricating oil fraction of the crude petroleum is a mixture of hydrocarbons containing A.** 20-30 carbons **B.** 16-20 carbons **C.** 11-15 carbons **D.** 5-10 carbons

**40**. Arrange these alkanamines according to their increasing basicity **A.** NH3 < RNH2 < R2NH < R3N **B.** RNH2 < NH3 < R₂NH < R3N **C.** RNH2 < R₂NH < NH3 < R3N **D.** RNH2 < R₂NH < R3N < NH3

**CHEMISTRY 6**

**1. In which of these compounds is the oxidation number of nitrogen zero?** A. NH3 B. NaNO3 C. N2O D. N2

**2. One example of a hygroscopic substance is A.** NaOH B. Dilute H2SO4 C. CaO D. MgSO4

**3.** CUO(s) + H2(g) CU(s) + H2O(g)

**In the equation above, the effect of increased pressure on the equilibrium position is** that **A.** the equilibrium is shifted to the left **B.** the equilibrium is shifted to the right **C.** there is no effect **D.** more H2(g) is produced

**4. Helium is preferably used to inflate party and meteorological balloons instead of hydrogen because it is A.** lighter **B.** coloured **C.** non-flammable **D.** a noble gas

**5. The law that governs writing a correct balanced chemical equation is A.** Reciprocal proportion **B.** Constant Composition **C.** Conservation of matter **D.** Multiple proportion

**6. The method suitable to purify water contaminated with ink is by? A.** Crystallization **B.** Distillation **C.** Chromatography **D.** Filtration

**7. When heat is absorbed by a system, S is positive hence there is A.** increase in entropy **B.** decrease in enthalpy **C. s**pontaneity of reaction **D.** decrease in pressure

**8. The waste that is biodegradable is A.** plastics **B.** metal scraps **C.** lead compound **D.** sewage

**9. A suitable catalyst for the production of margarine from vegetable oil is A.** hydrogen **B.** nickel **C.** manganese(IV) oxide **D.** platinum

**10. Cu²+(aq) + 2NaOH →**

**In the test for cupper(II) ions using sodium hydroxide above, the products obtained are A**. 2Cu2+ + 2NaOH B. Cu(OH)(aq) + 2Na+(aq) C. NaOH + Cu D. Cu(OH)2 + 2NaH

**11**. **The oxidation number of manganese in MnO and MnO2 respectively are A**. +2 and +2 B. +2 and +4 C. +4 and +2 D. +1 and +2

**12**. **Wrought iron is basically A.** brittle iron B. purest form of iron C. impure form of iron D. hard form of iron

**13**. **A metal that can be extracted by roasting in air is A**. Ag B. Au C. Sn D. Cu

**14**. **An example of alkanal is A.** CH3CH2OH B. CH3CHO C. CH3COCH3 D. CH3COOH

**15**. **The general formula for an ether is** A. RCHO B. RCOOR' C. ROR' D. R₂CO

**16**. **The derivative of alkane that is used as an anesthesia is A.** Trichloromethane B. Monochloromethane C. Tetrachloromethane D. Dichloromethane

**17**. **The fifth member of the alkyne series can be represented as** A. C4H10 B. C5H8 C. C6H10 D. C7H12

**18. Ethanol can be produced industrially** by A. esterification B. reducing ethanol with nascent hydrogen C. fermentation C. action of cold water on calcium carbide

**19. When Sudan III reagent is added to a solution of coconut oil, the colour obtained is A.** bluish green **B.** red **C.** orange **D.** reddish brown

**20. Using a suitable catalyst n-heptane can be catalytically cyclized to obtain A.** benzene **B.** ethyl benzene **C.** toluene **D.** xylene

**21. Phenol-methanal polymer is used for making A.** utensil handle **B.** contact lens **C.** plastic pipe **D.** mattress

**22. A hydrocarbon X with a molar mass of 26 consists of 92.3% carbon. What is its molecular formula?** A. C2H2 B. CH4  C. C2H6 D. C2H4

**23. If the empirical formula of a compound CH₂, what will be its molecular formula if the vapour density is 39? A**. CH4 B. C2H6 C. C3H6 D. C6H12

**24. The element in the periodic table used to represent the alpha particles A.** hydrogen B. neon C. helium D. nickel

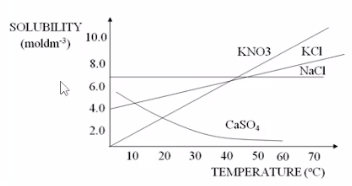
**25.** **The scientist whose research led to the quantization of electrons in the atomic structure is A.** Lorde Rutherford B. JJ Thompson C. Neils Bohr D. John Dalton

**26.** **What did Millikan calculate in the oil**-**drop experiment? A.** change-to-mass ration of the electron B. mass of the electron C. charge of the electron D. mass of the proton

**27**. **All the periodic properties of elements on the periodic table are based on A.** volume B. mass number C. atomic number D. density

**28**. **If 140 cm³ of Hydrogen diffuse in 40 sec. How long will it take 245 cm³ of gas Z whose molar mass is 50 [H = 1**] A. 3.5 seconds B. 35 seconds C. 350 seconds D. 3500 seconds

**29. Water assumes the shape of a container in which it is placed because its molecules A**. are held together by some forces of attraction B. are clustered together in definite volumes C. are not able to move freely D. have no definite shape



**30**. **In the graph above, which of these salts is most soluble at temperatures above 40 °C**? A. NaCl B. KNO3 C. KCI D. CaSO4

**31.** **The gas that is commonly used to demonstrate the fountain experiment is A.** hydrogen chloride B. hydrogen sulphide C. nitrogen(II) oxide D. dinitrogen(I) oxide

**32.** **Which of** **the following gas is used in ventilating underground railway premises? A.** Hydrogensulphide **B.** Sulphur(IV)oxide **C.** Chlorine **D.** Ozone



**33. In the reaction above, the catalyst used is A.** V2O5 B. Ni C. MnO2 D. MnO4

**34. The limiting factor in the use of hydrogen gas to meteorological studies is A.** flammable **B.** inflammable **C.** low density **D.** low reactivity

**35. For ammonia gas to be obtained dry in the laboratory, it has to pass through a drying tower containing A.** CaCl₂ **B.** Cao **C.** Concentrated H2SO4 **D.** MnO2

**36. An example of a soluble salt is A**. PbCl2 B. BaSO4 C. NH4Cl D. HgCl2

**37**. **One example of a salt which in aqueous solution would change the red litmus paper blue is A**. Na2SO4 B. AlCl3 C. NH4CI D. CH3COONa

**38**. **The acidic ion produced from the ionization of tetraoxosulphate (VI) acid is A.** SO42- B. HSO4- C. OH- D. HS2-

**39.** **One of the following equations represents the chemical reaction at the anode during the electrolysis of aqueous copper(II)tetraoxosulphate(VI) using copper electrodes A**. Cu² + 2e Cu(s) B. Cu Cu2+ + 2e C. 40H- 2H2O + O2 + 4e D. 4H+ + 4e 2H₂

**40. When the same quantity of electricity is passed to a solution of AgNO3, Cu(NO3), and Al(OH)3. The mass of the three cations produced at cathode respectively are [Al = 27, Cu = 63.5, Ag = 108] A.** 27, 63.5 and 108 B. 95.25, 108 and 13.5 C. 54, 63.5 and 27 D. 108, 63.5 and 9

**CHEMISTRY 7**

**1. T** **The best sequence of operation to obtain pure alum from a powdered mixture of alum and sand is A.** sublimation → dissolution → filtration → drying **B.** dissolution→ filtration → sublimation **C.** dissolution →filtration → crystallization **D.** sublimation → filtration → drying

**2.** **Determine the empirical formula of an oxide of sulphur containing 60% of oxygen A**. SO3 B. SO2 C. SO4 D. SO

**3**. **The volume occupied by 1 mole of an ideal gas at a temperature of 13º C and a pressure of 1.58 atm is [R = 0.082 atm dm³ K-¹ mol-¹]** A. 14.84dm³ B. 14.84cm³ C. 0.64dm³ D. 0.64cm³

**4**. **At a given temperature and pressure, a gas X diffuses twice as fast as gas Y, it follows that A.** Gas Y is two times as heavy as gas X B. Gas Y is four times as heavy as gas X C. Gas Y is monoatomic D. Gas X is diatomic

**5**. T**he scientist that performed the experiment on discharge tubes that led to the discovery of the cathode ray as a subatomic particle is A.** J. J. Thompson B. Robert Millikan C. Ernest Rutherford D. Niels Bohr

**6**. **When n = 3, the quantum number of an element is A.** 3 B. 9 C. 18 D. 21

**7. The shape of the molecule of carbon(IV) oxide is A**. Tetrahedral B. pyramidal C. Plannar D. Linear

**8. The process above produces A.** atomic mutation B. a radioactive isotope C. other neutrons D. radiations

**9.** **In the treatment of water for municipal supply chlorine is used to A.** prevent tooth decay B. prevent goiter C. kill germs D. remove colour of odour

**10.** **The combustion of candle under limited supply of air forms A.** water and CO2 B. water and CO C. soot and CO D. soot and CO2

**11.** **What is the concentration of a solution obtained when 1 dm³ of a 0.01 moldm-³ was concentrated to 500 cm³? A.**  0.02 moldm-³ **B.** 0.04 moldm-³ **C.** 0.03 moldm-³ **D.**  0.01 moldm-³

**12.** **Fog is a colloid in which A**. liquid particles dispersed in a gas medium B. gas particles dispersed in a liquid medium C. solid particles dispersed in a gas medium D. gas particles dispersed in a solid medium

**13**. **Which of the following is an air pollutant? A.** O2 B. CO C. H2O(g) D. O3

**14**. **A gas that turns lime water milky is likely to be from A.** Trioxocarbonate(IV) B. Chloride C. Trioxonitrate (V) D. Tetraoxosulphate(VI)

**15**. **The volume in cm³ of a 0. 12 mol dm-³ HCI required to completely neutralize a 20 cm³ of 0.20 mol dm-³ NaOH is A**. 12.00 B. 0.0012 C. 33.33 D. 2.40

**16**. **The salt formed when strong acid reacts with strong base is A.** normal B. double C. complex D. basic

**17**. **The colour change when damp starch-iodide paper is inserted in a jar of chlorine gas is A.** green B. brown C. blue-black D. yellow

**18**. **Calculate the mass of magnesium that will be liberated from its salt by the same quantity of electricity that liberated 16.0g of silver [Mg =24.0, Ag = 108] A**. 3.65 g B. 3.56 g C. 1.87 g D. 1.78 g

**19**. **Concentrated sodium chloride solution is electrolyzed using mercury cathode and graphite anode. The products at the anode and cathode respectively are A.** hydrogen and chlorine B. chlorine and hydrogen C. chlorine and sodium D. sodium and chlorine

**20**. **Determine the half-life of a first order reaction with constant 4.5 -3 sec-1 A.** 154 s B. 15.4 s C. 1540 s D. 1.54 s

**21.** **A factor that does not affect the rate of a chemical reaction is A.** surface area B. temperature C. volume D. catalyst

**22.** **N2(g) + 3H2(g) 2NH3(g) An equilibrium can be established in the reaction above if A.** Both the forward and the backward reactions have the same rate B. The forward and the backward reactions have stopped C. The rate of the forward reaction is greater than that of the backward reaction D. The rate of the backward reaction is greater than that of the forward reaction

**23. In contact process, the catalyst used in the conversation of Sulphur (IV) oxide to Sulphur (VI) oxide is A.** nickel B. platinum C. vanadium (V) oxide D. magnesium (IV) oxide

**24. The element which can combine with oxygen to form an acid anhydride of the form XO2 A.** phosphorus B. chlorine C. fluorine D. sulphur

**25. Oxides that dissolve in water to produce acidic solutions are known as A.** amphoteric oxides B. basic oxides C. acid radicals D. acid anhydride

**26.**  **Rust on the surface of a metal sheet contains A**. hydrated iron (II) oxide B. hydrated iron (III) oxide C. iron (III) hydroxide D. iron (III) trioxocarbonate (IV)

**27**. **Coal gas has a high calorific value but it is not preferred for use in the home because it A.** has an unpleasant odour B. is more expensive than other fuel gases C. burns explosively D. contains pollutants

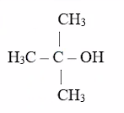
**28**. **What is formed when metal react with acid to liberate gas? A.** Salt B. Base C. Acid D. Liquid

**29**. **Aqueous solution of sodium hydroxide can be used to test for the presence of: I Ca²+, II Zn2+, III Cu²+ A.** I only B. I and III C. I, II and III D. I and II only

**30**. **The composition of alloy permallory is iron and A.** copper B. nickel C. lead D. magnesium

**31**. **CH3-CH2-OH and CH3-O-CH3 The relationship between the two compounds above is that, they are A**. allotropes B. isotopes C. isomers D. isobars

**32**. **Homologous series differs by A.** CH2 B. C₂H₂ C. C2H4 D. C2H6



**0933. The IUPAC nomenclature of the compound above is A.** propan-1-ol B. butan-1-ol C. 2-methyl propan-1-ol D. 2-methyl propan-2-ol

**34.** **Alkanoates are naturally found in A.** lipids B. vitamins C. proteins D. rubbers



**35. From the table above, which of these two compounds can form functional group isomers? A.** S and T B. T and U C. S and V D. T and V

**36.** **Fats and oils are esters of fatty organic acids combined with a trihydric alkanol commonly reffered to as A.** ethanol B. methanol C. glycol D. glycerol

**37.** **The difference in molecular mass between an alkene and alkyne with six carbon per mole is A.** 10 B. 12 C. 2 D. 14

**38.** **Aqueous solution of an organic compound decolourizes acidified KMnO4 solution, and produces effervescence with saturated NaHCO3(aq). The compound is A**. ethanedioic acid B. ethanediol C. ethanoic acid D. ethanol

**39**. **The molecular formula of a hydrocarbon with an empirical formula of CH3 and a molar mass of 30 is A.** C2H4 B. C3H3 C. C2H6 D. C6H6

**40**. **When a mixture of ethanoic acid and ethanol is boiled with addition of few drops of concentrated H2SO4 as a catalyst, the product formed besides water is A.** methylpropanoate B. ethyethanoate C. butanoate D. propylmethanoate

**CHEMISTRY 8**

**1. An example of a substance that does not change directly from solid to gas when heated is A**. NH4CL(S) B. I2(S) C. CaCO3(S) D. S(S)

**2**.**C2H4(g )+ 3O2(g)  2CO2(g) + H2O(g) The above equation represents the combustion of ethene. If 10 cm3 of ethene is burnt in 50 cm3 of oxygen, what would be the volume of oxygen that would remain at the end of the reaction** A. 20 cm3 B. 40 cm3 C. 60 cm3 D. 50 cm3

**3. Half-life of a radioactive element is 2days what fractions has decays after 4days A.** ¼ **B.** ½ **C.** ¾ **D.** 1/3

4. **At a given temperature and pressure, a gas X diffuses twice as fast as gas Y, it follows** **that** **A.** Gas Y is two times as heavy as gas X **B.** Gas Y is four times as heavy as gas X **B.** Gas Y is monoatomic **D.** Gas X is diatomic

**5. If 11.0 g of a gas occupies 5.6 dm3 at s.t.p, calculate its vapour density (1.0 mole of a gas occupies 22.4 dm3)** A. 22 B. 44 C. 66 D. 88

**6. The van der Waals forces of attraction operates between** A. atoms B. cations C. molecules D. anions

**7. The electron configuration of an atom of nitrogen is 1s2 2s2 2p 2p 2p because the atom is** **A.** In an excited state **B.** undergoing energy changes **C.** unstable and ready to combine with another **D.** simply obeying rules governing electron configuration

**8.** **+ X In the reaction above, X is A.** a proton B. an alpha particle C. a beta particle D. a neutron

**9.** **Nitrogen obtained from air is not absolutely pure because it contains A.** oxygen B. carbon (IV) oxide C. inert gases D. water vapour

**10.** **The substance that reacts with sodium to form alkali and changes white anhydrous copper(II) tetraoxosulphate(VI) to blue A.** base B. acid C. water D. solvent

**11.** **Kerosene is used as solvent for A.** Paints B. Sulphur C. Gums D. fats

**12.** **Solubility curve is a plot of solubility against A.** temperature B. pressure C. volume D. concentrate

**13.** **A major effect of oil pollution in coastal waters is the A**. destruction of aquatic life B. nitrification of the water body C. detoxification of water D. disinfection of the water body

**14**. **The term strong and weak acids is used to indicate the A**. number of H+ released by an acid B. number of OH- releases by an acid C. extent of ionization of an acid D. strength of its action on substance

**15**. **Hydrochloric acid is regarded as a strong acid because it A.** ionizes partially B. ionizes completely C. is a mineral acid D. reacts with a base

**16**. **The indicator used in a titration between strong acid and weak base base is A.** methyl orange B. phenolphthalein C. bromothylmol blue D. methyl red

**17**. **When a specie undergoes oxidation, it’s A.** oxidation number increases B. oxidation number decreases C. oxidation number remains constant D. acts as oxidizing agent

**18**. **The cathode and anode suitable in the electroplating of a teaspoon with nickel are respectively** A. teaspoon and nickel rod B. nickel rod and teaspoon C. teaspoon and carbon rod D. carbon rod and teaspoon

**19**. **The amount of Faraday required to discharge 4.5 moles of Al3+ is A.** 13.5 B. 4.5 C. 7.5 D. 1.5

**20**. **A typical chemical reaction will be spontaneous if A**. enthalpy change is negative B. free energy change is greater than one C. entropy change is zero D. enthalpy and free energy change are equal

**21. In a chemical reaction, surface area of reactants can affect A.** CaCO3 + 2HCI → CaCl₂ + H₂O + CO2 **B.** MgCl2 + H2SO4 → MgSO4 + 2HCI **C.** H₂ + Cl2 → 2HCI **D.** NaOH + HCI → NaCl + H2O

**22. H2(g) + 12(g) 2HI(g) ∆H = -ve KJmol-1** **In the equation above, the amount of hydrogen iodide will reduce by A.** an increase in temperature **B.** an increase in pressure **C.** a decrease in temperature **D.** a decrease in pressure

**23. In Contact process, the catalyst used in the conversion of sulphur (IV) oxide to sulphur(VI) oxide is A.** nickel **B.** platinum **C.** vanadium(V) oxide **D.** magnesium(IV) oxide

**24. The reaction of hydrogen and chlorine to produce hydrogen chloride gas is explosive in A.** diffused light **B.** sun light **C.** infrared light **D.** Raman light

**25. An oxide of nitrogen that can rekindle a glowing splint is A.** nitrogen(I)oxide **B.** nitrogen(II) oxide **C.** nitrogen (IV)oxide **D.** dinitrogen tetraoxide

**26. An example of an amphoteric oxide is A.** P4O10 **B.** Al2O3 **C.** CuO **D.** K₂O

**27. Which of the following represents an order of increasing reactivity? A.** Au < Cu < Sn < Fe < Ca **B.** Ca < Fe < Sn < Cu <Au **C.** Au Cu < Fe < Sn < Ca **D.** Cu <Sn < Fe < Cu <Au

**28. The main constituent of water-glass is A.** calcium trioxosilicate(IV) **B.** calcium trioxosulphate (IV) **C.**sodium trioxosulphate(IV) **D.** sodium trioxosilicate(IV)

**29. Alkali metals react with cold water to liberate A.** oxygen **B.** carbon(II) oxide **C.** hydrogen **D.** carbon (IV) oxide

**30. The IUPAC nomenclature of the complex K4Fe(CN)6 is A.** potassium hexacyanoferrate(II) **B.** potassium hexacyanoferrate(III) **C.** potassium hexacyanoferrate(IV) **D.** potassium hexacyanoferrate(VI)

**31. An organic compound with general formula RCOR' is an A.** alkanone **B.** alkanal **C.** alkanoate **D.** alkanoic acid

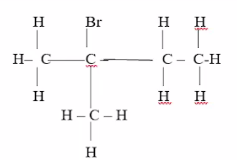
**32. The general molecular formula CnH2n-2 represents that of an A.** alkyne **B.** alkene **C.** alkane **D.** alkanal

**33. The term that is not associated with petroleum industry? A.** Cracking **B.** Saponification **C.** Polymerization **D.** Fermentation

**34. 2CxHyO + 502 → 4CO2 + 4H2O CxHyO in the equation is A.** CH2O **B.** C2H6O **C.** CH4O **D.** C₂H₄**O**

**35. The hybridization scheme in ethyne is A.** sp **B.** sp³ **C.** sp²d **D.** sp²s

**36. The reaction between alkanoic acids and alkanols in the presence of an acid catalyst is known as A.** saponification **B.** dehydration **C.** esterification **D.** hydrolysis



**37. The IUPAC name of the compound above is A.** 3-Methyl-3-Bromo butane **B.** 2-Methyl-2-Bromo butane **C.** 2-Bromo-2-methyl butane **D.** 3-Bromo-3-methyl butane

**38. Alkylation of benzene is catalyzed by A.** palladium **B.** nickel **C.** sunlight **D.** aluminium chloride

**39. The functional groups present in a molecule of glucose are A.** alkanol and alkanal **B.** alkanal and alkanoate **C.** alkanone and alkanal **D.** alkanol and alkanone

**40. Benzene formed nitrobenzene at temperature of 60 °C when it reacts with mixture of concentration trioxonitrate (V) acid and concentrated A.** phosphoric acid **B.** hydrochloric acid **C.** tetraoxosulphate(VI) acıd **D.** hydrogen iodide

**CHEMISTRY 9**

**1. The higher electronegativity of halogens can be accounted for by their A.** ability to form ionic compounds **B.** electron configuration **C.** ability to exist in the three state of matter **D.** oxidizing ability

**2. The constituents of producer gas are A.** CO2 and N2 **B.** CO and N₂ **C.** CO2 and H2 **D.** CO and H₂

**3.** **The nitrogenous compound in dead materials in the soil is converted to A.** dioxonitrate (III) **B.** trioxonitrate(V) **C.** ammonia **D.** ammonium salts

**4.** **When sulphur(IV) oxide is passed into solution of acidified tetraoxomanganate(VII), the colour changes from A.** blue to green **B.** pink to yellow **C.** purple to colourless **D.** orange to green

**5.** **A suitable indicator for the titration between ethanedioic acid and potassium hydroxide is** A. methyl red B. methyl blue C. methyl orange D. phenolphthalein

**6. In a titration exercise, H2C2O4(aq) was titrated against a solution of NaOH. What is the most suitable indicator that could be used for this titration? A.** Phenolphthalein **B.** Methyl orange **C.** Methyl red **D.** pH metre

**7.** **An example of a complex salt is** A. [Cu(NH4)]2+ B. KAI(SO4)2.12H2O C. K2SO4 D. KCN

**8. The pollutants that cause green-house effect are A.** NO2 and SO2 B.CO2 and SO2 C. CO and CO2 D. CO and NO2

**9.** **The presence of impurities in any substance tends to** A. raise both the boiling and melting points B. raise the melting point and lower the boiling point C. lower the melting point and raise the boiling point D. lower both the melting and the boiling point

**10. The mixture of gases used in a photographer's flash tube is A.** krypton and xenon **B.** helium and argon **C.** argon and xenon **D.** argon and krypton

**11.** **2S02(g) + O2(g) 2S03(g)** **∆H = -395.7 kjmol-¹ The reaction above, the forward reaction is favoured by A.** increase in temperature B. decrease in temperature C. decrease in pressure D. decrease in concentration

**12.** **Determine the half-life of a first order reaction with constant 4.5 x10-3 sec-1** A. 154 s B. 15.4 s C. 1540 s D. 1.54 s

**13. X + 5H2O → XH2O + 4H2O In the equation above, X becomes A**. hygroscopic B. efflorescent C. deliquescent D. hydrated

**14**. **The oxidation number of oxygen in H2O2 and Na2O respectively are A.** -2 and -2 **B.** -1 and -2 **C.** + 2 and -2 **D.** + 1 and -2



**15. The table above shows the results of an experiment carried out by reacting 6 g of magnesium with 10 cm3 of a 0,5 moldm-3 HCl. How long does it take the reaction to occur?** **A.** 4 minutes **B.** 5 minutes **C.** 6 minutes **D.** 7 minutes

**16.** **Two moles of carbon atom that contain Avogadro's number has** **A**. 3.01 x 1024 molecules B. 3.01 x 1023 molecules C. 1.204 x 1024 molecules D. 1.204 x 1023 molecules

**17**. **The chemical reactivity of an organic compound is determined by it’s A**. functional group B. homologous series C. molecular formula D. structural formula

**18**. **Proteins are easily denatured at temperature above A.** 100C B. 200C C. 300C D. 400C

**19**. **The products formed from the alkaline hydrolysis of animal fats are A.** salt of fatty acid and glycerol **B.** brine and glycol **C.** crystalline salt and glyceride **D.** ammonium salt and glycoside

**20. Which of these compounds is not an isomer of pentan-1-ol, C5H11OH? A.** Pentan-2-ol **B.** Ethoxypropane **C.** 2.2-dimethylpropan-1-ol **D.** 2,2-butan-l-ol

**21. In the petroleum industry, an alkane that causes knocking in car engines is A.** 2, 2, 4-trimethylpentane **B.** 2, 2, 4-trimethylheptane **C.** octane **D.** heptane



**22.** **The reaction above illustrates A.** esterification **B.** dehydration **C.** oxidation **D.** polymerization

**23.** **An organic compound contains 53.1 Carbon, 6.2 Hydrogen, 12.4 Nitrogen and 28.3 Oxygen by mass. What is the molecular formula if its vapour density is 56.5? [C = 12, H = 1, N = 14. O =16] A.** C5H7NO2 **B.** C5H6NO2 **C.** C3H6NO2 **D.** C3H7NO2

**24.** **The raw material used for making polyvinyl chloride is A**. C2H2 B. CH4 C. C2H6 D. C2H4

**25.** **The product formed when stearic acid, a triglyceride and sodium hydroxide react are** A. detergent and soap B. ethanol and glycerol C. sodium stearate and glycerol D. ester and glycerol



**26. The equation above represents the process of A.** combustion B.decomposition **C.** polymerization D. cracking

**27.** **What is the concentration of a solution obtained when 1 dm³ of a 0.01 moldm-³ was concentrated to 500 cm³? A.** 0.02 moldm-3 **B.** 0.04 moldm-3 **C.** 0.03 moldm-3 **D.** 0.01 moldm-3

**28. The solubility of ethanol in water is due to its A.** ionic character B. low freezing point C. hydrogen bonding D. covalent bonding

**29.** **If 79 g of a gas at s.t.p occupies a volume of 25 cm³, what is the relative molecular mass of the gas? (G.M.V & s.t.p = 22.4 dm³)** A. 17 B. 32 C. 64 D. 71

**30. = The equation above represents A.** Gay Lussa’s law B. Dalton’s law of partial pressure C. Graham’s law D. Avogadro’s law

**31.** **The quantity of electricity required to deposit 180 g of Ag from a molten silver trioxonitrate (V) is [Ag = 108] A.** 1.08 F **B.** 3.30 F **C.** 1.67 F **D.** 1.80 F

**32. Calculate the time of current flow when a current of 0.50 A is passed through an electrolyte and 1500 C of electricity was used A.** 8000 B. 7500 C. 1500 D. 3000

**33.** **The IUPAC nomenclature of the complex K4Fe(CN)6 is A.** potassium hexacyanoferrate(II) **B.** potassium hexacyanoferrate(III) **C.** potassium hexacyanoferrate(IV) **D.** potassium hexacyanoferrate(VI)

**34.** Sn(s) + 2HCl(aq) →

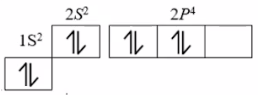
**In the reaction above, the products formed are A.** SnCl2 + H2(g) B. SnCl + H2(g) C. SnCl4 + H2(g) D. SnCl + Cl2(g) + H2(g)

**35.** **Which of the following is used in forming slag in the blast furnace for the extraction of iron? A**. Ca(CO3)2 B. Ca(OH)2 C. CaCO3 D. CaO

**36**. Alkali metals react with cold water to liberate A. oxygen B. carbon(II) oxide C. hydrogen D. carbon(IV) oxide

**37**. Half-life of a radio nuclide with relative atomic mass of 60 is 4 days, what percentage of the substance will remain after 16 days of exposure? A. 6.25 B. 30.00 C. 25.00 D. 12.50

**38**. **In the periodic table, s-block elements are made up of A.** Groups 1, 2 and 3 **B.** Groups 1 and 2 **3.** Group 3 **D.** Groups 3 and 7



**39**. **The diagram above represents the distribution of electrons in the atom of oxygen. Which of the principles/rules below is violated? A.** Aufbau principle **B.** Hund's rule of maximum multiplicity **C.** Pauli's exclusion principal **D.** Graham's law of diffusion

**40.** **Which of these compounds will their metal and non-metal have equal number of shells after combination A**. CuO B. KBr C. MgO D. NaCl