Chemistry

1983- 2004

SCHOOLINGS JAMB

Questions

# Chemistry 1983

1. X is crystalline salt of sodium. Solution of X in water turns litmus red produces a gas which turns lime water milky when added to sodium carbonate. With barium chloride solution, X gives a white precipitate which is insoluble in dilute hydrochloric acid. X is
   1. Na2,CO3 B. NaHCO3
2. NaHSO4 D Na2SO3

E. Na2SO4

1. The alkanol obtained from the production of soap is

sweet taste and melts on heating. In the presence of yeast and in the absence of air X is converted to compound Y in the absence of air, X is converted to compound Y and colourless gas.

Compound Y reacts with sodium metal to produce a gas Z which gives a ‘pop’ sound with a glowing splint. Y also reacts with ethanoic acid to give a sweet smelling compound W.

1. Compound W is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A. | ethanol B. | glycerol |  | A. | a soap | B. | an oil |
| C. | methanol | D. | propanol | C. | an alkane | D. | an ester |
| E. | glycol |  |  | E. | sucrose |  |  |

1. The flame used by welders in cotton metals is 9. The molecular formula of X is
   1. butane gas flame A. C H O B. C H O

12 22 11 6 12 6

* 1. acetylene flame C. C H O D. C H O

3 6 3 7 14 7

* 1. kerosene flame E. C H3O

4 4

* 1. oxy-acetylene flame
  2. oxygen flame

1. Consecutive members of an alkane homologous series differ by
   1. CH B. CH2

C. CH3 D. CnHn

E. CnH2n+2

1. If an element has the lectronic configuration 1s22s2 2p 3s2 3p2, itis

6

* 1. a metal
  2. an alkaline earth metal
  3. an s-block element
  4. a p-block element
  5. a transition element

1. Some copper (11) sulphate pentahydrate (CuSO45H2O), was heated at 120oC with the following results: Wt of crucible = 10.00 g; Wt of crucible + CuSO45H2O= 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]
   1. 1 B. 2

C. 3 D. 4

E. 5

1. The three-dimensional shape of methane is
   1. hexagonal B. tigonal

C. linear D. tertrahedral

E. cubical

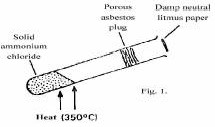
## Question 8-10 are based on the following

An unknown organic compound X has a relative molecular mass of 180. It is a colourless crystalline solid, readily soluble in water. X contains the element C, H, and O in the atomic ratio 1:2:1. The compound has a

1. reaction of X with yeast forms the basic of the
   1. plastic industry
   2. textile industry
   3. brewing industry
   4. soap industry
   5. dyeing industry.
2. A mixture of common salt, ammonium chloride and barium sulphate can best be separated by
   1. addition of water followed by filtration then sublimation
   2. addition of water followed by sublimation then filtration
   3. sublimation followed byaddition of water then filtration
   4. fractional distillation
   5. fractional crystallization.
3. Which of the following relationships between the pressure P, the volume V and the temperature T, represents and ideal gas behaviors?
   1. P & VT B. P & T/V

C. PT & V D. PV& VT

E. P & V/T

1. 

In the above experiment (fig1) the litmus paper will initially

* 1. be bleached B. turn green

C. turn red D. turn blue

E. turn black

1. The colour imparted to a flame by calcium ion is
2. How many isomeric forms are there for themolecular formula C3H6Br2?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A. | green | B. | blue | A. | 1 | B. | 2 |
| C. | brick-red | D. | yellow | C. | 3 | D. | 4 |
| E. | lilac |  |  | E. | 5 |  |  |

1. In the reaction M+ N  P; H = + Q kJ. Which of the following would increase the concentration of the product?
   1. Decreasing the concentration of N
   2. Increasing the concentration of P
   3. Adding a suitable catalyst.
   4. Decreasing the temperature
2. In which of the following processes is iron being oxidized?
3. Fe + H2SO4 H2 + FeSO4



1. FeSO4+ H2S FeS + H2SO4

3 FeCl + CI2 2FeCL3



4 FeCl3 + SnCI2 2FeCL2 + SnCI4

1. 1 only B. 2 only

C. 3 only D. 1 and 3

E. 2 and 4.

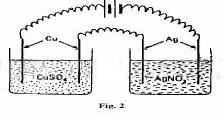
1. 

Fig.2

In the above experiment (fig.2), a current was passed for 10 minutes and 0.63 g of copper was found to be deposited on the cathode of CuSO4 cells. The weight

of AgNO3 cell during the same period would be [Cu = 63, Ag –108]

1. 0.54 g B. 1.08 g

C. 1.62 g D. 2.16 g

E. 3.24 g

1. In the reaction Fe + Cu2+ Fe2+ + Cu, iron displaces copper ions to form copper. This is due to the fact that
   1. iron is in the metallic form while dthe copper is in the ionic form
   2. the atomic weight of copper is greater than that of ion
   3. copper metal has more electrons than ion metal
   4. iron is an inertmetal
   5. iron is higher in the electrochemical series than copper.
2. C2H5 ~~C~~ =CH2 CH3

The correct name of the compound with the above

structural formula is

* 1. 2-methylbut-1-ene

1. A piece of burning sulphur will continue to burn in a gas jar of oxygen to give misty fumes which readily dissolve in water. The resulting liquid is
   1. sulphur (1V) trioxide
   2. Tetraoxosulphate acid (V1)
   3. Trioxosulphate (1V) acid
   4. Dioxosulphate (11) acid
   5. Hydrogen sulphide
2. Sodium decahydrate (Na2SO4 10H2O) an exposure to air loses all its water of crystallization. The process of loss is known as
   1. Efflorescence B. Hygroscopy
3. Deliquescence D. Effervescence

E. Dehydration

1. Which of the following happens during theelectrolysis of molten sodium chloride?
   1. Sodium ion loses an electron
   2. Chlorine atom gains anelectron
   3. Chloride ion gains an electron
   4. Sodium ion isoxidized
   5. Chloride ion isoxidized.
2. Crude petroleum pollutant usuallyseen on some Nigeria creeks and waterways can be dispersed or removed by.
   1. heating the affected parts order to boil off the petroleum
   2. mechanically stirring to dissolve the petroleum in water
   3. pouring organic solvents to dissolve the petroleum
   4. spraying the water with detergents
   5. cooling to freeze out thepetroleum.
3. An element is electronegative if
   1. it has a tendency to exist in the gaseousform
   2. its ions dissolve readily in water
   3. it has a tendency to lose electrons
   4. it has a tendency to gain electrons
   5. it readily forms covalent bonds
4. Solution X,Y, and Z have pH values 3.0, 5.0 and 9.0 respectively. Which of the following statements is correct?
   1. All the solution areacidic
   2. All solution are basic
   3. Y and Z are more acidic than water
   4. Y is more acidic than X.
   5. Z is the leastacidic
5. In the reactions

(1) H2 (g) + 1

* 1. 2-methylbut-2-ene
  2. 2-methylbut-1-ene

2 O2(g) H

2O(1); H =-2.86kJ

* 1. 2-ethyprop-1-ene

(11) C(s) + O (g) CO (g); H= -406 kJ

2 2

* 1. 2-ethylprop-2-ene

the equations imply that

1. more heat is absorbed heat is evolved in (1)
2. more heat is absorbed in (11)
3. less heat is evolved in (1)
4. reaction (11) proceeds faster than(1)
5. reaction (1) proceeds faster than (11)
6. Which of these metals, Mg, Fe, Pb, and Cu will dissolve in dilute HCI?
   1. All the metals
   2. Mgm Fe, and Cu
   3. Mg, Fem and Pb
   4. Mg and Fe only
   5. Mg only
7. Stainless steel is an alloy of
   1. Carbon, iron and lead
   2. Carbon, ion andchromium
   3. Carbon iron and copper
   4. Carbon, iron and silver
   5. Carbon and iron only
8. What volume of 0.50 MH2SO4 will exactly neutralize 20cm3 of 0.1 M NaOH solution?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 2.0 cm3 | B. | 5.0 cm3 |
| C. | 6.8 cm3 | D. | 8.3 cm3 |
| E. | 10.4 cm3 |  |  |

1. Which of the following pair of gases will NOT react further with oxygen at a temperature between 30oC and 400oC?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | SO2 and NH3 | B. | CO2 and H2 |
| C. | NO2 and SO3 | D. | SO3 and NO |
| E. | CO and H2 |  |  |

1. Some metals are extracted from their ores after some preliminary treatments by electrolysis (L) some by thermal reaction(T) and some by a combination of both processes(TL). Which set-up in the following for the extraction of iron copper and aluminum is correct?
   1. Iron (L), copper (L) m aluminum (T)
   2. Iron (T), copper (L), aluminum(T)
   3. Ion (TL), copper (TL), aluminium (TL)
   4. Iron (L), copper (T), aluminium (T).
   5. Ion (T), copper (L), aluminium (TL).
2. In the preparation of some pure crystals of Cu (NO3)2 starting with CuO, a student gave the following statements as steps he employed. Which of these shows a flaw in his report?
   1. Some CuO was reacted with excess dilute H SO
3. Column chromatography
4. Evaporation
5. Increasing the pressure of a gas
   1. lowers the average kinetic energy of the molecules
   2. decreases the density of the gas
   3. decreases the temperature of the gas
   4. increases the density of the gas
   5. increases the volume of the gas.
6. 2.5 g of a hydrated barium salt gave on heating, 2.13 g of the anhydrous salt. Given that the relative molecular mass of the anhydrous salt is 208, the number of molecules of water of crystallization of the barium salt is

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 10 | B. | 7 |
| C. | 5 | D. | 2 |
| E. | 1 |  |  |

1. 3.06 g of a sample of potassium trioxochlorate

(v) (KCIO3) was required to make a saturated solution with 10cm3 of water at 25oC. The solubility of the salt at 25oCis [K =39, CI =35.5, O=16]

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 5.0 moles dm3 | B. | 3.0 moles dm3 |
| C. | 2,5 moles dm3 | D. | 1.0 moles dm3 |
| E. | 0.5 moles dm3 |  |  |

1. The cracking process is veryimportant in the petroleum industry because it
   1. gives purer products
   2. Yields morelubricants
   3. Yields more engine fuels
   4. Yields more asphalt
   5. Yield more candle wax
2. A gas that can behave as reducing agent towards chlorine and as an oxidizing agent toward hydrogen sulphide is
   1. O2 B. NO

C. SO2 D. NH3

E. CO2

1. Which if the following solution will give a white

precipitate with barium chloride solution and a green flame test?

|  |  |  |  |
| --- | --- | --- | --- |
| A.  C. | Na2SO4 CaSO4 | B.  D. | CuSO4  CaCI2 |
| E. | (NH4)2 SO4 |  |  |

1. The mass of an atomis determined by
   1. its ionization potential

2 4

* 1. The solution was concentrated
  2. When the concentrate was cooled, crystals formed were removed by filtration.
  3. The crystals were washed with very cold water
  4. The crystals were then allowed to dry.

1. Which of the following seperation processes is most likely to yield high qualityethanol (>95%) from palm wine?
   1. Fractional disllation without a dehydrant
   2. Simple distillation without adehydrant
   3. Fractional distillation with a dehydrant
2. its electrochemical potential
3. the number of protons
4. the number of neutrons and protons
5. the number of neutrons and electrons
6. Which ofthe following is neutralization reaction?
   1. Addition of chloride solution
   2. Addition of trioxonirate (V) acid (nitricacid) to distilledwater.
   3. Addition of trioxonirate (V) acid (nitricacid) to tetraoxosulphate (V1) acid (sulphuric acid).
   4. Addition of trioxonirate (V) (potassium nitrate) solution
7. More CuCI is formed at 10oC
8. Less CuCI2 is formed at 10oC

2

* 1. Addition of trioxonirate (V) acid (nitricacid) potassium hydroxide solution.

1. there is no change CuCI2 10oC

formed at 40oC and

E. More CuCI is consumed at 40oC

2

1. A jet plane carrying 3,000 kg of ethane burns off all the

gas forming water and carbondioxide. If all the 48. Zn + H2SO ZnCI + H

4 2 2

carbondioxide is expelled and the water formed is condensed and kept on board the plane, then the gain in weight is

* 1. 1,800 kg B. 900 kg

C. 600 kg D. 2,400 kg

E. 1,200kg

1. Liquid X, reacts with sodium trioxocarbonate (IV)

The rate of the above reaction will be greatly increased if.

* 1. the zinc is in the powered form
  2. a greater volume of the acid is used
  3. a smaller volume ofthe acid is used
  4. the reaction vessel is immersed in an ice-bath
  5. the zinc is in the form of pellets.

(Na2CO3) to give a gas which turns calcium chloride

1. Zn + H SO

ZnSO + H

2 4 4 4



solution milky. X is

* 1. Na2SO4 (aq) B. KI (ag)

C. An alkali D. An acid

E. A hydrocarbon.

1. Which of the following statements isFALSE?
   1. copper (11) ion can be reduced to copper (1) ion by hydrochloric acid and zinc.
   2. Sodium metal dissolves in water givingoxygen
   3. Nitrogen is insoluble inwater
   4. Carbondioxide is soluble in water
   5. Lead has a higher atomic weight than copper
2. When sodium dioxonitrate (111) (HaNO \) dissolvesis

In the above reaction how much zinc will be left undissolve if 2.00 g of zinc treated with 10cm3 of 1.0 M of H2SO4? [Zn =65, S=32, O = 16, H = 1]

* 1. 1.35 g B. 1.00 g

C. 0.70 g D. 0.65 g

E. 0.06 g

1. 30cm3 of 0.1 M AI(NO3)3 solution is reacted with 100cm3 of 0.15M of NaOH solution. Which is in excess and by how much?
   1. NaOH solution, by 70cm3
   2. NaOH solution, by 60cm3
   3. NaOH solution by 40cm3
      1. Exothermic B.

2

Endothermic

D. AI (NO3)3, solution by 20cm3

C. Isothermic D. Isomeric

E. Hydroscopic

1. The equilibrium reaction between copper (1) chloride and chloride at 25oC and 1 atmosphere is represented by the equation:
2. AI (NO3)3 solution, by 10cm3

2CuCI2 + CI2 2CuCI2 H = -166kJ . Which ofthe

following statement is TRUE for the reaction, pressure remaining constant.

A. More CuCI is formed at 40oC

2

# Chemistry 1984

* 1. Sodium chloride may be obtained from brineby
     1. titration B. decantation

C. distillation D. evaporation

E. sublimation

* 1. 20cm3 of hydrogen gas are sparked with 20cm3 of oxygen gas in an eudiometer at 373K (100oC) and 1 at atmosphere. The resulting mixture is cooled to 298 K (25oC) and passed over calcium chloride. The volume of the residual gas is
  2. For the reaction NH4 NO 2 N2 + 2H2O calculatethe volume of nitrogen that would be produced at S.T.P from 3.20 g of the trioxonirate (111) salt.
     1. 2.24 dm3 B. 2.24 cm3

C. 1.12cm3 D. 1.12dm3

E. 4.48dm3

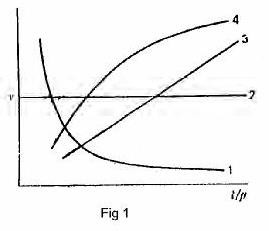
(Relative atomic masses: N = 14m O =16, H=1).

* 1. Manganese (1V) oxide reacts with concentrated hydrochloric acid according to the equation

MnO + xHCI  MnCI + CI +yH O. x and y are

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 40cm3 | B. | 20cm3 |
| C.  E. | 30cm3  5 cm3 | D. | 10cm3 |

2 2 2

* + 1. 2 and 5 respectively
    2. 2 and 4 respectively
    3. and 2 respectively
    4. 4 and s2 respectively
    5. 4 and 1 respectively
  1. A molar solution of caustic soda is prepared by dissolving
     1. 40 g NaOH in 100 g of water
     2. 40 g NaOH in 1000 g of water
     3. 20 g NaOH in 500 g of solution
     4. 20 g NaOH in 1000 g of solution
     5. 20 g NaOH in 80 g of solution.
  2. Which among the element 1. Carbon 2. Oxygen 3. Copper 4. Bromine 5. Zinc will NOT react with either water of stream?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 1 and 2 | B. | 2 and 3 |
| C. | 3 and 4 | D. | 1, 2, and 3 |
| E. | 2, 3 and 5 |  |  |
| 7. |  |  |  |

Fig 1

Which of the curves shown in fig 1 represents the relationships between the volume (v) and pressure (p) of an ideal gas at constant temperature?

* + 1. 1 B. 2

C. 3 D. 4

E. 1 and 3

1. powdering the reactant if solid
   1. 1,2 and 3 B. 1, 3 and 5

C. 2, 3 and 5 D. 3 and 4

E. 3 and 5

11 The balance equation for the reaction of tetraoxosulphate (V1) acid with aluminium hydroxide to give water and aluminium tetraoxosulphate (V1) is

1. H2SO4 +AISO4  2H2O +AISO4
2. HSO4 + AIOH H2O +AISO4
3. 3H2SO4 +2AIH3 6H2OH + AI (SO4)3
4. 3H2SO4 + 2AI(OH)3 6H2O + AI (SO4)3
5. H2SO4 +AI (OH)3 H2O +AI2(SO4)3

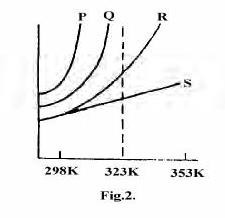
12.

Fig. 2.

The solubility curves of four substances are shown in Fig.2. Which of the four substances would crystallize from a saturated solution cooled from 353 K (80oC) to 323 K(50oC)

1. P and Q B. P and R

C. P and S D. R and S

E. Q and R.

1. which of the following mixtures would result in a solution of pH greater than 7?
   1. 25.00 cm3 of 0.05 M H SO and 25.00 cm3 of

2 4

0.50 m Na2CO3

* 1. 25.00 cm3 of 0.50 M H SO and 25;00 cm3 of

1. Naphthalene when heated melts at 354K (81oC) . At this temperature the molecules of naphthalene .

0.10 M NaHCO3

* 1. 3

2 4

and 25.00 cm3 of

25.00 cm of 0.11 M H2SO4

* + 1. decompose into smallermolecules
    2. change their shape

0.10M NaOH

D. 25.00 cm3 of 0.11 M H SO and 50.00 cm3 of

* + 1. are oxidized by atmospheric oxygen
    2. contract

2 4

0.50 M NaOH

* + 1. 25.00 cm3 of 0.25 MH SO and 50.00 cm3 of) .20

2 4

E. become mobile as the inter molecular forces are broken.

1. The ration of the number of molecules in 2g of hydrogen to that in 16 g of oxygen is
   1. 2:1 B. 1:1

C. 1:2 D. 1:4

E. 1:8

1. Which combination of the following statements is correct?

1. lowering the activation energy

2 conducting the reaction in a gaseous state

M NaOH

1. In which of the following reactions does hydrogen peroxide acts as a reducing agent?
   1. H2S + H2O  S + 2H2O
   2. PbSO3 + H2O2  PbSO4 + H2O
   3. 2‘! + 2H + H2O I2 +2H2O
   4. PbO2 + 2HNO3 +H2O2  Pb (NO3)2 + 2H2O

+ O2

* 1. SO + H2O2 H2SO4

1. For the reaction 2Fe + 2 e- 2Fe2+ +I , which of the

2

1. increasing the temperature
2. removing the products as soon as they are formed

following statements is TRUE?

* 1. Fe is oxidized to Fe3
  2. Fe3+ is oxidized to Fe2+
  3. I- is oxidized to I 21. An element that can exist in two or more different

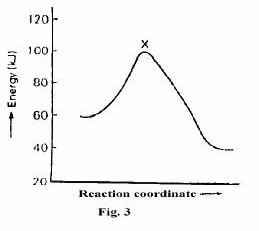
2

* 1. I- is reduced to I2
  2. I- is displacing an electron from Fe3+

structure forms which possess the desame chemical properties is said to exhibit

|  |  |  |  |
| --- | --- | --- | --- |
| A. | polymerism | B. | isotropy |
| C. | isomorphism | D. | isomerism |
| E. | allotropy. |  |  |

* + 1. Sulphur….
       1. Forms two alkalineoxides
       2. Is spontaneously flammable
       3. Burns with a blue flame
       4. Conducts electricity in the molten state
       5. Is usually stored in the form of sticks in water.

The diagram above (Fig.3) shows the energy profile for the reaction A+B = C+ D. form this diagram, its clear that the reaction is

|  |  |  |  |
| --- | --- | --- | --- |
| A. | spontaneous | B. | isothermal |
| C. | adiabatic | D. | exothermic |
| E. | endothermic |  |  |

1. In dilute solute the heat of the following NaOH + HCI = NaCI + H2O+ H2SO4  Na2SO4 + 2H2Ois

|  |  |  |  |
| --- | --- | --- | --- |
| A. | +28.65 kJ | B. | –28.65kJ |
| C. | +57.3 kJ | D. | –114.6 kJ |
| E. | –229.2 kJ |  |  |

1. For the reactions: (1 Melon oil + NaOH ! Soap + Glycerol (11) 3Fe + 4H2O Fe3O4 + 4H2 (111) N2O4

2NO2. Which of the following statements is true?

* 1. Each of the three reactions requires a catalyst
  2. All the reactions demonstrate Le Chatelier’s principle
  3. The presence of a catalyst will increase the yield of products
  4. Increase in pressure will result in higher yields of the products in 1 and 11 only
  5. Increase in pressure will result in higher of the products in 111 only.

1. Which of the following methods may be used to prepare trioxonirate (V) acid (nitric acid) in the laboratory?
   1. Heating ammonia gas with tetraoxosulphate (1V) acid
   2. Heating ammonium trioxosulphate (V) with tetraoxonitrate (V)acid
   3. Heating sodium trioxonirate (v) with tetraoxosulphate (V1) acid
   4. Heating potassium trioxonirate (V) with calcium hydroxide.
   5. Heating a mixture of ammonia gas and oxygen\
2. Lime –water, which is used in the laboratory for the detection of carbon (1V) oxide, is an aqueous solution of:

|  |  |  |  |
| --- | --- | --- | --- |
| A. | Ca (OH)2 | B. | CaCO3 |
| C. | CaHCO3 | D. | CaSO4 |
| E. | N2CO3 |  |  |

* + 1. Which off the following statements is NOT true of carbon monoxide?
       1. CO is poisonous
       2. CO is readily oxidized at room temperature by air to form Co2
       3. CO may be prepared by reducing CO2, mixed coke heated to about 1000oC
       4. CO may be prepared by heating charcoal with a limited amount of O2
       5. CO is a good reducing agent.
    2. From the reactions:

ZnO + Na2O  Na2ZnO and

ZnO+ CO2 ZnCO3 it may be concluded that zinc oxide is

|  |  |  |  |
| --- | --- | --- | --- |
| A.  C.  E. | neutral acidic  a mixture | B.  D. | basic amphoteric |
| An example of a neutral oxide is | | | |
| A. | AL2O3 | B. | NO2 |
| C.  E. | CO2  SO2 | D. | CO |

* + 1. 3CI2+ 2NH3  N2 + 6HCI. In the above reaction, ammonia acts as.
       1. a reducing agent
       2. an oxidizing agent
       3. an acid
       4. a catalyst
       5. a drying agent
    2. In the Haber process for the manufacturer of ammonia, finely divided iron is used as
       1. an ionizing agent
       2. a reducing agent
       3. a catalyst
       4. a dehydrating agent
       5. an oxidizing agent.
    3. An organic compound with a vapour density 56.5 has the following percentage composition: C = 53.1%, N = 12.4%, O = 28.3%, H = 6.2%. The molecular formula of the compound is
       1. C3H6O2N B. C5H6O2N

C. (C5H7O2N)½ D. C5H7O2N

E. (C5H7ON)2.

Relative atomic masses: N = 12.4%, O = 28.3%, H = 1)

* + 1. The hybridization of the carbon atom in ethyne is
       1. Sp^ B. sp3

C. sp2 D. sp

E. s

* + 1. When the kerosene fraction form petrol is heated at high temperature, a lower boiling liquid is obtained. This process is known as
       1. polymerization B. refining

C. hydrogenation D. cracking

E. fractional distillation O

* + 1. CH3- CH2-C

OH

Is

* + - 1. acetic acid B. propanal

C. propanol D. ethanoic acid

E. propanoic acid

* + 1. Alkaline hydrolysis of naturally occurring fats and oils yields.
       1. fats and acids
       2. soaps and glycerol
       3. margarine and butter

1. which of the following statement is NOT correct about all four of the acids: HBr, HNO3H2CO3and H2SO4? They
   1. dissolve marble to liberate litmus red
   2. have a pH less than 7
   3. turn blue litmusred
   4. neutralize alkalis to form salt
   5. react with magnesium to liberate hydrogen.
2. If the cost of electricity required to deposit 1 g old magnesium is N5.00. How much salt would it cost to deposit 10 g of aluminium?
   1. N10.00 B. N27.00

C. N44.44 D. N66.67

E. N33.33.

(Relative atomic masses: AI = 27, Mg = 24).

37, In an experiment, copper tetraoxosulphate (V1) solution was electolysed using copper electrodes, The mass of copper deposited at the cathode by the passage of 16000 coulombs of electricity is

A. 16.70 g B. 17. 60g

C. 67.10 g D. 10. 67g

E. 60.17 g

(Relatively atomic masses: Cu = 63.5m O = 16,

H = 1, S = 32).

D. esters 3 19 24 20 19 . Which of the following

38. R U S T

1 9 12 10 7

E. detergents.

* + 1. Which of the following represents a carboxylic acid?

OH

* + - 1. R ~~C~~ O

OR

* + - 1. R C



O

* + - 1. H2SO4,
      2. R - COOCOR

H

* + - 1. R C

O

* + 1. which of the statement is INCORRECT?
       1. fractional distillation of crude petroleum will give following hydrocarbon fuels in order of increasing boiling point: Butane < petrol < kerosene
       2. H2C = CH2 will serve as a monomer in the preparation of polythene
       3. Both but – 1- ene and but –1-1yne willdecolorize bromine readily.
       4. But –2 – ene will react with chlorine to form 2, 3 – dichlorobutane.
       5. Calcium carbide will react with water to form any alkayne

statements is NOT true of the elements R, U, S, T, Y?

1. R is an isotope of hydrogen
2. U and Y are isotopes
3. R,U,S and T are metals
4. T is a noble gas
5. S will react with oxygen to form SO
6. Nitrogen can best be obtained from a mixture of oxygen and nitrogen by passing the mixture over
   1. potassium hydroxide
   2. heated gold
   3. heated magnesium
   4. heated phosphorus
   5. calcium chloride.
7. Water is said to be ‘hard’ if it
   1. easily formsice
   2. has to be warmed before sodium chloride dissolves in it
   3. forms an insoluble scum with soar
   4. contains nitrates
   5. contains sodium ions.
8. Sodium hydroxide (NaOH) pellets are
   1. deliquescent B. hygroscopic

C. efflorescent D. hydrated

E. fluorescent.

1. Which of the following structure formulae is NOT numeric with others?
   1. H H H H

| | | | H–C- C - C – OH

| | | | H H H H

* 1. H H H H

| | | | H– C- O- C - C – C- H

| | | |

H H H H

* 1. H H H H

| | | | H– C- C - C – C- H

| | | | H OH H H

* 1. H O H

|  |

H–C- C - C – C- H

| | | |

H H H H

* 1. H H O H

| |

H–C - C - C – C- H

| | | |

H H H H

1. Alkalines
   1. are all gases
   2. have the general formula C H + O
2. A piece of sea shell, when dropped into a dilute solution of hydrochloric acid produces a colourless odorless gas, which turns clear limewater milky. The shell contains
   1. sodium chloride
   2. ammonium nitrate
   3. calcium carbonate
   4. calcium chloride
   5. magnesium chloride
3. An aqueous solution of a metal salt, Mm gives a white precipate with NaOH, which dissolves in excess NaOH. With aqueous ammonium the solution of M also gives a white precipate which dissolves in excess ammonia. Therefore the caution in M is
   1. Zn++
   2. Ca++
   3. AI+++
   4. Pb++
   5. Cu++
4. The I.U.P.A. C name for the compound

H

|

CH- C – CH2 - CH3

|

CH3 is

* 1. isopropylethene

n 2n 2

1. contains only carbon and hydrogen
2. are usually soluble inwater
3. are usually active compounds.
4. If an excess of a liquid hydrocarbon is poured into a jar of chlorine, and the sealed jar is then exposed for several
   1. acetylene
   2. 3-methylbutane
   3. 2-methybutane
   4. 5-methypentane.
5. At S.T.P how many litres of hydrogen can be obtained

hours to bright sunlight, all the chlorine gas is consumed. The hydrocarbon is said to have undergone

* 1. a polymerizationreaction
  2. an isomerixation reaction
  3. an addition reaction
  4. a substitution reaction
  5. a reduction reaction

1. The function of conc. H2SOH4 in the etherification of ethanoic acid with ethanol is to
   1. serves as a dehydrating agent
   2. serves as solvent
   3. act as a catalyst
   4. prevent any side reaction
   5. serve as an oxidizingreaction

from the reaction of 500cm3 of 0.5 M H SO metal.

1. 22.4 dm3

2

4

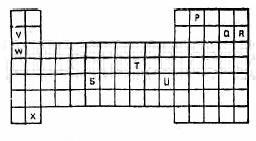
1. 11.2 dm3
2. 6.5 dm3
3. 5.6 dm3
4. 0.00 dm3

(Gram molecular volume of H2 = 22.4 dm3)

excess zinc

# Chemistry 1985

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 25.0 moles | B. | 12.5 moles |
| C. | 6.25 moles | D. | 3.125 moles |
| E. | 0.625 moles |  |  |

1. 3.0 g of a mixture of potassium carbonate and potassium chloride were dissolved in a 250cm3 standard flask. 25 cm of this solution required 40.00cm3 of 0.1 M HCI for neutralization. What is the percentage by weight of K2CO3 in themixture?

3

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 60 | B. | 72 |
| C. | 82 | D. | 89 |

Fig. 1

1. Figure shows part of the periodic Table. Which of the elements belongs to the p-block?
   1. S,T and U.
   2. V, W and X
   3. S and T only
   4. P, Q and R
   5. V,W, X and S.
2. Which of the following conducts electricity?
   1. Sulphur B. Graphite

C. Diamond D. Red phosphorus

E. Yellow phosphorus.

1. An organic compound contains 72% carbon 12% hydrogen and 16% oxygen by mass. The empirical formula of the compound is
   1. C6H22O3 B. C6H10O3

C. C12H12O D. C6H12O

E. C3CH10

( H= 1, C = 12, O= 16).

1. 0.499 of CuSO .xH O when heated to constantweight

4 2

gave a residue of 0.346 g. The value of x is

* 1. 0.5 B. 2.0

C. 3.0 D. 4.0

E. 5.0.

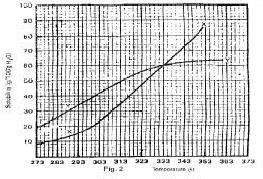
(Cu = 63.5, S = 32.0 O = 16, H = 1).

1. In an experiment which of the following observation would suggest that a solid sample is a mixture? The
   1. solid can be ground to a fine powder
   2. density of the solid 2.25 g dm-3
   3. solid begins to melt until 648 K
   4. solid absorbs moisture from the atmosphere and turns into aliquid
   5. solid melts at 300 K.
2. Hydrogen diffuses through a porous plug
   1. at the same rate as oxygen
   2. at a slower rare than oxygen
   3. twice as fast as oxygen
   4. three times as fast as oxygen
   5. four times as fast as oxygen.

1. Given the molecular mss of iron is 56 and that of oxygen is 16, how many moles of Iron (111) oxide will be contained in 1 kg of the compound?

E. 92 (K = 39, O = 16, C = 12).

Figure 2 below represents the solubility curb\ves of two salts, X and Y, in water. Use this diagram to answer question9 to 11



1. At room temperature (300K)
   1. Y is twice as soluble as X
   2. X is twice as soluble as Y
   3. X and Y soluble to the same extent
   4. X is three times as soluble as Y
   5. Y is three times as soluble as X
2. If 80 g each of X and Y are taken up in 100g of water at 353 K we shall have.
   1. only 10 g of X and Yundissolve
   2. only 16 g of Y undissolve
   3. 10 g of X and 16 g of Y undissolved
   4. all X and Y dissolved
   5. all X and Yundissolved
3. If the molar mass of X is 36 g, the number of moles of X dissolved at 343 is
   1. 0.2 moles B. 0.7 moles

C. 1.5 moles D. 2.0 moles

E. 3.0 moles

1. Some properties of chemical substances are mentioned below (i) solar taste (ii)slippery to touch (iii)yields alkaline gas with ammonium salts (iv) has pH less than 7 (v) turns phenolphthalein pink. Which of the above are NOT typical properties of alkaline?
   1. (i), (iv) and(v)
   2. (iv) and (v)
   3. (i) and (iv)
   4. (ii) and (v)
   5. (ii), (iii) and (v)
2. A certain volume of a gas at 298K is heated such that its volume and pressure are now four times the original values. What is the new temperature?
   1. 18.6K B. 100.0K

C. 298.0K D. 1192.0K

E. 47689.0 K

1. Hydrogen is not liberated when trioxonirate (v) acid reacts with zinc because
   1. Zinc is rendered passive by the acid
   2. Hydrogen produced is oxidized towater
   3. Oxides of nitrogen areproduced
   4. All nitrates are soluble in water
   5. trioxonitrate v acid is a strong acid.
2. The boiling points of water, ethanol, toluene and button-2-ol are 373.OK, 351.3K, 383.6 K and 372.5 K respectively. Which liquid has the highest vapour pressure at 323.0K?
   1. water B. Toluene

C. Ethanol D. Butan-2-ol

E. None

1. In what respect will two dry samples of nitrogen gas differ from each other if samples 1 is prepared by completely removing CO2 and O2 from air and sample 2 is prepared by passing purified nitrogen (i) oxide over heated copper? Sample 1 is
   1. purer than sample 2
   2. slightly denser than sample2
   3. in all respects the same as sample 2
   4. colourless but sample 2 has a light brown.

carbon monoxide and high level of methane, the probable source(s) of the pollution must be

1. automobile exhaust and biological decomposition
2. combustion of coal and automobile exhaust
3. biological decomposition only
4. combustion of coal, automobile exhaust and biological decomposition
5. combustion of coal and biological decomposition.
6. A correct electrochemical series can be obtained from K, Na, Ca, Al, Mg, Zn, Fe, Pb, H, Cu, Hg, Ag, Au by interchanging
   1. Al and Mg B. Zn and Fe

C. Zn and Pb D. Pb and H

E. Au and Hg.

1. A certain industrial process is represented by the chemical equation 2A(g) + B(g) ’!C(g) + 3D(g) H = XkJ mol- . Which of the following conditions will favour the

yield of the product?

* 1. Increases in the temperature, decrease in pressure.
  2. Increase in temperature increase in pressure
  3. Decrease in temperature, increasein pressure
  4. Decrease in temperature, increase in pressure.
  5. Constant temperature, increase in pressure.

1. 2MnO - + 10Cl- + 16H + ’! 2Mn2++ 5Cl + 8H O. which of

4 2 2

the substances serves as an oxidizing agent?

* 1. Mn2+ B. Cl-

C. H2O D. MnO4

E. Cl2

* 1. slightly less reactive than sample 2 24. In the reaction H O ’! H2 + ½O2 H=-2436000kJ2,

2 (g) (g) (g)

which of the following has no effect on the equilibrium

1. Copper sulphate solution is electrolyzed using platinum electrodes. A current of 0.193 amperes is passed for 2hrs. How many grams of copper are deposited?
   1. 0.457 g B. 0.500 g

C. 0.882 g D. 0.914 g

E. 1.00 g (Cu = 63.5m F = 96500 coulombs)

1. X + Y Z is an equilibrium reaction. The addition of a catalyst



* 1. increases the amount of W produced in a given time
  2. increase the rate of change in concentrations of X, Y and Z
  3. increases the rate of disappearance of X and Y
  4. increases the rate of the forwardreaction
  5. decreases the amounts of X and Y left after the attainment ofequilibrium.

1. What is the formula of sodium gallate if gallium (Ga) showsan oxidation number of +3.
   1. NaGaO3 B. Na2G(OH)2

C. NaGa(OH)3 D. NaGa (OH)4

E. NaGaO

1. If the ONLY pollutants found in the atmosphere over a city are oxides of nitrogen suspended lead compounds,

position?

* 1. Adding argon to the system
  2. Lowering the temperature
  3. Adding hydrogen to the system
  4. Decreasing the pressure
  5. Increasing the temperature.

1. which of the following metals will displace iron from a solution of iron(11) tetraoxosulphate(1V)?
   1. copper B. mercury

C. silver D. Zinc

E. Gold

1. Complete hydrogenation of ethyne yields
   1. benzene B. methane

C. ethene D. propane

E. Ethane

1. Which of the following is used in the manufacture of bleaching powder?
   1. sulphur dioxide B. chlorine
2. hydrogen tetraoxosulphate
3. hydrogen sulphide
4. nitrogen dioxide
5. A man suspected to being drunk is made to pass his breath into acidified potassium dichromate solution. If

has breath carries a significant level of ethanol, the final colour of the solution is.

* 1. Pink B. Purple

C. Orange D. Blue-black

E. Green.

1. When pollen grains are suspended in water and viewed through a microscope, they appear to be in a state of constant but erratic motion. This is due to
   1. convection currents
   2. small changes in pressure
   3. small changes intemperature
   4. a chemical reaction between the pollengrains and water
   5. the bombardment of the pollen grains by molecules ofwater.
2. The energy change (H) for the reaction



CH3.

1. The oxidation of CH- CH- C- O gives

|  |  |  |  |
| --- | --- | --- | --- |
|  | |  |  |
| A. | 2-butanone | H H  B. | 2-butanal |
| C.  E. | butane  3-butanal. | D. | butanoic acid |

1. Tetraoxosulphate (V1) ions are finally tested using
   1. acidified silver nitrate
   2. acidified barium chloride
   3. lime – water
   4. dilute hydrochloric acid
   5. acidified lead nitrate
2. The I.U.P.A.C name for the compound

CH

CO(g)

+½O2

(g)

CO2

(g) is

3

CH3- CH- CH –CH = CH - CH3 is

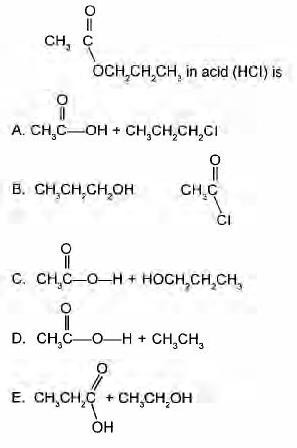
* 1. 2-methl-3-patene
  2. 4-methy-2-pentane
  3. 2-methl-2-penten

( Hi(CO) = -110.4 kJ mol-1( Hi(CO ) = -393 kJ mol-1

2

|  |  |  |  |
| --- | --- | --- | --- |
| A. | -503.7 kJ | B. | +503.7 kJ |
| C. | –282.9 kJ | D. | +282.9 kJ |
| E. | +393.3 kJ |  |  |

1. The product formed on hydrolysis of



1. The neutralization reaction between NaOH solution and nitrogen (1V) oxide (NO2) produces water and
   1. NaNO2 and NaNO3
   2. NaNO3 and HNO3
   3. NaNO2
   4. NaNO3
   5. NaN2O3
   6. 4-methyl-3-pentene
   7. 2-methyl-3-pentane
2. Mixing of aqueous solution of barium hydroxide and sodium tetraoxocarbonate(1V) yields a white precipitate of
   1. barium oxide
   2. sodium tetraoxocarbonate(1V)
   3. sodium, oxide
   4. sodium hydroxide
   5. barium tetraoxocarbonate.
3. An organic compound decolorized acidified KMnC4 solution but failed to react with ammoniacal silver nitrate solution. Theorganic compound is likely to be.
   1. a carbonxyllic acicd
   2. an alkane
   3. an alkene
   4. an alkyne
   5. an alkanone
4. Solid sodium hydroxide on exposure to air absorbs a gas and ultimately gives another alkaline substance with the molecularformula.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | NaOH.H2O | B. | NaOH.N2 |
| C. | Na2CO3 | D. | NaHCO3 |
| E. | NaNO3 |  |  |

1. Which of the following is the functional group of carboxylic acids?
   1. -OH
   2. >C= O
   3. >C-OH O
   4. -C

OH

* 1. -C= N

1. Which of the following substances is the most abundant in the universe?
   1. Carbon B. Air

C. Water D. Oxygen

E. Hydrogen

## Question 41 and 42 are based on the following.

A colourless organic compound X was burnt in exces air to give two colourless and odourless grass, Y and Z

, as products. X does not decolorize bomine vapour; Y turns lime milky while Z gives a blue colour with copper

(11) tetraoxosulphate (V1).

1. Compound X is
   1. an alkene
   2. an alkane
   3. an alkyne
   4. tetra chloromethane
   5. Dichloromethane
2. Y and Z arerespectively.
   1. CO2 and NH3 B. CO and NH3

C. SO2 and H2O D. CO2 and H2O

E. SO2 and NH3

1. Which of the following compounds is NOT the correct product formed when the parent metal is heated in air?
   1. Calcium oxide(CaO)
   2. Sodium oxide(Na2O)
   3. Copper (11) oxide (CuO)
   4. Tri-iron tetroxide(Fe3O4)
   5. Aluminium oxide (Al2O3)
2. The atomic number of an element whose caution, X2+, has the ground state electronic configuration is Is22s22P63s22p6 is
   1. 16 B. 18

C. 20 D. 22

E. 24

1. When marble is heated to 1473 K, another whiter solid is obtained which reacts vigorously with water to give an alkaline solution. The solution contains
2. Addition of dilute hydrochloric acid to an aqueous solution of a crystalline salt yielded a yellow precipitate and a gas which turned dichromate paper green. The crystalline salt was probably
   1. Na2SO4 B. Na2S

C. NaS2O3.5H2O D. NaCO3

E. NaHCO3

1. The process involved in the conversion of an oil into margarine is known as
   1. hydrogenation B. condensation

C. hydrolysis D. dehydration

E. cracking

1. An aqueous solution of an inorganic salt gave white precipate (i) soluble in excess aqueous NaOH (ii) insoluble in excess aqueous NH3 (III) with dilute HCI. The caution present in the inorganic salt is
   1. NH3 + B. Ca++

4

C. N++ D. Al+++

E. Pb++

1. Which of the following roles does sodium chloride play in soap preparation? It
   1. reacts with glycerol
   2. purifies the soap
   3. accelerates the decomposition of the fat and oil
   4. separates the soap form the glycerol
   5. converts the fat acid to its sodium salt.
2. The function of sulphur during the vulcanization of rubber is to .
   1. act as catalyst for the polymerization ofrubber molecules
   2. convert rubber from thermosetting tio thermo plastic polymer
   3. from chains which bind rubber molecules together
   4. break down rubber polymermolecule
   5. shorten the chain length of rubber polymer.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | NaOH | B. | KOH |
| C.  E. | Mg(OH)2 Ca(OH)2 | D. | Zn(OH)2 |

# Chemistry 1986

1. The movement of liquid molecules from the surface of the liquid gaseous phase above it is known as
   1. Brownian movement
   2. Condensation
   3. Evaporation
   4. Liquefaction
2. What mass of a divalent metal M (atomic mass= 40) would react with excess hydrochloric acid to liberate 22 cm3 of dry hydrogen gas measured as S.T.P?
   1. 8.0 g B. 4.0 g

C. 0.8 g D. 0.4 g

[ G. M. V = 22.4 dm3]

1. 10cm3 of hydrogen fluoride gas reacts with 5cm3 of dinitrogen difllouride gas (N F2 )2 to form 10cm3 of a single gas. Which of the following is the most likely equation to the reaction?
   1. HF + N2F2  N2HF3
   2. 2HF + N2F22NHF2
   3. 2HF + N2F2 N2H2F4
   4. HF +2N2F2  N4HF4
2. The number of atom chlorine present in 5.85 g of NaCI is
   1. 6.02 x 1022
   2. 5.85 x 10

2233

* 1. 6.02 x 10
  2. 5.85 x1024

[Na = 23, Cl = 35.5]

Avogadro’s Number = 6.02 x 1023]

1. How much of magnesium is required to react with 250cm3 of 0.5 M HCl?
   1. 0.3 g B. 1.5 g

C. 2.4 g D. 3.0 g

[Mg = 24]

1. 200cm3 of oxygen diffuse through a porous plug in 50 seconds. Hoe long will 80 cm3 of methane (CH4) take to diffuse through the same porous plug under the same conditions?
   1. 20 sec B. 20 sec

C. 14 sec D. 7 sec

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

1. The relationship between the velocity (U) of gas molecules and their relative molecule mass (M) is shown by the equation

A Û = (kM) ½

1. Û =(kM)2
2. Û = k

m

D Û = (k/ ) ½

m

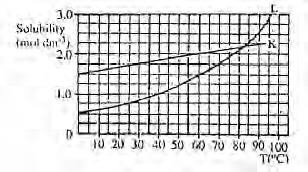
1. An element with atomic number twelve is likely to be
   1. electrovalent with a valency of 1
   2. electrovalent with a valency of 2
   3. covalent with a valency of 2
   4. covalent with a valency of 4
2. Which of the following group of physical properties increases form left to right of the periodic table? 1 lonization energy 2 Atomic radius 3Electronegativity 4 Electron affinity

In the solubility curve above, water at 98oC is saturated with KCl impurity in the crystals formed when the solution is cooled to 30oC?

* 1. NaHSO4, Ph<5
  2. Na CO , Ph>8

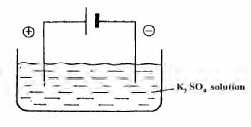
2 3

* 1. Na2Cl, Ph =7
  2. NaHCO3, Ph <6



1. Which of the following is an acid salt?
   1. NaHSO4 B. Na2SO4

C. CH3CO2Na D. Na2S

1. Which of the following solution will conduct theleast amount of electricity?
   1. 2.00 M aqueous solution of NaOH
   2. 0.01 M aqueous solution of NaOH
   3. 0.01 m aqueous solution of hexaonic acid
   4. 0.01 M aqueous solution of sugar.
2. 

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

1. When 50 cm3 of a saturated solution of sugar (molar mass 342.0 g) at 40oC was evaporated to dryness, 34.2 g dry of solid was obtained. The solubility of sugar of 40oC is
   1. 10.0 moles dm-3 B. 7.0 moles dm-3

In the electrolysis of aqueous solution of K2SO4 above cell, which species migrate to the anode?

A. SO 2- and OH- B. K+ and SO2-

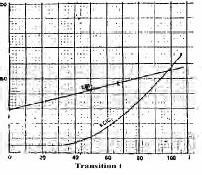
C. OH4 and H O D. H O and K+

3 3

in the

C. 3.5 moles dm-3 D. 2.0 moles dm-3 16. How many coulombs of electricity are passedthrough

a solution in which 6.5 amperes are allowed to runfor

1.0 hour?

1. 3.90 x 102 coulombs
2. 5.50 x 103coulombs
3. 6.54 x 103 coulombs
4. 2.34 x104 coulombs
5. Which of these represents a redox reaction?
   1. AgNO3 + NaCl AgCl + NNO3
   2. H2s + Pb(NO3)2 PbS + 2HNO3
   3. CaCO3  CaO + CO2
   4. Zn + 2HCl  ZnCI2 + H2
6. How many electrons are transferred in reducing one atom of Mn in the reaction

MnO2 + 4HCl MnCl2 + 2H2O + Cl2

* 1. 2 B. 3

C. 4 D. 5

1. 20 cm3 of 0.1 molar NH4OH solution whenneutralized with 20.05 cm3 of 0.1 molar HCl liberated 102 Joules of heat. Calculate the heat of neutralization of NH4OH
   1. -51.0 kJ mol-1 B. +57.3 kJ mol-1

C. +57.0kJ mol-1 D. +51.0kJ mol-1

1. What is the consequence of increasing pressure on
2. The exhaust fumes from a garage in a place that uses petrol of high sulphur content are bound to contain
   1. CO and SO3
   2. CO and SO2
   3. CO, SO2 and SO3
   4. CO and H2S
3. Oxygen-demanding wastes are considered to be a water pollutant because they.
   1. deplete oxygen which is necessary for the survival of aquatic organisms
   2. increase oxygen which is necessary for the survival of aquatic organisms

the equilibrium reaction ZnO

+ H Zn

+ H O

* 1. increase other gaseous species which are

(s)

2(g

(s)

2 (i)

1. The equilibrium is driven to the left
2. The equilibrium is driven to the right
3. There is no effect

necessary for survival of aquatic organisms

1. deplete other gaseous species which are necessary for the survival of aquatic

D. More ZnO

(s)

is produced

organisms.

1. The approximate volume of air containing 10cm of oxygen is
   1. 20 cm3 B. 25 cm3

C. 50 cm3 D. 100 cm3

1. The reaction Mg + H2O MgO + H2 takes placeonly in the presence of
   1. excess Mg ribbon
   2. excess cold water
2. very hot water

E. steam

1. When steam is passed through red hot carbon, which of the following are produced?
   1. Hydrogen and oxygen and carbon(1V) oxide
   2. Hydrogen and carbon (1V) oxide
   3. Hydrogen and carbon (11) oxixde
   4. Hydrogen and trioxocarbonate(1V) acid
2. Which of the following contains an efflorescent, a deliquescent and a hydroscopic substance respectively?
   1. Na2SO4, concentrated H SO CaCl
3. Which of the following will react further with oxygen to form a higher oxide?
   1. NO and H2O
   2. CO and CO2
   3. SO2 and NO
   4. CO2 and H2O
4. In the course of an experiment, two gases X and Y were produced. X turned wet lead ethanoate to black and Y bleached moist litmus paper. What are the elements(s) in each of the gases X and Y respectively?
   1. H and S;Cl
   2. H and O; Cl
   3. H and S;C and O
   4. H and Cl;S and O
5. Which of the following sulphides is insoluble in dilute HCl?
   1. Na2S B. ZnS

C. CuS D. FeS

1. When chlorine is passes into water and subsequently exposed to sunlight, the gas evolved is
   1. HCl B. HOCl

2 2 2

* 1. O
  2. Cl O

Na2CO3.H2O, FeSO2.7H2O, concentrated 2 2 2

H2SO4

* + 1. Na2CO3. 10H2O, FeCl3 concentrated H2SO4
    2. Concentrated H2SO4, FeSO4.7H2O,MgCl2

1. The tabulated results below were obtained by titrating

10.0 cm3 of water with soap. The titration was repeated with the same sample of water after boiling.

Before boiling After boiling

Final (cm3) 25.0 20.0

1. Which of the following metals does NOT form a stable

trioxocarbonate(1V)

* 1. Fe B. Al

C. Zn D. Pb

1. Which of the following metals with NaOH to give salt and water only. When Z is treated with dilute HCl, a gas is evolved which gives a yellow suspension on passing into concentrated H SO . Substance Z is.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Initial(cm3) | 10.00 |  | 15.0 |  | A.  C. | NaHS  NaS | 2 4  B.  D. | Na2SO3  NaHSO3 |
| The ratio of permanent to temporary hardness is | | | |  |  | | |  |
| A. | 1:5 | B. | 1:4 | 34. | Ammonia gas is normally dried with | | |  |
| C. | 4:1 | D. | 5:1 |  | A. concentrated sulphuric acid | | |  |
|  |  |  |  |  | B. quicklime | | |  |
|  |  |  |  |  | C. anhydrous calcium chloride | | |  |
|  |  |  |  |  | D. magnesium sulphate, | | |  |

1. What are the values of x, y and z respectively in the equation xCu +yHNO3 xCu(NO3)2 + 4H2O + zNO?s
   1. 4;1;2
   2. 3;8;2
   3. 2;8;3
   4. 8;3;2
2. The iron (111) oxide impurity in bauxite can be removed by
   1. fractional crystallization in acidsolution
   2. dissolution in sodium hydroxide and filtration
   3. extraction with concentrated ammonia and reprecipitation
   4. electrolysis of moltenmixture.
3. A white solid suspected to be lead trioxonirate (V), zinc trioxocarbonate(1V) of calcium trioxocarbonate (1V) was heated strongly. Its residue, which was yellow when hot and white when cold, is

|  |  |  |  |
| --- | --- | --- | --- |
| A. | lead (11) oxide | B. | calcium oxide |
| C. | zinc oxide | D. | lead nitrite |

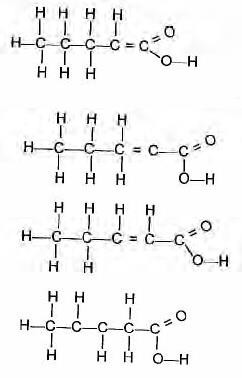
1. Which of the following compounds would give lilac fame coloration and a white precipitate with acidified barium chloride solution?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | KCl | B. | NaNO3 |
| C. | K2SO | D. | CaSO4 |

1. How will a metal X, which reacts explosively with air and with dilute acids be best extracted from its ores?
   1. Electrolysis of the solution of its salt
   2. Decomposition of its oxide
   3. Displacement from solution by an alkali metal
   4. Electrolysis of fused salt
2. Which of the following is NOT correct for the named organic compound in each case?
   1. Butanoic acid solution gives effervescence
3. How many isomers can be formed from organic compounds with the formulaC3H8O?
   1. 2 B. 3

C. 4 D. 5

1. Which of the structural formula for pent-2-enoic acid?



1. When ethanol is heated with excess concentrated sulphuric acid, theethanol is
   1. oxidized to ethene
   2. polymerized to polyethene
   3. dehydrated to ethene
   4. dehydrated to ethyne.
   5. with Na2CO3 solution

o 47. Which of the following compounds is NOT formed by

Glucose when reacted with Na CrO at 0 C will

2 4

show immediate discharge of colour

* 1. When but-2-ene is reacted with dilute solution of KmnO4 the purple colour of KMnO is discharge readily even at room temperature
  2. When butan-2-ol is boiled with Butanoic acid with a drop of concentrated H2SO4 a sweet smelling liquids isproduced.

1. Which of the following is used as an‘anti-knock’ in automobile engines?
   1. Tetramethyl silane
   2. Lead tetra-ethyl
   3. Glycerol
   4. N-heptanes
2. What reaction takes place when palm-oil is added to potash and foams are observed?
   1. Neutralization
   2. Saponification
   3. Etherification
   4. Salting-out

the action of chlorine on methane?

A. CH3Cl B. C2H5Cl

C. CH2Cl2 D. CHCl3

1. The general formula of an alkyl halide (where X represent the halide)is
   1. CnH2n-2X B. –CnH2n +1X

C. CnH2n +2X D. CnH2nX

1. Which of the following are made by the process of polymerization?
   1. Nylon and soap B. Nylon and rubber

C. Soap and butane D. Margarine and

Nylon

1. Starch can converted to ethyl alcohol by
   1. distillation B. fermentation

C. isomerization D. cracking.

.

# Chemistry 1987

1. A brand of link containing cobalt (11), copper (11) and irons can best be separated into its various components by.
   1. fractional crystallization
   2. fractional distillation
   3. sublimation
   4. chromatography.
2. Which of the following substances is a mixture?
   1. Granulated sugar
   2. Sea-water
   3. Sodium chloride
   4. Iron fillings
3. The number of molecules of carbon (1V) oxideproduced when 10.0 g CaCO is treated with 0.2 dm3 of 1 M HCl in

3

the equation CaCO3 + 2HCICaCl2 + H2O + CO2 is

* 1. 1.00 x1023
  2. 6.02 x 1023
  3. 6.02 x 1022
  4. 6.02 x 10 23

[Ca= 40, O= 16, C = 12, N = 6.02 x 102,3 H= 1, Cl = 35.5]

A

1. The atomic numbers of two elements X and Y are 12 and 9 respectively. The bond in the compound formed between the atoms of these two elements is.
   1. ionic B. convalent
2. neutral D. co-ordinate.
3. An element Z, contained 90% of 16 Z and 10% of 18 Z. Its relative atomic mass is

8 8

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

1. The greater the difference in electronegativity between bonded atoms, the
   1. lower the polarity of the bond
   2. higher the polarity of the bond C weaker the bond
   3. higher the possibility of the substance formed being a molecule.
2. A stream of air was successively passed through three tubes X, Y, and Z containing a concentrated aqueous solution of KOH, red hot copper powder and fused calcium chloride respectively. What was the composition of gas emanating from tube Z?
   1. CO2 and the inert gases
3. In the reaction CaC + 2H O Ca (OH + C H B. N , CO and the inert gases

2 2

2(s) 2 (1) 2(s) 2 2(g) C. N and the inert gases

what is the mass of solid acetylene gas at S.T.P?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 3.8 g | B. | 2.9 g |
| C. | 2.0 g | D | 1.0 g |

[C = 12, Ca –40, G.M.V= 22400 cm3]

1. If the quality of oxygen occupying a 2.76 liter container at a pressure of 0.825 atmosphere and 300 K is reduced by one-half, what is the pressure exerted by the remaining gas?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 1.650 atm | B. | 0.825 atm |
| C. | 0.413 atm | D. | 0.275 atm |

1. Which of the following substances has the lowest vapour density?
   1. Ethanoic acid B. Propanol

C. Dichlomethane D. Ethanal

[O = 16, Cl = 35.5, H =1, C = 12]

1. If d represents the density of a gas and K is a constant, the rate of gaseous diffusion is related to the equation
   1. r =k d
   2. r = kd
   3. r =k



d

* 1. r = k d

1. An isotope has an atomic number of 17 and a mass number of 36. Which of the following gives the correct number of neutrons and protons in an atom of the isotope?

2

1. Water vapour, N2 and the inert gases.
2. In the purification of town water supply, alum is used principally to.
   1. kill bacteria
   2. control the pH ofwater
   3. improve the taste of the water
   4. coagulate small particles of mud.
3. Which of the following water samples will have the highest titer value wages titrated for the Ca2+ ions using soap solution?
   1. Permanently hard water after boiling
   2. Temporarily hard water after boiling
   3. Rain water stored in a glass jar for two years
   4. Permanently hard water passed through permutit
4. Oil spillage in ponds and creeks can be cleaned up by
   1. burning off the oil layer
   2. spraying with detergent
   3. dispersal with compressed air
   4. spraying with hot water.
5. The solubility of Na3AsO4(H2O)12 is 38.9 g per 100 g H2O. What is the percentage of Na3AsO4 in the saturated solution?

Neutrons Protons

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 87.2% | B. | 38.9% |
| C. | 19.1% | D. | 13.7% |

|  |  |
| --- | --- |
| A. 53 | 17 |
| B. 17 | 36 |
| C. 19 | 17 |
| D. 36 | 17 |

[As = 75, Na = 23, O = 12, H= 1]

1. Which is the correct set results for tests conducted respectively on fresh lime and ethanol?

|  |  |  |
| --- | --- | --- |
| Test | Fresh lime juice | Ethanol |
| 1. Add crystals of NaHCO3 2. Test with methyl orange 3. Taste 4. Add a piece of sodium | Gas evolve  Turns colourless Bitter  No gas evolved | No gas evolved  No change Sour  H2 evolved |

1. In which of the following are the aqueous solutions of each of the substances correctly arranged in order of decreasing acidity?
   1. Ethanoic acid, milk of magnesia, sodium chloride, hydrochloric acid and sodium hydroxide.
   2. Ethanoic acid hydrochloric acid, milk of magnesiam sodium chloride and sodium, hydroxide.
   3. Hydrochloric acid, ethanoid acid solution chloride, milk of magnesia and sodium hydroxide
   4. Hydrochloric acid sodium hydroxidesodium chloride ethanoic acid and milk of magnesia
2. The basicity of tetraoxophosphate (v) acid is
   1. 7 B. 5

C. 4 D. 3

1. If 24.83 cm3 of 0.15 M NaOH is tritrated to its end point with 39.45 cm3 of HCl, what is the molarity of the HCl ?
   1. 0.094 M B. 0.150 M

C. 0.940 M D. 1.500 M

1. 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

1. Which of the following statements is CORRECT if 1 Faraday of electricity is passed through 1 M CuSO4 solution for 1 minute?
   1. The pH of the solution at the cathode decreases
   2. The pH of the solution at the anode decreases
   3. 1 mole of Cu will be liberated at the cathode
   4. 60 moles of Cu will be liberated at the anode.
2. What mass of magnesium would be obtained by passing a current of 2 amperes for 2 hrs. 30mins through molten magnesium chloride?
   1. 1.12 g B. 2.00 g

C. 2.24 g D. 4.48 g

[1 faraday = 96500 coulombs, Mg = 24]

1. In the reaction of 3CuO+ 2NH3  3Cu + 3H2O +N2 how many electrons are transferred for each mole to copper produced?
   1. 4.0 x 10-23 B. 3.0 x10–23

C. 1.2 x 1024 D. 6.0 x 1024

1. Z is a solid substance, which liberates carbon (1V) oxide on treatment with concentrated H2SO4, KnnO4. The solid substance, Z is

.A. sodium hydrogen trioxocarbonate(1V)

* 1. ethanoic acid
  2. iron (11) trioxocarbonate(1V)
  3. ethanedioc acid (oxalicacid)

1. 5 g of ammonium trioxonirate (V) on dissolution in water cooled its surrounding water and container by 1.6kJ. What is the heat of solution of NH4NO3?

A. +51.4 kJ mol-1 B. +25.6 kJ mol-1

C. +12.9 kJ mol-1 D. –6.4 kJ mol-1

[N = 14, O = 16, H = 1]

1. Tetraoxosulphate (1V) acid is prepared using the chemical reaction SO3(g) + H2O(1) H2SO4(1). Given the heat of formation for SO3(g), H2O(1) and H2SO4(1) as –395 kJ mol-1 –286 kJ mol-1 and – 811 kJ mol-1 respectively is
   1. -1032kJ B. – 130kJ

C. +130kJ D. +1032 kJ

1. The times taken for iodine to be liberated in the reaction between sodium thisosulphate and hydrochloric acid at various temperatures are asfollows:

|  |  |  |  |
| --- | --- | --- | --- |
| TempoC | 25 | 35 | 45 |
| Time (seconds) | 72 | 36 | 18 |

These results suggest that.

* 1. for a 10o rise in temperature rate of reaction is doubled
  2. for a 10o rise in temperature rate of reaction is halved
  3. time taken for iodine to appear does not depend on temperature
  4. for a 10o rise in temperature, rate of reaction is tripled.

1. The reaction between sulphur (1V) oxide and oxygen is represented by the equilibrium reaction

2SO2(g H + O2(g) 2SO3(g), H = - 196 kJ. What factor would influence increased production SO3(g)?



* 1. Addition of a suitable catalyst
  2. Increase in thetemperature of the reaction
  3. Decrease in the temperature of SO2(g)
  4. Decrease in the concentration of SO2(g)

1. Which of the following equations correctly represents the action of hot concentrated alkaline solution on chlorine?
   1. Cl2(g) + 2OH(g) OCl(q) + Cl(q) + H2O(1)
   2. 3Cl2(g) + 6OHClO3(aq) + 5Cl (aq) + 3H2O(1)
   3. 3CI + 6OH(aq) ClO + 5Cl- + 3H O

2(g) 3(s) (aq) 2 (1)

* 1. 3Cl2(g) + 6OH(aq) 5ClO3(aq) + Cl (aq)

+3H2O(1)

1. Magnesium ribbon was allowed to burn inside a given gas P leaving a white solid residue Q. Addition of water to Q liberated a gas which produced dense white fumes with a drop of hydrochloric acid. The gas Pwas

|  |  |  |  |
| --- | --- | --- | --- |
| A. | nitrogen | B. | chlorine |
| C. | oxygen | D. | sulphur (1V) oxide |

1. The best treatment for a student who accidentally poured concentrated tetraoxosulphate(V1) acid on his skin in the laboratory is to wash he skinwith
   1. cold water
   2. sodium trioxocarbondioxide solution
   3. Iodine solution
   4. Sodium triocarbonate (1V) solution.
2. In which of the following pairs of elements is allotropy exhibited by each element?
   1. Phosphorus and hydrogen
   2. Oxygen and chlorine
   3. Sulphur and nitrogen
   4. Oxygen and sulphur.
3. Which of the following gases can best be used for demonstrating the fountain experiment? (i) Nitrogen
4. Which of the following compounds will give a precipitate with an aqueous ammoniacal solution of copper (1) chloride?
   1. CH3CH =CHCH3
   2. CH3C——CCH3
   3. CH =C—CH2CH3
   4. CH2= CH-CH-=CH2
5. The efficiency of petrol as a fuel in high compression inetrnal combustion engines improves with an increase in the amount of
   1. Branched chain alkanes B Straight

chain alkanes C. Cycloalkanes D. Halogenated hydrocarbons

1. A palm wine seller stoppered a bottle of his palm wine in his stall and after a few hours the bottle represents the reaction that occurred?

(ii) Ammonia (iii) Nitrogen (l)oxide (iv) Hydrogen A. C H Oenzymes 2 C H OH + 2CO

6 12 6 2 5 2(g)

chloride

1. C H OH  CH2 = CH2(G)) + H O

2 5 2

A. (ii) and (iii) B. (i) and(iii)

1. (ii) and (iv) D. (ii) only.
2. When calcium hydroxide us heated with ammonium tetraoxosulphate (V1), the gas given off may be collected by
   1. bubbling it through concentrated H SO
3. C2H5OH + dil H2SO4C2H5OSO2OH
4. 2C6H12O6C12H12O13 +H2O
5. ethanol reacts with aqueous sodium mono-oxoio date(1) to gives a bright yellowsolid with a characteristic smell. The products is
   1. trichlomethane

2 4.

* 1. Bubbling it through water and then passing it through calcium oxide
  2. Passing it directly through calcium oxide
  3. Passing it directly through calcium chloride.

1. Which of the following elements will form oxide which will dissolve both dilute HNO3 and NaOH solution to form salts?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | Cl | B. | Mg |
| C. | Ag | D. | Mn |

1. Stainless steel is an alloy of
   1. iron, carbon and silver
   2. ironm carbon and lead
   3. iron, carbon andchromium
   4. iron and carbon only.
2. Alloys are best prepared by.
   1. high temperature are welding of the metals
   2. electrolysis using the major metallic component as cathode
   3. reducing a mixture of the oxides of the elements
   4. cooling a molten, mixture of the necessary elements.
3. Corrosion is exhibited by.
   1. iron only
   2. electropositive metals
   3. metals belowhydrogen in the electrochemical series
   4. all metals
4. Inspite of the electronic configuration, 1s22s p22, carbon is tetravalent because

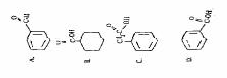
2

* 1. the electrons in both 2s and 2p orbital have equal energy
  2. the electrons in both 2s and 2p orbital are equivalent
  3. both the 2s and 2p orbital hybridize
  4. the six orbital hybridize to four.
  5. ftriiodomethane
  6. iodoethane
  7. ethanal

1. The most volatile fraction obtained from fractional distillation of crude petroleumcontains
   1. butane propane and kerosene
   2. butane propane and petrol
   3. ethane, methane and benzene
   4. ethane methane and propane
2. Local black soap is made by boiling palm with liquid extract of ash. The function of the ash is to provide the
   1. acid B. ester of alkanoic acid

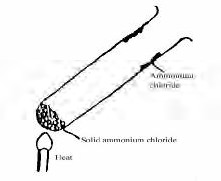
C. alkali D. alkanol

1. Synthetic rubber is made by polymerization of
   1. 2 methylbuta-1,3-diene
   2. 2 methl buta-1, 2 – diene
   3. 2 methyl buta – 1-ene
   4. 2 methy buta –2-ene
2. Complete oxidation of propan – 1 – of gives
   1. propanal
   2. propan-2-L
   3. propan-1-one
   4. propanoic acid
3. When water drops are added to calcium carbide in a container and the gas produced is passed called and
   1. oxyethylene flame
   2. oxyhydrocarbon flame
   3. oxyacetylene flame
   4. oxymethane flame.
4. The structure of benzoic acid is.



# Chemistry 1988

|  |  |  |  |
| --- | --- | --- | --- |
| A. | Boyle | B. | Charles |
| C. | Graham | D. | Gay-lussac |

1. 

In the experiment above, ammonium chloride crystals deposit on the walls of the tube is as a result of

* 1. Evaporation
  2. Recrystallization
  3. Sublimation
  4. Fractional precipitation.

1. The formula of the compound formed in a reaction between a trivalent metal M and a tetravalent non-metal X is.

7, An increase in temperature causes an increase in the pressure in the

* 1. average velocity of the molecules
  2. number of collisions between the molecules
  3. density of the molecules
  4. free mean path between each molecules and other.

1. The forces holding naphthalene crystal together can be overcome when naphthalene is heated to a temperature of 354 K resulting in the crystals melting. These forces are known as.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | coulombic | B. | ionic |
| C. | covalent | D. | van der waals |

1. A metallic ion X2+with an inert gas structure contain 18 electrons. How many protons are there in this ion?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 20 | B. | 18 |
| C. | 16 | D. | 2 |

* 1. MX B. M X

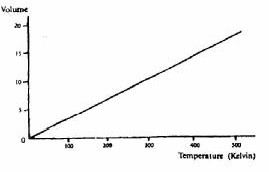
3 4

C. M4X3 D. M3X2

1. 2.25 g of sample of an oxide of a copper. 2.50 g of another oxide of Copper on reduction also gave2.0 g of copper. These results are in accordance with the law of
   1. constant composition
   2. conversation of matter
   3. multiple proportions
   4. definite proportions.
2. One role of propane is mixed with five moles of oxygen. The mixture is ignited and the propane burns completely. What is the volume of the products at soap?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 112.0 dm3 | B. | 67.2 dm3 |
| C. | 56.0 dm3 | D. | 44.8 dm3 |

[G.M.V = 22.4 dm3mol-1]

1. 0.9 dm3 of a gas at s. t. p was subjected by means of a movable piston to two times the original pressure with the temperature being now kept at 364 K. What is the volume of the gas in dm3 at this pressure?
   1. 2.0 B. 4.5
2. 6.0 D. 8.3
3. 

Which of the gas laws does the above graph illustrate?

1. Which of the following physically properties decreases across the periodic table.
   1. Ionization potential
   2. Electron affinity
   3. Electronegativity
   4. Atomic radius
2. What are the possible oxidation numbers for an element if its atomic is 17?
   1. -1 and 7 B. – 1 and 6

C. – 3 and 5 D. – 2 and 6

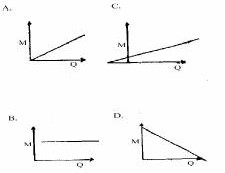
1. The energy change accompanying the addition of an electron to a gaseous atom is called
   1. first ionization energy
   2. second ionization energy
   3. electron affinity
   4. electronegativity
2. The molar ratio of oxygen to nitrogen in dissolved air is 2:1 whereas the ratio is 4:1 in atmospherics air because
   1. nitrogen is less soluble than oxygen
   2. oxygen is heavier than nitrogen
   3. nitrogen has a higher partial than pressure in air
   4. gases are hydrated in water.
3. An eruption polluted an environment with a gas suspected to H2S, a poisonous gas. A rescue team should spray the environment with
   1. water
   2. moist SO2
   3. acidified KmnO4 andwater
   4. water, acidified KnnO4 and oxygen.
4. 1.34 g of hydrated sodium tetraoxosulphate (V1) was heated to give an anhydrous salt weighing 0.71g. The formula of thehydrated salt.
   1. Na2SO4.7H2O
   2. Na2SO4.3H2O
   3. Na2SO4.2H2O
   4. Na2SO4.H2O.

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

1. The ion that may be assumed to have negligible concentration in a sample of water that lathers readily with soap is
   1. Mg2+ B. K+

C. CO2- D. HCO

electricity. G passing through the electrolyte. This is represented graphically by.



3 3

25. A mixture of starch solution and potassium iodide was

1. A substance S is isomorphous with another substance

R. When a tiny crystal of R,

1. S dissolves in the solution
2. Crystals of R areprecipitated
3. There is no observable change
4. R and S react to the generate heat.
5. Which of the following dilute solutions has thelowest pH value?
   1. Calcium trioxocarbonate(1V) B Sodium trioxocarbonate(1V)
6. hydrochloric acid
7. ethanoic acid
8. Which of the following in aqueous solution neutralize litmus?

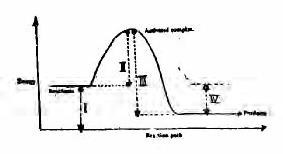
|  |  |  |  |
| --- | --- | --- | --- |
| A. | NH4Cl | B. | Na2CO3 |
| C. | FeCl3 | D. | NaCl. |

1. What volume of a 0.1 M H3PO will be required to neutralize 45.0cm3of a 0.2 M NaOH?

26.

placed in a test tube. On adding dilute tetraoxosulphate (V1) acid and then K2Cr2O7 solutions, a blue-black colour was produced. In this reaction, the

1. iodine ion isoxidized
2. tetraoxosulphate(V1) acid acts as an oxidizing agent
3. starch has been oxidized
4. K2Cr2O7 is oxidized.



Which of the following statements is TRUE?

* 1. 10.0 cm3 B. 20.0 cm3

C. 27.0cm3 D. 30.0cm3

1. The dissolution of NaOH endothermic

(s)

in water is

1. Which of the following substances is a basic salt?
2. The heat of solution of NaOH(s) is positive
3. The NaOH(s) gains heat from the
   1. Na2CO3
   2. Mg(OH)Cl

surroundings.

* 1. NaCHO3
  2. K2SO4.Al2(SO4)3.24H2O.

1. Which of the following acts both as reducing and an oxidizing agent?
2. The heat of solution of NaOH(s) is negative.

28. Which of the following will produced the greatest increase in the rate of the chemical reaction represented by the equation

Na S O +2HCl 2NaCl + H O + SO +S ?



(a q

|  |  |  |  |
| --- | --- | --- | --- |
| A. | H2 | B. | SO2 |
| C. | H2S | D. | C |

2 2 3(aq)

(aq)

2 (1)

2(g)

(s)

1. Which of the following reactions takes place in the cathode compartment during the electrolysis of copper

(11) chloride solution?

* 1. decrease in temperature and an in increase in the concentration of the reactants
  2. An increase in the temperature and a decrease in the concentration of the reactants
  3. An increase in the temperatureand an increase in the concentrations of the reactants
     1. Cu2+(aq) + 2e  Cu(s) D. A decrease in the temperature and a decrease
     2. 2Cl – 2e  Cl
     3. Cu(s) – 2e 

22+

in the concentration of the reactants.

Cu (aq)



(aq

* + 1. Cu2+

(aq)

+ 2Cl CuCl2(aq) 29. Which property of reversible reaction is affected by a catalyst?

* + - 1. heat content(enthalpy)
      2. energy of activation
      3. free energy change

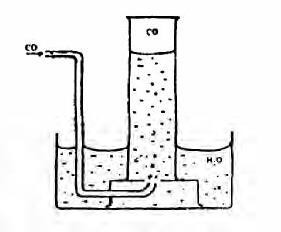
1. The mass of a substance, M liberated at an electrode during electrolysis is proportional to the quantity of
2. equilibrium position.
3. Which of the following is used in fire extinguishers?
   1. Carbon (11) oxide
   2. Carbon (1V) oxide
   3. Sulphur (1V) oxide
   4. Ammonia
4. When H2S gas is passed into a solution of iron (111) chloride, the colour changes from yellow to green. This is because.
   1. H2S is reduced to S
   2. Fe3+ ions are oxidized by H S

2

* 1. H S ions are oxidized by Fe3+

2

* 1. Fe3+ ions are reduced to Fe3+ ions

1. 

Carbon (11) oxide may be collected as shown above because it

* 1. is heavier than air
  2. is less dense than air
  3. is insoluble inwater
  4. burns in oxygen to form carbon(1V)oxide.

1. In the reaction C5H10O5(s) 6C(s) + 5H2O concentrated H2SO4 is acting as
   1. a reducing agent
   2. an oxidizing agent
   3. a dehydrating agent
   4. a catalyst
2. Suitable regents for the laboratory preparation of nitrogen are
   1. sodium trioxonirate (lll) and ammonium chloride
   2. sodium trioxonirate(V) and ammonium chloride
   3. sodium chloride and ammonium trioxonirate (V)
   4. sodium chloride andammonium trioxonirate(lll)
3. The thermal decomposition of copper (ll) trioxonirate

(V) yields copper (ll) oxide, oxygen and

1. nitrogen (ll) oxide
2. nitrogen(ll) oxide
3. nitrogen (lV) oxide
4. nitrogen
5. Chlorine is produced commercially by
   1. electrolysis of dilute hydrochloric acid
   2. electrolysis of brine
   3. neutralization of hydrogen chlorine
   4. heating potassiumtrioxochlorate(V)
6. Which of the following is used in the manufacture of glass?
   1. Sodium chlorine
   2. Sodium trioxocarbonate(lV)
   3. Sodium tetraoxosulphate (Vl)
   4. Sodium trioxonirate(V)
7. Aluminium is extracted commercially from its ore by
   1. heating aluminium oxide with coke in a furnace
   2. the electrolysis of fused aluminium oxide in cryolite
   3. treating cryolite with sodium hydroxide solution under pressure
   4. heating sodium aluminium silicate to a high temperature.
8. Given the reactions
9. Fe(s) + (NO3)2(aq) Fe(NO3)2(aq) + X(s)
10. H2(g) + XO(s) X(s) + H2O(g), X is likely to be.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | copper | B. | zinc |
| C. | calcium | D. | lead. |

1. Crude copper can be purified by the electrolysis of CuSO4(aq) if
   1. platinum electrodes are used
   2. the crude copper is made the anode of the cell
   3. the crude copper is made the cathode of the cell
   4. crude copper electrodes areused.

O

1. The IUPAC name for CH3CH2 CHC

CH3 OH

* 1. 2 – methylbutanoic acid
  2. 2 – methyl - -hydrosyketone
  3. 2 – methyl - - hydroxyl baldheaded
  4. 2 – methylpentanoicacid

1. Alkanoates are formed by the reaction of alkanoic acids with
   1. alkyl halides B. alkanols

C. ethers D. sodium

1. The acidic hydrogen in the compound

1 2 3 4 5

H—C= C—CH=CH—CH3 is the hydrogen attached to carbon number

* 1. 5 B. 4

C. 3 D. 2

1. The four classes of hydrocarbons are
   1. ethane, ethene ethyne and benzene
   2. alkanes, alkenesm alkynes and aromatics
   3. alkanes, alkenes, alkynes and benzene
   4. methane, ethane, propane and butane
2. Alkanes 400-700oC smaller + alkanes +hydrogen. The

catalyst alkanes

above reaction is known as

* 1. Photolysis B. Cracking

C. Isomerization D. Reforming.

diastase

1. In the reaction 2(C6H10O5) n + nH2O nC12H22O11 diastase is functioning as
   1. a dehydrating agent
   2. a reducing agent
   3. an oxidizing agent
   4. a catalyst.
2. 48. which of the following compounds has the highest boiling point?
   1. CH CH CH CH OH
3. Detergents have the general formula
   1. R(CH2)NOH
   2. RSO3 Na+
   3. RCO2 Na+
   4. RCO2H
4. What process would coal undergo to give coal gas, coal tar, ammoniac liquor and coke?
   1. steam distillation

3 2 2 2

* 1. CH3 CH2 CH2 CHO
  2. CH3 CH2 CH2 CH3
  3. CH3 CH2 OCH2 CH2
  4. Destructive distillation
  5. Liquefaction,
  6. Hydrolysis.

# Chemistry 1989

1. Which of the following would support the conclusion that a solid sample ismixture?
   1. The solid can be ground to a fine powder
   2. The density of the solid is 2.25 g dm3
   3. The solid has a melting range of 300oC to 375oC.
   4. The solid of the moisture from the atmosphere.
2. The molar of carbon to hydrogen of volatile liquid compound is 1:2. 0.12 g of the liquid evaporation at

s.t.p gave 32 cm3 of vapour. The molecular formula of the liquids is

1. The minimum volume of oxygen required for the complete combustion of mixture of 10cm3 of CO and 15 cm3 of H2 is
   1. 25.0 cm3

B 12.5 cm3

C 10.0 cm3

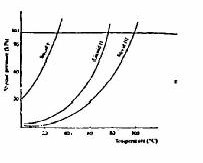
1. 5.0 cm3
2. What is the partial pressure of hydrogen gas collected over water at standard atmospheric pressure and 25oC if the saturation vapour pressure of water is 23 mm Hg at that temperature?.
   1. C H B. C H A. 737 mm Hg B. 763 mmHg

3 6 4 8

C C H D. C H C. 777 mm Hg D. 737 mmHg

5 10 6 12

[ G.M.V = 22.4 DM3, C=12, H=1]

1. 

It can be deduced from the vapour of pressure curves above that.

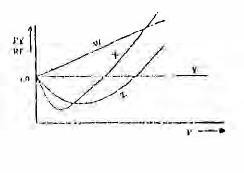
* 1. liquid has the highest boiling point
  2. liquid has the highest boiling point
  3. liquid lll has the highest boiling point
  4. liquid lll has the lowest boiling point.

1. 20.00 cm3 of a solution containing 0.53 g of anhydrous Na2CO3 in 100 cm3 requires 25.00 cm3 of H2SO4for complete neutralization. The concentration of the acid solution in moles per dm3 is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A. | 0.02 | B | 0.04 | A. | W | B. | X |
| C | 0.06 | D. | 0.08 | C. | Y | D. | Z |

1. The atomic radius Li, Na and K are 1:33 Am 1.54A and

1.96A respectively. Which of the following explain this gradation in atomic radius?

1. Electropositivity decreases from Li to Na to K
2. Electronegativity decreases from Li to Na to K.
3. The number of electron shells increase from Li to Ma to K
4. The elements are in the same period.
5. 

Which of the curves in the above graph illustrates the behaviors of an ideal gas?

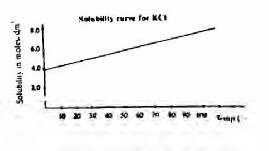
[ H= 1, C = 12, 0 = 16, Na = 23 , S =32]

1. Elements X and Y have electronic configurations 1s22s22p4 and 1s22s22p63s23p1 respectively. When they combine, the formula of the compound formed is

16. A hydrated salt of formula MSO4.XH2O contains 45.3% by mass of thewater of crystallization.

Calculate the value of X.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A. | XY | B. | YX | A. | 3 | B. | 5 |
| C. | X2Y3 | D. | Y2X3 | C. | 7 | D. | 10 |
| [M = 56, S= 32, O =16, H= 1] | | | | | | | |
| 10. The atomic number of cesium is 55 and its atomic mass | | | | | | | |
| is 133. The nucleus of cesium atom therefore contains | | | | 17 |  |  |  |
| A. 78 protons and 55 electrons | | | |  |  |  |  |
| B. 55 protons and 78 neutrons | | | |  |  |  |  |
| C. 55 neutrons and 78 electrons | | | |  |  |  |  |
| D. 78 neutron and 55 neutrons | | | |  |  |  |  |

1. Four elements P,Q,R and S have atomic numbers of 4, 10, 12, and 14 respectively. Which of these elements is a noble gas?
   1. P B. Q

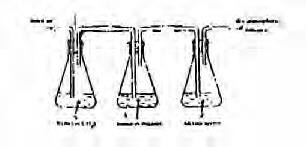
C. R D. S

1. How many valence electrons are contained in the element represented by 31 P?

15

If the graph above 1 dm3 of a saturated solution of HCI is cooled from 80oC, the mass of crystals deposited will

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A. | 3 | B. | 5 | be. |  |  |  |
| C. | 15 | D. | 31 | A. | 7.45 g | B. | 14.90 g |
|  |  |  |  | C. | 74.50 g | D. | 149.00 g |
| 13. |  |  |  |  |  | [K = 39, | Cl= 35.5] |



In the above set up, substances X and Y are respectively.

* 1. Lime water and copper (ll) tetraoxosulphate (Vl)
  2. Potassium trioxocarbonate(lV) and alkaline prygallol
  3. Potassium hydroxide and alkaline pyrogallo
  4. Potassium trioxocarbonate (lV) and concerntrate tetraoxosulphate (Vl) aid

1. The gaseous pollutant sulphur (lV) oxide is most likely to be detected in fairly reasonable quantities in the area around a plant for the
   1. extraction of aluminium from bauxite
   2. production of margarine
   3. smelting of copper
   4. production of chlorine from brine
2. Calcium hydroxide is added in the treatment of town water supply to
   1. kill bacteria in the water
   2. facilitate coagulation of organicparticles
   3. facilitate sedimentation
   4. improve the tase of thewater.
3. Using 50cm3 of 1 M potassium hydroxide and 100cm3 of 1M tetraoxosulphate(Vl) acid, calculate the respective volumes in cm3 of bade and acid 100 cm3 of base and acid that would be required to produce the maximum amount of potassium tetraoxosulphate(Vl)

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 50,50 | B. | 25,50 |
| C. | 50,25 | D. | 25,25 |

[K = 39, S= 32, O = 16, H = 1]

1. A solution of calcium bromide contains 20 g dm3 What is the molarity of the solution with respect to calcium bromide and bromide ions?
   1. 0.1,0.1 B. 0.1,0.2

C. 0.1,0.05 D. 0.05,0.1

[Ca = 40, Br = 80]

1. The substance of ZnO dissolves in sodium hydroxide solution and mineral acid solution to gives soluble products in each case. ZnO is therefore referred to as.
   1. an allotropic acid
   2. an atmophericoxide
   3. a peroxide
   4. a dioxide.
2. An acid its conjugate base .
   1. can neutralize each other toform a salt
   2. differ only by a proton
   3. differ only by the opposite charges they carry
   4. are always neutral substances
3. The same current is passed for the same time through solutions of AgNO3 and CuSO4 connected in series. How much silver will be deposited if 1.0 g of copper is produced?
   1. 1.7 g B. 3.4 g

C. 6.8 g D. 13. 6 g [Cu = 63.5, S = 32, O = 16M Ag = 108, N = 14]

1. What is discharged at the cathode during the electrolysis of copper (ll) tetraoxosulphate (Vl) solution?
   1. Cu2+ only B. H+ only

C. Cu and H+ D. Cu2+ and SO2-

2+

1. An element, Z forms an anion whose formula is [Z(CN) ]y. If has an oxidation number of +2, what is the value of y?

6

* 1. -2 B. 3

and –396 kJ respectively. Calculate the molar heat of formation of ethane in kJ.

A. -2792 B. +2792

C. –64 D. +64

28. CO(g) + H2O CO2(g) + H2(g) H = -41000 J. Which

of the following factors favour the formation of

hydrogen in the above reaction? I high pressure II low pressure III high temperature IV use of excess steam

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| C. | –4 | D. | –5 | A. | I, III, and IV | B. | III only |
|  |  |  |  | C. | II, III and I | D. | Iv only. |

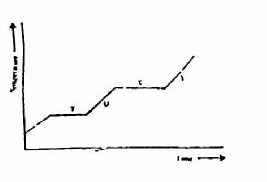
1. Which of the reaction is NOT an example of a redox reaction?

I Fe + 2Ag+  Fe2+ + 2Ag+

1. 2H2S + SO2  2H2O + 3S
2. N2 + O2 2NO
3. CaCO3 CaO + CO2

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

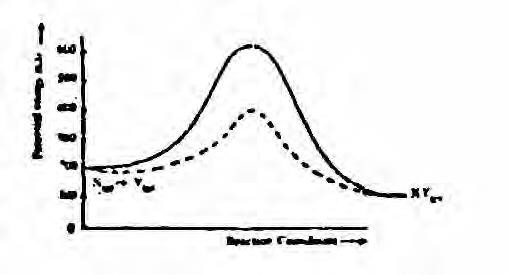
29.



The above graph shows a typical heating curve from the solid phase through the liquid phase to the gaseous phase of a substance . What part of the curve shows solid and liquid in equilibrium?

A. T B. U

C. X D. Y

30. Which of the following represents the balanced equation for the reaction of copper with concentrated trioxonirate (V)acid?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 26. |  |  | A.  B.  C. | 2NHO Cu(NO ) + H  3(aq) 3 2(aq) 2(g)  Cu(s) + 4HNO3Cu(NO3)2(aq) + 2H2O(l) + 2NO  2(g)  3Cu(s) + 8HNO3(aq) 3Cu(NO3)2(aq) + 4H2O(l) | | |
|  |  |  | D. | + 2NO(g)  3Cu(s) + 4 HNO3(aq 3Cu(NO3)2(aq) + 2H2O(l) +  2NO(g). | | |
|  |  | 31. | The catalyst used in the contact process for the | | | |
| manufacture of tetraoxosulphate(Vl) acid is | | | | | | |
|  |  | A. | Manganese (lV) oxide | |  |  |
|  | The above diagram gives the potential energy profile |  | B. Manganese (ll) tetraoxosulphate (lV) | | | |
|  | of the catalyzed uncatalysed reactions of |  | C. Vanadium (V)oxide | | |  |
|  | X(g) + Y(g)  XY(g) . Deduce the respective |  | D. Iron metal | |  |  |
|  | activation energies in kJ of the catalyzed and |  |  |  |  |  |
|  | uncatalysed reverse reactions. | 32. | Some products of destructive distillation of coal are | | | |
|  | XY(g) + X(g)  X(g) + Y(g) |  | A. carbon (iV) oxide and ethanoic acid | | | |
|  | A. 300,500 B. 500,300 |  | B. trioxocarbonate (lV) acid and methanoic acid | | | |
|  | C. –300, -500 D. –5000. |  | C. producer gas and water gas | | | |
| D. coke and ammonialiquor | | | | | | |
| 27. | The combustion of ethene, C2H2, is given by the equation |  |  |  |  |  |
|  | C2H4  2CO2 + 2H2O; H = -1428 kJ. If the molar heats  of formation of water and carbon (l) oxide are –286kJ | 33. | Gunpowder is made from charcoal, sulphur and potassium trioxonirate (V). The salt in the mixture | | | |
|  |  |  | performs the function of | |  |  |
|  |  |  | A. | an oxidant | B. | a reductant |
|  |  |  | C. | a solvent | D. | a catalyst |



1. Which of the followingreaction is (are) feasible? l Br (2l) + 2Cl(aq 2Br(aq) + Cl2(aq



1. When excess chlorine is mixed with ethene at room temperature, the product is

ll 21

)

(aq)

+ Br

2(1)

2Br

(aq)

+ l2

(s)

1. 1,2 – dichloroethane

lll 2F(aq) + Cl2(aq 2Cl(aq) + F2(g)

lV 2F + Br 2Br + F

(ag) 2(1) (aq) 2(g)

A l B. ll

C I and lll D. lll andlV

1. 1,2 – dichloroethene
2. 1, 1- dichloroethane
3. 1, 1- dichloroethene.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | 43. | Vulcanization of rubber is a process by which |
| 35. | Bleaching powder, CaOCl2.H2O, deteriorates on |  | 1. Isoprene units are joined to produce rubber 2. Rubber latex is coagulated |
|  | exposure to air because   1. it loses its water ofcrystallization 2. atmospheric nitrogen displaces chlorine from |  | 1. Sulphur is chemically combined in the rubber 2. Water is removed from therubber. |
|  | it   1. carbon (lV) oxide of the atmosphere displaces chlorine fromit 2. bleaching agents should be stored insolution | 44. | The reaction between ethanoic acid and sodium hydroxide is an example of   1. esterification B. neutralization   C. hydrosylation D. hydrolysis |

1. The product of the thermal decomposition of ammonium trioxonirate (V)are.
   1. NO2 and oxygen
   2. NH3 and oxygen
   3. nitrogen and water
   4. N2O andwater.
2. The scale of a chemical balance is made of iron plate and coated with copper electrolytically because.
   1. iron is less susceptible to corrosion than copper
   2. copper is less susceptible corrosion as ion
   3. copper is less susceptible to corrosion than ion
   4. copper and ion are equally susceptible to corrosion.
3. The bond which joins two ethanoic acid molecules in the liquid state is
   1. a covalent bond
   2. an ionic bond
   3. a dative covalent bond
   4. a hydrogen bond
4. The alkaline hydrolysis of fats and oils produces soap and
   1. propane 1, 1, 3-triol
   2. propane – 1, 3, 3-triol
   3. propane-1-2-2-triol
   4. propane-1-2-3-triol
5. which of the following is NOT a monomer? A.



|  |  |  |
| --- | --- | --- |
| 38. A metal is extracted for, its ore by the electrolysis of tits  molten chlorine and it displace lead from lead (ll) trioxonirate(V) solution. The metal is | B. | CH2 = CH2 |
| A. copper B. aluminium  C. zinc D. sodium | D. | CH2 = CHCl |

1. Mortar is NOT used for under-water construction because.
   1. It hardens by loss of water
   2. Its hardening does not depent upon evaporation
2. It requires concrete to harden
3. It will be washed away by the flow of water.
4. Which of the following is NOT involved in the extraction of metals from their ores?
   1. reduction with carbon
   2. reduction with other metals
   3. reduction by electrolysis
   4. oxidation with oxidizingagent.
5. Which of the following compounds is an isomer of the compound.
   1. CH-CH2-CH-CH2-CH3 B. CH-CH2-CH-CH2-CH3 CH3 C2H5

C. CH-CH2-CH-CH3 D. CH3-CH-CH2-CH3 C2H5 CH3

1. What is the IUPAC name for the compound

CH3

CH2 = C

CH2CI

* 1. 1-chloro-2-methylprop-2, 3-ene
  2. 1-chloro-2-methlprop-2-ene
  3. 3-chloro-2-methylprop-1-ene
  4. 3-chloro-2-methyprop-1,2-ene

1. The gas responsible for most of the fatal explosion in coal mines is
   1. butane B. ethene

C. ethane D. methane

1. Three liquids X,Y and Z containing only hydrogen and carbon were burnt on a spoon, X and Y burnt with sooty flames while Z did not. Y is able to discharge the colour of bromine water whereas X and Z cannot. Which of the liquids would be aromatic in nature?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A. | X and Z |  | B. | Y |
| C. | X | D. | Z |  |

# Chemistry 1990

[G.M.V at s.t.p = 22.40 dm3]

1. Which of the following is a physical change?
   1. The bubbling of chlorine into water
   2. The bubbling of chlorine into jar containing hydrogen
   3. The dissolution of sodium chlorine inwater
   4. The passing of steam over heated iron.
2. Changes in the physical states of chemical substances T are shown in the schemebelow.

Liquid T



Y

Z

Solid T X Gaseous T The letters X, Y and Z respectivelyrepresent

* 1. sublimation, condensation and freezing
  2. sublimation, vaporization andsolidification
  3. freezing, condensation and sublimation
  4. evaporation, liquefaction and sublimation.

1. In the reaction: SnO2 + 2C Sn + 2CO the mass of coke containing 80% carbon required to reduce 0.032 kg of pure tin oxide is
   1. 0.40 kg B. 0.20 kg

C. 0.06 kg D. 0.40 g

[Sn = 119, O = 16, C = 12]

1. The Avogadro’s number of 24 of magnesium is same as that of
   1. 1 g of hydrogen molecules
   2. 16 g of oxygenmolecules
   3. 32 g of oxygenmolecules
   4. 35.5 of chlorinemolecules.
2. If a gas occupies a container of volume 146 cm3 at 18oC and 0.971 atm, its volume on cm3 at s.t.p is

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

1. The volume occupied by 1.58 g of gas s.t.p is 500 cm3. What is the relative molecule mass of thegas?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 28 | B. | 32 |
| C. | 344 | D. | 71 |

1. Equal volumes of CO, SO2 NO2 and H2S, were released into a room at the same point and time. Which of the following gives the order of the room?
   1. CO2, SO2,NO, H2S,
   2. SO2, NO2, H2S, CO
   3. CO, H2S, SO2, NO2
   4. CO, H2S, NO2, SO2

[S = 32, C=12, 0=16, N = 14, H =1]

1. A basic postulate of the kinetic theory of gases is that the molecules of a gas move in straight lines between collisions. This impliesthat.
   1. collisions are perfectlyelastics
   2. forces of repulsion exist
   3. forces of repulsion and attraction are in equilibrium
   4. collisions are inelastic.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | Q | R | S |
| Proton | 13 | 16 | 17 | 19 |
| Electron | 13 | 16 | 17 | 19 |
| Neutron | 14 | 16 | 35 | 20 |

Which of the four atoms P,Q,R and S in the above data can be described by the following properties: relative atomic mass is greater than 30 but less than 40 ; it has an odd atomic number and forms a unipositive ion in solution?

* 1. P B. Q

C. R D. S

1. Which of the following terms indicates the number of bonds that can be formed by atom?
   1. Oxidation number
   2. Valence
   3. Atomic number
   4. Electronegativity.
2.  X X(g). The type of energy involved in the above transformation is

(g)

* 1. ionization energy
  2. sublimation energy
  3. lattice energy
  4. electron affinity

1. Chlorine, consisting of two isotope of mass numbers 35 and 37, has an atomic of 35.5. The relative abundance of the isotope of mass number 37 is.
2. What is concentration of H+ ions in moles per dm3 of a solution of pH4.398?
   1. 4.0 x 10-5 B. 0.4 x10-5

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A. | 20 | B. | 25 | C. | 4.0 x 10-3 | D. | 0.4 x 10-3 |
| C. | 50 | D. | 75 |  |  |  |  |

1. 10.0 dm3 of air containing H S as an Impurity was passed through a solution of Pb(NO3)2 until all the H2S had reacted. The precipitate of PbS was found weight 5.02

2

g. According to the equation: Pb(NO3)2 + H2O ’! PbS “!+2HNO3 the percentage by volume of hydrogen sulphides in the air is.

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

[Pb = 207, S = 23, GMV at s.t.p = 22.4 dm3]

1. A blue solid, T, which weighted 5.0 g was placed on a table. After 8 hours, theresulting pink sold was found to weight 5.5 g. It can be inferred that substance T
   1. is deliquescent
   2. is hydroscopic
   3. has some molecules of water of crystallization
   4. is efflorescent
2. The effluent of an industrial plant used ins the electrolysis of concentrated brine, with a flowing mercury cathode may contain impurities like.
   1. oxygen
   2. hydrogen
   3. mercury (ll)chloride
   4. hydrogen chloride
3. What volume of 11.0 M hydrochloric acid must be dilute to obtain 1 dm3 of 0.05 M acid?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 0.05 dm3 | B. | 0.10 dm3 |
| C. | 0.55 dm3 | D. | 11.0 dm3 |

1. If 10.8 g of silver is deposited in a silver coulometer connected in series with a copper coulometer, the volume of oxygen liberated is
   1. 0.56 dm3 B. 5.50 dm3

C. 11.20 dm3 D. 2 2 . 4 0

dm3

[Ag = 108, Cu = 64, GMV at s.t.p = 22.40 dm3].

1. 0.1 faraday of electricity deposited 2.95 g of nickel during electrolysis is an aqueous solution. Calculate the number of moles of nickel that will Be deposited by

0.4 faraday

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 0.20 | B. | 0.30 |
| C. | 0.034 | D. | 5.87 |

[Ni = 58.7]

1. Cr2O 2- + 6Fe2+ + 14H+ 2Cr3+ + 6Fe3+ + 7H O. In the

7 2

above chromium change from.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | +7 to +3 | B. | +6 to +3 |
| C. | +5 to +3 | D. | –2 to+3 |

1. In the reaction 10- + 51- + 6H+ 31 + 3H O, the
2. The solubility in moles per dm3 of 20 g of CuSO dissolved in 100 g of water at 180oC is

4

* 1. 0.13 B. 0.25

3 2 2

oxidizing agent is

A. H+ B. 1-

C. 10- D. 1

3 2

C. 1.25 D. 2.00

1. Smoke consists of

[Cu = 63.5, S = 32, O = 16] 26. Fe O + 2Al Al O + 2Fe are –1670 kJ mol-1 and

2 3(s) 2 3 (s)

–822kJ mol-1 respectively, the enthalpy change in kJ for the reason is

* 1. solid particles dispersed inliquid
  2. solid or liquid particles dispersed in gas
  3. gas or liquid particles dispersed in liquid
  4. liquid particles dispersed in liquid.

1. NaC2O4 + CaCl  CaC2O4 + 2NaCl. Given a solution of 1.9 g of sodium oxalate in 50 g of water at room temperature, calculate the minimum volume of 0.1 M

calcium oxalate required to produce maximum calcium oxalate using the above equation.

* 1. 1.40x 102 dm3
  2. 1.40x 102 cm3
  3. 1.40 x 10-2 dm3
  4. 1.40 x 10-2 cm3

3

A. +2492 B. +848

C. –848 D. 2492

1. Iron galvanized with zinc catholically protected from corrosion. This is because
   1. zinc has a more positive oxidation potential than iron
   2. zinc has a less positive oxidation potential than iron
   3. both have the sameoxidation potential
   4. zinc is harder than iron.
2. Which of the following samples will react faster with dilute dtrioxonitrate (V) acid?
   1. 5 g of lumps of CaCO at 25oC
3. 2.0 g of monobasic acid was made up to 250 cm with B. 3 o

dist3illed water. 25.00 cm3of this solution required 20.00

5 g of powered CaCO3 at 25 C

C. 5 g of lumps of CaCO at 50oC

cm of 0.1 M NaOH solution for completeneutralization. D. 3 o

The molar mass of the acid is

A. 200 g B. 160 g

5 g of powered CaCO3 at 50 C

1. In the reaction ,
2. 100 g D. 50 g 2Hl(g) H2(g) + I (g), H = 10 kJ;

2

the concentration of iodine in the equilibrium mixture can be increased by

* 1. raising the pressure
  2. raising the temperature
  3. adding the temperature
  4. lowering the pressure

1. Which of the following gases can be collected by upward displacement of air?
   1. NO B. H2

C. NH3 D. Cl2

1. The brown fumes given off when trioxonirate(V) acid consist of
   1. NO2 and O2 B. H2O and NO2
2. NO2, O2 andH2O D. NO2 and H2O
3. Which of the following tests will completely identify
4. To make coloured glasses, small quantities of oxides of metals which form coloured silicates are often added to

the reaction mixture consisting of Na2CO3 and SO2. Such a metal is

* 1. potassium B. barium

C. zinc D. copper

1. 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.
   1. (NH4)2CO3 B. ZnCO3

C. Al2(SO4)3 D. PbCO3

any one of sulphur (lV) oxide, hydrogen, carbon (lV)

1. A cycloalkane with molecular formula C H

has

5 10

oxide and nitrogen (ll) oxixde?

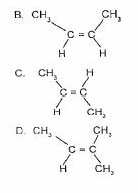
* 1. pass each gas into water and test with blue litmus pare
  2. pass each gas into limewater
  3. expose each gas to atmosphericair

A. one isomer B. two isomers

C. three isomers D. four isomers

1. The structure of cis-2butene is
   1. CH -CH=CH-CH

3 3

1. passs each gas to concentrated -

tetraoxosulphate(Vl) acid.

1. In the Haber process for the manufacture of ammonia, the catalyst commonly used is finely divided.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | vanadium | B. | platinum |
| C. | iron | D. | copper |

1. A metallic oxide which reacts with both HCl and NaOH to give salt and water only can be classified as
   1. an acidic oxide
   2. an atmospheric oxide
   3. a neutral oxide
   4. an atmospheric oxide
2. Which of the following metals will liberate hydrogen form steam or diluteacid?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | copper | B. | iron |
| C. | lead | D. | mercury |

1. Coal fire should not be used in poorly ventilated rooms because
   1. of theaccumulation of CO2 which cause deep sleep
   2. it is usually too hot
   3. of the accumulation of CO which causes suffocation
   4. it removes most of the gases in the room
2. The major component of the slag from the production of iron is
   1. an alloy of calcium and iron
   2. coke
   3. impure ion

E. calcium trioxosilicate(V)

1. Sodium hydroxide should be stored in properlyclosed containers because it
   1. readily absorbs water vapour from the air
   2. is easily oxidized by atmospheric oxygen
   3. turns golden yellow when exposed to light.
   4. Melts at a low temperature.
2. What is the IUPAC name for the hydrocarbon

CH3 CH3—C = CH— CH—CH3

CH2

CH3

* 1. 2-ethyl-4-methylpent-2-ene
  2. 3,5-dimenthylhex-3-ene
  3. 2,4-dimenthylhex-3-ene
  4. 2-methyl-4-ethylpent-3-ene

1. CH3 = CH P. Compound P, in the above reaction, is.
   1. CH — C = CH NH2 NH2
   2. CH3 — C CHNa
   3. CH3 — C  ~~C~~ — Na
   4. CH3 — C ~~C~~ — NH2
2. The label on a reagent bottle containing a clear organic liquid dropped off. The liquid was neutral to litmus and gave a colourless gas with metallic sodium. The liquid must be an
   1. alkanoate B. alkene

C. alkanol D. alkane

1. COOH

+ NaOH

COOH + H2O



1. Which of the following compounds represents the

COOH COO-Na+

The above reaction is an example of

* 1. displacement reaction
  2. a neutralization reaction
  3. an elimination reaction
  4. Saponification

A..

polymerization product of ethyne?

|  |  |  |
| --- | --- | --- |
| 47. | Alkanoic acids have low volatility compared with |  |
|  | Alkanoic because they |  |
|  | A. are morepolar than alkanols |  |
|  | B have two oxygen atoms while alkanols have |  |
|  | one |  |
|  | C. form two hydrogen bonds while alkanols | B. |
|  | donot |  |
|  | D. form two hydrogen bonds while alkanols form |  |
|  | one. |  |

1. The octane number of a fuel whose performance is the

same as that of a mixture of 55 g of 2, 2, 4-trimethyl C. pentane and 45 g of n-heptanes is

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 45 | B. | 55 |
| C. | 80 | D. | 100 |

1. Which of the following is formed when maltose reacts with concentrated tetraoxosulphate (Vl) acid.
   1. Carbon (lV) oxixde D.
   2. Coal tar
   3. Charcoal
   4. Toxicfumes

# Chemistry 1991

1. Which of the following can be obtained by fraction of distillation?
   1. Nitrogen from liquidair
   2. Sodium chloride for seawater
   3. Iodine from a solution of iodine in carbon tetrachloride
   4. Sulphur from a solution of sulphur in carbon disulphide.
2. Which of the following aremixture? I Petroleum ii Rubber latex. Iii Vulcanizes’ solution. Iv Carbon (ll) sulphides
   1. I, ii and iii
   2. I, ii and iv
   3. I and iionly
   4. I and iv
3. Anironoreisknowntocontain70.0%FeO. The mass
4. In two separate experiments 0.36 g and 0.71 g of chlorine combine with a metal X to give Y and Z respectively. An analysis showed that Y and Z contain 0.20 g and

0.40 g of X respectively. The data above represents the law of.

1. multiple proportion
2. conversation of mass
3. constant composition
4. reciprocal proportion.
5. 30cm3 of oxygen at 10 atmosphere pressure is placed in a 20 dm3 container. Calculate the new pressure it temperature is kept constant.
   1. 6.7 atm B. 15.0atm

C. 6.0 atm D. 66.0atm

3

2 3 6. A given quantity of gas occupies a volume of 228 cm

of iron metal which can theorically be obtained from 80kg of the ore is.

A. 35.0 kg B. 39.2 kg

C. 70.0 kg D. 78.4 kg

[Fe = 356, O = 16]

at a pressure of 750 mm Hg. What will be its volume at atmospheric pressure?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 200cm3 | B. | 225 cm3 |
| C. | 230 cm3 | D. | 235 cm3 |

1. Calculate the volume of carbon (lv) oxide measure at s.t.p, produced when 1 kg of potassium hydrogen trioxocarbonate (iV) is totally decomposed by heat.
   1. 28 dm3 B. 56 dm3
2. 112 dm3 D. 196 dm3

[G.M.Vat s.t.p = 22.4 dm3, K = 39, O = 16, C = 12, H= 1]

1. A sample of a gas exerts a pressure of 8.2 atm when confined in a 2.93dm3 container at 20oC. The number of moles of gas in the sampleis

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 1.00 | B. | 2.00 |
| C. | 3.00 | D. | 4.00 |

[ R= 0.082 litre atm/deg mole]

1. Atoms of element X (with 2 electrons in the outer shell) combine with atoms of Y( with 7 electrons in the outer shell). Which of the following is FALSE? The compound formed
   1. has formula XY
   2. is likely to be ionic
   3. contains X2+ ions
   4. contains Y- ions
2. The ions X- and Y+ are isoelectronic, each containing a total of 10 electrons. How many proteins are in the nuclei of the neutral atoms of X and Y respectively?

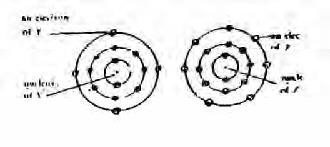
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A. | 10 and 10 |  | B. | 9 and 9 |
| C. | 11 and 9 | D. | 9 and 11 |  |

1. The electronic configuration of an element is 1s2 2s22p6 3s2 3p3. How many unpaired electron are there in the element.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 5 | B. | 4 |
| C. | 3 | D. | 2 |

1. Which of the following represents thetype of bonding present in ammonium chloride molecule?
   1. Ionic only
   2. Covalent only
   3. Ionic and dative covalent
   4. Dative covalent only.
2. Which of the following is arranged in order of increasing electronegativity?
   1. Chlorine, aluminium, magnesium, phosphorus, sodium.
   2. Sodium, magnesium, aluminium phosphorus, chlorine
   3. Chlorine, phosphorus, aluminium, magnesium, sodium.
   4. Sodium, chlorine, phosphorus, magnesium, aluminium.
3. A quantity of air was passed through a weighed mount of alkaline pyrogallol. An increase in the weight of the pyrogallol would result from theabsorption of.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | nitrogen | B. | neon |
| C. | argon | D. | oxygen. |

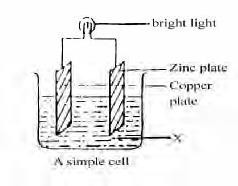


The electrons of two atoms of Y and Z are arranged in shells as shown above. The bond formed between the atoms of Y and Z is

* 1. ionic
  2. covalent
  3. dative
  4. metallic.

1. Which of the following ionsis a pollutant in drinking water even in trace amount?
   1. Ca2+
   2. Hg2+
   3. Mg2+
   4. Fe2+
2. The solubility of copper (ll) tetraoxosulphate (Vl) is 75 g in 100 g of water at 100oC and 25 g in 100 g of water at 30oC.What mass of the salt would crystallize, if 50 g of copper (ll) tetraoxosulphate (Vl) solution saturated at 100oC were cooled to 30oC?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 57.5 g | B. | 42.9 g |
| C. | 28. 6g | D. | 14.3 g |

1. A sample of temporary hard water can be prepared in the laboratory by.
   1. dissolving calcium chloride in distilled water
   2. saturating lime water with carbon(lV) oxide
   3. saturating distilled water with calcium hydroxide
   4. dissolving sodium hydrogen trioxocarbonate (lV) in some distilled water.
2. A property of a colloidal dispersion which a solution does not have is .
   1. the Tyndall effect
   2. homogeneity
   3. osmotic pressure
   4. surface polarity.
3. 50 cm3 of sulphur (lV) oxide, 800cm3 of ammonia, 450 cm3 of hydrogen chloride, 1.0 cm3 of water at 15oC. Which of the following is suitable for demonstrating the fountain experiment?
   1. Sulphur (lV) oxide and hydrogen chloride
   2. Carbon (lV) oxide and ammonia
   3. Ammonia and hydrogen chloride
   4. Carbon (lV) oxide and sulphur (1V) oxide
4. C. lower the activation energy for the reaction
5. lower the heat of reaction, H, for the reaction,
6. 1.1 g of CaCl dissolved in 50 cm3 of water caused a rise in temperature of 34oC. The heat reaction, H for CaCl

2

2

in kJ per moles is

* 1. -71.1 B. –4.18

C. +17.1 D. +111.0

[Ca = 40, Cl = 35.5, specific heat of water is 4.18 KJ-1

1. NO + CO 1/2 N2 + CO2 H = -89.3kJ

Which of the following substances could be satisfactorily used as X in the above figure?

* 1. Ammonia and Potassiumhydroxide
  2. Potassium hydroxide and sodiumchloride
  3. Ammonia and ethanoicacid
  4. Ethanoic and sodiumchloride

1. What volume of CO2 at s.t.p would be obtained by reacting 10cm3 of 0.1 M solution of anhydrous sodium trioxocarbonate (lV) with excess acid?

.What conditions would favour maximum conversion of nitrogen (ll) oxide and carbon(ll) oxide in the reaction above?

* 1. low temperature and high pressure
  2. high temperature and low pressure
  3. high temperature and high pressure
  4. low temperature and lowpressure.

1. Which of the following equilibria is unaffected by a pressure change?
   1. 2NaCl 2Na + Cl
2. 2.240 cm3 B. 22.40 cm3

C. 224.0 cm3 D. 2240 cm3

[G.M.V at s.t.p = 22.4 dm3

1. If a current of 1.5 A is passed for 4.00 hours through a molten tin salt and 13.3 g of tins is deposited, What is the oxidation state of the metal in thesalt?

|  |  |
| --- | --- |
| Initial concentration of no in moles | Initial Rate (moles / sec) |
| 0.001 | 3.0 x 10-5 |
| 0.002 | 1.2 x 10 -4 |

* 1. 1 B. 2

2

* 1. H2 + I2 2HI
  2. 2O3 3O2



* 1. 2NO2 N2O4

C. 3 D. 4

[Sn = 118.7, F = 96500 C mol-1]

1. Which of the following equivocal solutions, Na2CO3, Na2SO4, FeCl3, NH4Cl and CH3 COONa, have pH greater than?
   1. FeCl3 and NH4Cl
   2. Na2CO3 CH3 COONa and Na2SO4,
   3. Na2CO3 and CH3 COONa

The data in the table above shows the rate of reaction of nitrogen (ll) oxide with chlorine at 25oC. It can be concluded that doubling the intial concentration of NO increase the rate of reaction by factor of

A. two B. three

C. four D. five

1. Which of the following gases will rekindle a brightly glowing splint?
   1. FeCl3 , CH3, COONa. NH4Cl
2. NO2
3. NO
4. MnO- + 8H+ + ne M++ + 4H O. Which is the value of n the reaction above?

4 2

1. N2O D. Cl2
2. Which of the following salts can be melted without decomposition?
   1. Na2CO3 B. CaCO3

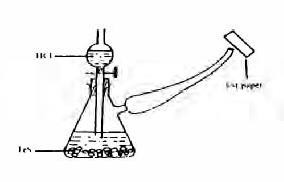
|  |  |  |  |
| --- | --- | --- | --- |
| A. | 2 | B. | 3 |
| C. | 4 | D. | 5 |

1. 2H2(g) + SO2(g) 3S(s) + 2H2O(1). The above reaction is
   1. a redox reaction in which H2S is the oxidant and

SO2 is the reductant.

* 1. a redox reaction in which SO2is the oxidant and H2S is the reductant.
  2. Not a redox reaction because there is no oxidant in the reaction equation
  3. Not a redox reaction because there is no reductant in the reaction equation.

1. Manganese(lV) oxide is known to hasten the decomposition of hydrogen peroxide. Its main actions is to.
   1. increase the surface area of the reactants
   2. increase the concentration of the reactants
   3. MgCO3 D. ZnCO3
2. Oxygen gas can be prepared by heating
   1. ammonium trioxonirate (V)
   2. ammonium trioxonirate (lll)
   3. potassium trioxonirate (V)
   4. manganese (lV)oxide.



The appropriate test paper to use in the above experimentis moist.

* 1. litmus paper
  2. potassium heptaoxodichromate(1V) paper
  3. lead (11)trioxonirate (V) paper.
  4. Universal indicator paper.

1. Addition of aqueous ammonia to a solution of Zn++ gives a white precipitate which dissolves in an excess of ammonia because.
   1. zinc isamphoteric
   2. zinc hydroxide is readily soluble
   3. zinc forms a complex which is readily soluble in excessammonia
   4. ammonia solution is a strong base.
2. Which of the following, in clear solution, forms a white precipitate when carbon(1V) oxide is bubbled into it for a short time?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | KOH | B. | NaOH |
| C. | Ca(OH)2 | D. | Al(OH)3 |

1. Copper (11) tetraoxosulphate (V1) is widely used as a
   1. Fertilizer B. Fungicide

C. Disinfectant D. Purifier

1. Which of the following metals can be prepared in samples by the thermal decomposition to their trioxonirate (V)salt?
   1. Copper and mercury
   2. Silver and copper
   3. Mercury and silver
   4. Magnesium and mercury
2. Which of the following compounds can exist as geometric isomers?
   1. 2-methylbut2-ene
   2. But-2-ene
   3. But-1-ene
   4. H

Cl — C—Br H

1. How many structural isomers can be written for the alkyl bromide C2H9Br?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 3 | B. | 4 |
| C. | 6 | D. | 8 |

1. The final products of the presence of ultraviolet light are hydrogen chloride and
   1. chloromethane
   2. tetrachloromethane
   3. trichloromethane
   4. dichloromethane
2. How many grams of bromine will be required to completely react with 10 g of propyne?
   1. 20 g B. 40 g

C. 60 g D. 80 g

[C = 12, H = 1, Br = 80].

1. Ethene when passed into concentrated H2SO4is rapidly

absorbed. The product is diluted with water and then warmed to produce.

* 1. ethanol B. diethyl ether

C. ethanal D. diethyl sulphate.

1. One of the advantages of detergents over soap is that detergents.
   1. are easier to manufacture
   2. foam more than soap
   3. form soluble salts with hard water
   4. are able to deter germ more than soap.
2. CH3CH2 CHCH3 alc.KOH CH3CH = CHCH3

X CHCH + CH CH CH =CH

3 3 2 2

The above reaction is an example of

* 1. dehydration
  2. dehydrohalogenation
  3. neutralization
  4. a fission reaction

1. A certain liquid has a high boiling point. It is viscous, non-toxic, miscible with water to be hygroscopic. This liquid is most likely to be.
   1. CH3CH2CH2CH2OH
   2. CH3CH2OHCH3
   3. CH3CH2CHOHCH3

E. CH3OHCHOCH2 OH

1. The compound.

CH3¯CH¯CH3

sCH2Cl Is known as

* 1. 1-chloro-2-methylbutane
  2. 1-chloro-2-methylpronane
  3. 2-chloromethylethane
  4. 1-chloro-2,2-dimethylethane

1. Which of the following statements is TRUE of the complete hydrolysis of a glyceride by sodium hydroxide?
   1. 3 moles of NaOH are required for each mole of glyceride
   2. 3 moles of glycerol areproduced
   3. onlyone mole of soap is formed.
   4. Concentrated H SO is essential for the

2 4

completion of the reaction.

1. Which of the following are the products of the reaction between CH3COOH and Cl2 in sunlight?
   1. ClCH2COOH+ HCl
   2. CH3COCl + HOCl
   3. CH3COOCl + HCl
   4. CH3COCl +H2O

# Chemistry 1992

1. Which of the following substances is not a homogeneous mixture?
   1. Filtered sea water
   2. Soft drink
   3. Flood water
   4. Writing ink
2. There is a large temperature interval between the melting point and the boiling point of a metalbecause.
   1. metals have very high melting points
   2. metals conduct heat very rapidly
   3. melting does not break the metallic bond but boiling does.
   4. the crystal lattice of metals is easily broken.
3. Howmanymoles of [H+] are there in 1 dm3 of 0.5 solution of H2SO4
   1. 2.0 moles B. 1.0 mole

C. 0.5 mole D. 0.25 mole

1. wH2SO4 + xA(OH)3  yH2O + zAl2(SO4)3. The

respective values of w, x, y and z in the equation above are

* 1. 2,2,5 and 1 B. 3,2,5and 2

C. 3,2,6 and 1 D. 2,2,6 and 2

1. A given mass of gas occupies 2 dm3 at 300 K. At what

temperature will its volume be doubled keeping the pressure constant?

* 1. 400 K B. 480 K

C. 550 K D. 600 K

1. If 100 cm3 of oxygen pass through a porous plug is 50 seconds, the time taken for the same volume of hydrogen to pass through the same porous plug is
   1. 10.0 s B. 12.5 s

C. 17.7 s D. 32.0 s [ O = 16, H = 1]

1. Which of the following is a measure of the average kinetic energy of the molecules of a substance.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | Volume | B. | Mass |
| C. | Pressure | D. | Temperature |

8 An increase in temperature causes an increase in the pressure of a gas in a fixed volume due to an increase in the

1. number of molecules of the gas
2. density of the gas molecules

C number of collisions between the gas

D. number of collision between the gasmolecules and the walls of thecontainer.

1. The nucleus of the isotope tritium, contains
   1. two neutrons with no protons
   2. one neutron and one proton
   3. two neutron and one electron
   4. two neutron, one proton, and one electron.
2. Howmany lone pairs of electron are there on the central atom of the H2Omolecules?

A.1

B. 2

C. 3

D. 4

1. 14 N + X  17 O + 1 H . In the above reaction , X is a

8 1

* 1. neutron, B. Heliumatom

C. Lithium atom D. Deutrium atom

1. Four elements P,Q,R and S have 1,2,3 and 7 electrons in their outermost shells respectively. The element which is unlikely to be a metal is
   1. P B. Q

C. R D. S

1. The pollutants that are likely to be present in an industrial environment are
   1. H S, SO and oxides of nitrogen

2 2

* 1. NH3, HCl and CO
  2. CO2 NH3 and H2S
  3. Dust, No and Cl2

1. Which of the following gases dissolves in water vapour to produce acid rain during rainfall?
   1. Oxygen
   2. Carbon (11) oxide
   3. Nitrogen
   4. Sulphur (lV)oxide
2. Water for town supply is chlorinate to make it free from
   1. bad odour
   2. bacteria
   3. temporary hardness
   4. permanent hardness.
3. On which of the following is the solubility of a gaseous substance dependant? 1. Nature of solvent.

11. Nature of solute 11. Temperature. 1V.Pressure.

A. l, ll, lll and lV B. l and ll only

C. ll only D. l, lll and iV only

1. An emulsion paint consist of
   1. gas or liquid particles dispersed in liquid
   2. liquid particles dispersed inliquid
2. In which of the following is the entropy change positive?
   1. H2O(l) H2O(g)
3. solid particles dispersed in liquid B. Cu2+ (aq) + Fe 

+ 3H

Fe2+(aq)+Cu

1. solid particles dispersed in solid
   1. N

2(g)

2(g

(s) 2NH

3(g)

(s)

1. A sample of orange juice is found to have a pH of

3.80. What is the concentration of the hydroxide ion in the juice?

A. 1.6 x 10-4 B. 6.3 x 10-11

C. 6.3 x 10-4 D. 1.6 x 10-11

1. Arrange HCl, CH3 COOH, C6H5CH3 in order of increasing conductivity.
   1. HCl,CH3 COOH,C6H5CH3
   2. C6H5CH3 HCl, CH3,COOH
   3. C6H5CH3 COOH,HCl,
   4. CH3, COOH,C6H5CH3,HCl
2. Which of these is an acid salt?
   1. K2SO4 Al2(SO4)3.24H2O
   2. CuCO3.Cu(OH)2
   3. NaHS

D. 2HCl(s) N2(g) + Cl2(g)

1. In what way is equilibrium constant for the forward reaction related to that that of the reverse reaction?
   1. The addition of the two is expected to be one
   2. The product of the two is expected to be one
   3. The two equilibrium constants are identical
   4. The product of the two is always greater than one.
2. Which of the following equilibra shows little or no net reaction when the volume of the volume of the system is decreased?
   1. H2(g) + l2(g 2Hl(g)



* 1. 2NO2(g N2O4(g)
  2. PCl PCl + Cl
  3. CaOCl

5( 3(g)

D.



2(g)

2

1. How many grams of H2SO4 are necessary for the preparation of 0.175 dm3 of 6.00 M H SO ?

2 4

* 1. 206.0 g
  2. 103.0 g
  3. 98.1 g
  4. 51.5 g

[S = 32.06, O = 16.00, H = 1.00].

1. Copper (ll) tetraoxosulphate (lV) solution is electrolyzed using carbon electrodes. Which of the following are produced at the anode and cathode respectively.
   1. Copper and oxygen
   2. Oxygen and copper
   3. Hydrogen and copper
   4. Copper and hydrogen
2. Calculate the mass, in kilograms, of magnesium produced by the electrolysis of magnesium(ll) chloride in a cell operating for 24 hours at 500 amperes.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 2.7 | B. | 5.4 |
| C. | 10.8 | D. | 21.7 |

[Faraday = 96,500 C mmol-1, Mg = 24]

1. MnO + 2Cl- + 4H Mn2+ +Cl + 2H O. The change

2 2 2

is oxidation numbers when the manganese, chlorine and hydrogen ions react according to the above equation are respectively.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 2, 2, 4 | B. | –1,-2 4 |
| C. | –2, 1, 0 | D. | 2, 4, 0 |

1. S O32- + l  S O62- + 21. In the reactionabove,

ZnO(s) + CO2(g ZnCO3(s)

1. For a general equation of the nature xP+ yQ mR

+ nS, the expression for the equilibrium constant is

* 1. k [P]x[Q]y
  2. [P]x [Q]y

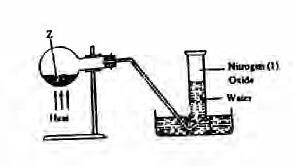
[R]m [S]n

* 1. [R]m [S]n

[P]x [Q]y

* 1. m [R] n [S]

X [P] y [Q].

1. Which of these statements is TRUE about carbon(1V)oxide?
   1. It supports combustion
   2. It is strong acidic in water
   3. It is very soluble in water
   4. It supports the burning of magnesium to produce magnesiumoxide.
2. 

2 2 4

the oxidizing agents is

* 1. S O32-

2

* 1. l2
  2. S O62-

4

* 1. l-

In the experiment above, Z can be

* + 1. a solution of sodium dioxonitrate(lll)and ammonium chloride
    2. a solution of lead trioxonitrate(V)
    3. a solution of sodium trioxonitrate(V)and ammonium chloride
    4. concentrated tetraoxosulphate (Vl) acid and sodium trioxonitrate(V).

1. Which of the following combination of gases is used for metal welding? 1. Oxygen and ethyne. ll Hydrogen and ethyne. 1ll. Hydrogen and oxygen. 1V Ethyne, hydrogen and oxygen.
   1. 1 and 11 B. 111 and1V

C. 1 and 111 D. 11 and 1V

1. Which of the following oxides of nitrogen is unstable in air?
2. CH3

CH3¯C = CH¯CH2¯CH¯ CH3 CH2

CH3

The IUPAC name for the hydrocarbon above is

* 1. 2-ethyl-5-methylhex-2-ene
  2. 2, 5-dimethylhex-2-ene
  3. 3,5-dimethylhept-3-ene
  4. 3,6-dimethylhexpt –3-ene

1. Which of the following compounds is a secondary alkanol?
   1. NO2
   2. NO

A. CH3¯ CH2¯CH¯CH3

* 1. N2O4 D. N2O5

1. The gas formed when ammonium trioxonitrate (V) is heated with sodium hydroxide is
   1. hydrogen
   2. nitrogen(1V) oxide
   3. oxygen
   4. ammonia
2. Safety matches contain sulphur and
   1. Potassiumtrioxochlorate(V)
   2. Potassium trioxonitrate (V)
   3. Charcoal
   4. Phosphorus sulpide
3. Addition of an aqueous solution of barium chloride to the aqueous solution of a salt gives a white precipate.
   1. nitrate B. carbonate

C. chloride D. sulphide

1. Sodium hydroxide solution can be conveniently stored in a container made of
   1. lead B. zinc

C. aluminum D. copper

1. Which of the following is NOT used as raw material in the solvary process?
   1. Ammonia
   2. Sodium chloride
   3. Calcium trioxocarbonate
   4. Sodium trioxocarbonate(V1)
2. Duralumin consists of aluminum, copper,
   1. zinc and gold
   2. lead and manganese

OH

* 1. CH3 CH2 CH2 CH2 OH
  2. CH3 CH2 OCH2 CH3 CH3

CH3¯ C¯OH

CH

3

1. Which of the following compounds reacts with sodium metals as well as silver and copper salt.
   1. CH3 Ca = C ~~¯~~CH3

B CH3 CH2 CH2 CH2 CH3

1. CH3 Ca CH3
2. CH3 CH CH CH3
3. Which of the following are isomers?
   1. Ethanol and dimethyl ether
   2. Benzene and methylbenzene
   3. Ethanol and propanone
   4. Trichloromethane and tetrachloromehane
4. The function group present in an treatment with a saturated solution of NaHCO3 is .
   1. hydroxyl group
   2. carbonalkoxyl group
   3. carbonyl group
   4. carboxy group.
5. Thecharacteristic reaction of carbonyl compounds is.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | Substitution | B. | Elimination |
| C. | Addition | D. | Saponificatioon |

1. An organic compound containing 40.1% carbon and 6.667% hydrogen has an empirical formula of .

C. nickel and silver

1. C H O
2. C H O

D. manganese and magnesium.

2 4 2

2 3 2

1. CH O D. CH O

2 3

1. CaO(s) + H2O(l )Ca(OH)2(s) H = -65kJ. The

process represented by the above equation is known as.

* 1. dissolution B. slackin

1. liming D. mortaring
2. The carbon atoms in ethane are
   1. sp3 hybridized
   2. sp hybridized
   3. sp2 hybridized
   4. not hybridized.
3. Alkanals can be differentiated from alkanones by reaction with.
   1. 2,4-dinitrophenlhydrazine
   2. hydrogen cyanide
   3. sodium hydrogen sulphite
   4. tollen’s reagent.
4. An example of a polysaccharide is
   1. dextrose B. mannose C.glucose D. starch.

# Chemistry 1993

1. The dissolution of common salt in water is physical change because
   1. the salt can be obtained by crystallization
   2. the salt can be recovered by the evaporation of water.
   3. Heat is not generated during mixing
   4. greater than the forces of attraction in both solid and the liquid phases
2. An element, E, has the electronic configuration 1s22s22p63s23p3. The reaction of E with a halogen X

can give.

1. The solution willnot boil at 100oC A. EX and EX B. EX only

3 5 3

C. EX5 only D. EX2 and EX3

1. Which of the following substances is mixture?
   1. Sulphur powder B. Bronze

C. Distilled water D. Ethanol

1. How many moles of oxygen molecules would be produced dfrom the decompostition of 2.5 moles of potassium trioxochlorate (V)?
   1. 2.50 B. 3.50

C. 3.75 D. 7.50

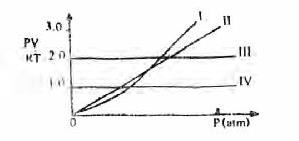
1. A balanced chemical equation obeys the law of
   1. Conservation of mass
   2. Definite proportions
   3. Multiple proportions
   4. Conservation of energy
2. At 25oC and 1 atm, a gas occupies a volume of 1.50 dm3. What volume will it occupy at 100oC at 1 atm?
   1. 1.88 dm3 B. 6.00 dm3

C. 18.80 dm3 D 60.00dm3

1. A gaseous mixture of 80.0 g of oxygen and 56.0 g of nitrogen has a total pressure of 1.8 atm. The partial pressure of oxygen in the mixture is
   1. 0.8 atm B. 1.0 atm

C. 1.2 atm D. 1.4 atm

[O = 16, N = 14]



Which of the curves above represents the behavior of 1 mole of an ideal gas?

* 1. 1 B. 11

C. 111 D. 1V

1. For iodine crystals to sublime on heating, the molecules must acquire energythat is
   1. less than the forces of attraction in the solid
   2. equal to the forces of attraction in the solid
   3. necessary to melt the solid
2. Two atoms represented as 235 Uand 238 U are
   1. isomers B. allotropes

92 92

C. isotopes D. anomers

1. As the difference in electronegativity between bonded atoms increase, polarity of the bond
   1. decreases B. increases
2. remains unchanged
3. reduces to zero.
4. Which group of elements forms hydrides that are pyramidal in structure?
   1. 111 B. 1V

C. V D. V1

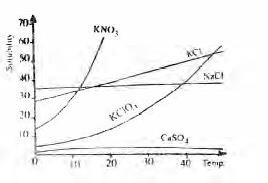
1. Water has a rather high boiling point despite its low molecular mass because of the presence of
   1. hydrogen bonding
   2. covalent bonding
   3. ionic bonding
   4. metallic bonding
2. Argon is used in gas-filled electric lamps because it helps to
   1. prevent the reduction of the lamp filament
   2. prevent oxidation of lamp filament
   3. make lamp filaments glow brightly
   4. keep the atmosphere in the lamp inert.
3. The air around a petroleum refinery is most likely to contain
   1. CO2 SO3 and N2O
   2. CO2 CO and N2O
   3. SO3 CO and NO2
   4. PH3 H2O and CO2
4. Water can be identified by the use of
   1. an hydrogen copper(11) tetraoxosulphate(1V)
   2. an hydrogen sodium trioxocarbonate(1V)
   3. potassium heptaoxochromate(vii)
   4. copper (11) trioxocarbonate(iv)
5. The phenomenon whereby sodium trioxocarbonate

(1) decahydrate loses some of its water crystallization on exposure to the atmosphere is known as

A. deliquescence B. hygroscopy

C. effervescence D. efflorescence

1. A student prepares 0.5 M solution each of hydrochloric and ethanoic acids and then measured their pH. The result would show that the
   1. pH values are equal
   2. HCl solution has higher pH
   3. Sum of the pH values is 14
   4. Ethanoic acid solution has a higher pH.



For which salt in the graph above does the solubility increase most rapidly with rise in temperature

From the data above, it can be deduced that the most powerful reducing agent of the four metals is

* 1. Cu B. Fe

C. Ba D. Zn

1. The oxidation states of chlorine in HOCl, HClO3 and HClO4 are respectively
   1. -1, +5 and +7
   2. –1 ,-5 and7

C. +1, +3 and +4

D. +1, +5 and +7

1. A reaction takes place spontaneously if
   1. ÄG =O
   2. ÄS < O and ÄH > O
   3. ÄH <TÄS
   4. ÄG>O
2. The standard enthalpies of formation of CO2(g), H2O(g) and CO(g) in kJ mol-1 are –394, -242 and –110 respectively. What is the standard enthalpy change for the reaction CO(g) + H2O CO2(g) + H2(g)?
   1. -42kJ mol-1
3. CaSO4
4. KNO3

B. +42 kJmol-1

1. NaCl D. KCl
2. NH3 + H3O  NH4 + H2O. it may be deduced from the reaction above that
   1. a redox reaction has occurred
   2. H O+ acts as an oxidizingagent

3

* 1. H O+ acts as an acid

3

* 1. Water acts as an acid

1. 4.0 g of sodium hydroxide in 250 cm3 of solution contains
   1. 0.40 moles perdm3
   2. 0.10 moles perdm3
   3. 0.04 moles perdm3
   4. 0.02 moles perdm3
2. During the electrolysis of a salt of metal M, a current of 0.05 A flow for 32 minutes 10 second and deposit

0.325 g of M. What is the charges of the metal ion?

A. 1

B.2

C.3

1. 4

[M = 65,l = 96,500 C per mole of electron]

1. Which of the following reactions occurs at the anode during the electrolysis of a very dilute aqueous solution of sodium chloride?
   1. OH –CH OH
   2. Cl- - e- Cl

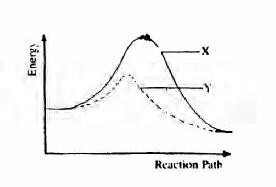


* 1. OH + Cl- HCl
  2. Na+ + e- Hg Na/Hg amalgam

1. Half – cell reaction E0

C. –262 kJ mol-1

D. +262 kJmol-1

1. 10 g of a solid is in equilibrium with its own vapour. When 1 g of a small amount of solid is added, the vapour pressure
   1. remain the same
   2. drops
   3. increase by 1%
   4. increase by 99%
2. 

In the diagram above, curve X represents the energy profile for a homogeneous gaseous reaction. Which of the following conditions would produce curve Y for the same reaction?

* 1. increase in temperature
  2. increase in the concentration of a rectant
  3. addition of a catalyst
  4. increase in pressure.

1. NaCl(s) + H2SO4(1)  HCl(g) + NaHSO4(s). In the

reaction above. H2SO4 behaves as

|  |  |  |  |
| --- | --- | --- | --- |
| Cu2+(aq) + 2e | Cu(s) | +0.34V | A. a stron acid |
| Fe2+(aq) + 2e | Fe | -0.44V | B. an oxiding agent |
| Ba2+(aq) + 2e | Ba(s) | -2.90V | C. a good solvent |
| Zn2+(aq) + 2e | Zn(s) | -0.76V | D. a dehydrating agent. |

1. Which of these salts will produce its metal, oxygen and nitrogen(1V) oxide onheating?
   1. Silver trioxonitrate(V)
   2. Sodium trioxonitrate (V)
   3. Calcium trioxonitrate (V)
   4. Lithium trioxonitrate (V)
2. An experiment produces a gaseous mixture of carbon (1V) oxide and carbon(11) Oxide. In order to obtain pure carbon (11) oxide, the gas mixture should be
   1. passed over heated copper(11) oxide

40.

H H2NCHC OH

The two functional groups in the above compound are.

A alcohol and amine

1. acid and amine
2. aldehyde and acid
3. ketone and mine
   1. bubbled through concentrated tetraoxosulphate(V1) acid
   2. bubbled through sodium hydroxide solution
   3. bubbled through water.
4. Which of the following is property of ionic chlorides?
   1. They can be decomposed heat.
   2. They react with aqueous AgNO3 to give q white precipitate which is soluble in excess ammonia
   3. They explode when in contact with dry ammonia gas
   4. They react with concentrated tetraoxosulphate (V1) acid togive white fumes of chlorides gas
5. When dilute aqueous solutions of (11) nitrate and potassium bromide are mixed, a precipitate is observed. The products of this reaction are.
   1. PbO(s) + Br- (aq) + KNO3
   2. Br2 + NO2(g) + PbBr2(s)
   3. PbO(s) PbO(s) + K+(aq) + Br(aq) +NO2(g)
   4. PbBr2(s) + K+(aq) + NO3(aq)
6. Bronze is an alloy will react to
   1. Silver and copper
   2. Silver and gold
   3. Copper and nickel
   4. Copper and zinc
7. Copper metal will react with concentrated trioxonitrate (V) acid to give
   1. Cu(NO3)3 + NO + N2O4 +H2O
   2. Cu(NO3)2 + NO +H2O
   3. CuO +NO2 + H2O
   4. Cu(NO3)2 + NO2 + H2O
8. The active reducing agent in the blast furnace for the extraction of iron is
   1. carbon B. limestone

C. carbon (11) oxide D. calcium oxide

1. Al2O3(s) + 3H2SO4(aq)=Al2(SO4)3(aq) + 3H2O(1) Al2O3(s) + 2NaOH(aq) + 3H2O (1) ’! 2NaAl(OH)4(aq).

We can conclude from the equations above that Al2O3(s) is

* 1. an acidic oxide
  2. an amphotericoxide
  3. a basic oxide
  4. a neutral oxide

1. The fraction of crude oil used as jet fule is
   1. refinery gas
   2. diesel oil
   3. kerosene
   4. gasoline
2. CH3CHCH2CHCH2CH3 CH3 CH3.

The IUPAC nomenclature for the compound above is.

* 1. dimethylhexane
  2. 3,5 dimethlpentane
  3. 1,1 dimethyl , 3 methylpentane
  4. 2,4 dimethylhexane.

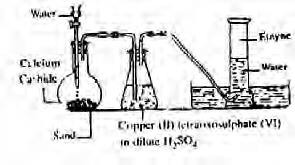
1. It is not desirable to use lead tetraethyl as an anti- knock agent because
   1. it is expensive
   2. of pollution effects from the exhaust fumes
   3. it lowers the octane rating of petrol
   4. it is explosive.
2. The carbon atoms on ethane are
   1. sp2 hybridized
   2. sp3 hybridized
   3. sp2d hybridized
   4. sp hybridized.
3. Catalytic hydrogenation of benzene produces
   1. an aromatic hydrocarbon
   2. margarine
   3. cyclohexane
   4. D.D.T
4. O O

CH3 C-OCH2CH2 and CH3CH2CH2 C-OH are

* 1. isomers
  2. esters
  3. carboxylic acids
  4. polymers.

1. Palm wine turns sour with time because.
   1. the sugar content is converted into alcohol
   2. the carbon(1V) oxide formed during the fermentation process has a sour taste
   3. it is commonly adulterated by the tappers and sellers
   4. microbial activity results in the production of organic acids within it.

|  |  |  |
| --- | --- | --- |
| 48 | 49. | Which of the represents Saponification? |
|  |  | A. reaction of carboxylic acids withsodium |
|  |  | hydroxide |
|  |  | B. reaction of Alkanoates with acids |
|  |  | C. reaction of carboxylic acids withsodium |
|  |  | alcohols |
|  |  | D. reaction of Alkanoates with sodium |
|  |  | hydroxide. |

The function of the copper (11) tetraoxosulphate (V1) in dilute H2SO4 in the figure above is to

1. Dry the gas
2. Absorb phosphine impurity]
3. Absorb ethene impurity
4. Form an acetylide withethyne.
5. The confirmatory test for Alkanoic acids inorganic qualitative analysis is the
   1. turning of wet blue litmus paper red
   2. reaction with alkanols to form esters
   3. reaction with sodium hydroxide to foemsalt and water
   4. reaction with aqueous Na2CO3 to liberatea gas which turns lime water milky.

# Chemistry 1994

1. A mixture of sand, ammonium chloride and sodium chloride is best separated by
   1. sublimation followed by addition of water and filtration
   2. sublimation followed by addtion of water and evaporation
   3. addition of water followed by filtration and sublimation
   4. addition odf water followed by crystallization and sublimation.
2. A pure solid usually melts
   1. over a wide rangeof temperature
   2. over a narrow range of temperature
   3. at a lower temperature than the impureone
   4. at the same temperature as the impureone.
3. At the same temperature and pressure, 50 cm3 of nitrogen gas contains the same number of molecules as
   1. 25 cm3of methane
   2. 40 cm3 of hydrogen
   3. 50 cm 3 of ammonia
   4. 100 cm3of chlorine
4. 8 g CH occupies 11.2dm3 at s.t.p. What volume would 22 g of CH3CH2CH occupy under the sme condition?

4

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 3.7 dm3 | B. | 11.2 dm3 |
| C. | 22.4 dm3 | D. | 33.6 dm3 |
|  |  |  | [ C= 12, H=1] |

1. To what temperature must a gas 273 K be heated in order to double both its volume and pressure?
2. For a gas, the relative molecular mass is equal to 2Y. What is Y?
   1. The mass of the gas
   2. The vapour density of the gas
   3. The volume of the gas
   4. The temperature of the gas
3. The densities of two gases, X and Y are 0.5 g dm-3 and

2.0 g dm-3 respectively. What is the rate of diffusion of X relative to Y?

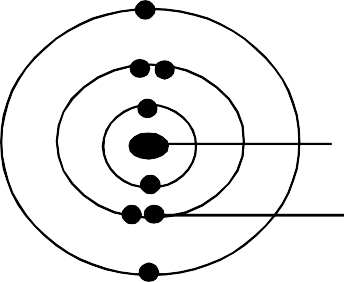
|  |  |  |  |
| --- | --- | --- | --- |
| A. | 0.1 | B. | 0.5 |
| C. | 2.0 | D. | 4.0 |

1. An increase in temperature curves causes an increase in the pressure of a gas because
   1. it decreases the number of Collision between the molecules
   2. the molecules of the gas bombard the walls of the container more frequently
   3. it increase the number of Collision between the molecules
   4. it causes the molecules to combine
2. The shape of ammonia molecules is
   1. trigonal planar
   2. octahedral
   3. square planar
   4. tetrahedral.
3. The number of electrons in the valence shell of an element of atomic number 14 is

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

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

1. Which of the following physical properties decreases down a group ion the periodic table?
   1. Atomic radius
   2. Ionic radius
   3. Electropositivity
   4. Electronegativity.

12

Nucleus

An Electron

The diagram above represents atom of

1. Mangnesium
2. Helium
3. Chlorine
4. Neon
5. Elements X, Y and Z belongs to groups 1,V and V11 respectively. Which of the following is TRUE about the bond types of XZ and YZ
   1. Both are electrovalent
   2. Both are covalent
   3. XY is electrovalent and YZ3 is covalent
   4. XZ is covalent and YZ3 is electrovalent.
6. Which of the following atoms represents deuterium? ‘ No of No of No of
7. A major effect of oil pollution in coastal water is the
   1. destruction of marinelife
   2. desalination of water
   3. increase in the acidity of the water
   4. detoxification of thewater.
8. Sodium chloride has no solubility product value because of its.
   1. saline nature
   2. high solubility
   3. low solubility
   4. insolubility
9. The solubility in moles per dm3 of 20.2g of potassium trioxonitrate (V) dissolved in 100g of water at room temperature is
   1. 0.10
   2. 0.20
   3. 1.00
   4. 2.00

[K = 39, O = 16, N = 14]

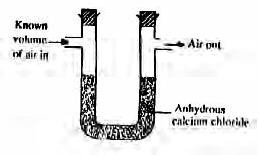
1. A few drops of concentrated PCl are added to about 10cm3 of a solution of pH 3.4. The pH of the resulting mixture is
   1. less than 3.4
   2. greater than 3.4
   3. unaltered
   4. the same as that of pure water
2. Which of the following compounds is a base?
   1. CO2
   2. CaO
   3. H PO

3 3

protons neutrons electrons

1. 1 0 0
2. 1 0 1
3. 1 1 1
4. 1 2 1
   1. CH3COOH
5. 20cm3 of a 2.0 M solution of ethanoic acid was added to excess of 0.05 M sodium hydroxide. The mass of the salt produced is
   1. 2.50 g
   2. 2.73 g
   3. 3.28 g
   4. 4. 54g

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

The set-up above would be useful for determining the amount of

1. Oxygen in air
2. Water vapour in air
3. CO2 in air
4. Argon in air.
5. A solid that absorbs water from the atmosphere and forms an aqueous solution is
   1. hydrophilic
   2. efflorescent
   3. deliquescent
   4. hygroscopic
6. What volume of oxygen measured at s.t.p would be liberated on electrolysis by 9650 coulombs of electricity?

A 22.4 dm3

B 11.2 dm3

C 1.12 dm3

D 0.560 dm3

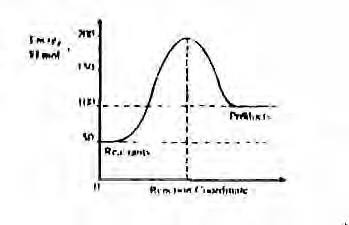
[Molar Volume of gas = 22.4 dm3, F = 96,500 C mol-1]

1. Crude copper could be purified by the electrolysis of concentrated copper911) chloride if the crude copper is
   1. made both the anode and the cathode
   2. made the cathode
   3. made the anode
   4. dissolved in the solution.
2. H-(s) + H O(1) H (g) + OH-(aq). From the equation 31. Which of the following are produced when ammonium

2 2

above, it can be inferred that the

* 1. reaction is a double decomposition
  2. hydride ion is reducing agent
  3. hydride ion is an oxidizing agent
  4. reaction is neutralization.

26

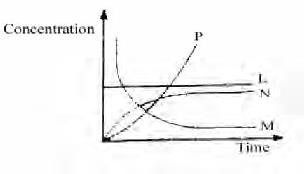
The H for the reaction represented by the energy profile above is

trioxonirate(V) crystals are cautiously heated in a hard glass round bottomed flask?

1. N2O and steam
2. NO2 and ammonia
3. N2O4 and NO2
4. NO and NO2

32. 2HCl(aq) + CaCO3(s) CaCl2(aq) + H2O(10 + CO2g).

From the reaction above, which of the following curves

represents the consumption of calcium trioxocarbonate(lV) as dilute HCl is added to it?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A. -100kJ mol-1 |  |  |  |  |
| B. +100 kJmmol-1 |  |  |  |  |
| C. +50kJ mol-1 |  |  |  |  |
| D. –50 kJmol-1 | A. | L | B. | M |
|  | C. | N | D. | P |
| 27. An anhydride is an oxide of a non-metal. |  |  |  |  |
| A. Which will not dissolve in water | 33. |  |  |  |
| B. whose solution water has pH greater than7 | |  |  |  |
| C. whose solution in water has a pH less than 7 | |  |  |  |
| D. whose solution in ware has a pH of 7 | |  |  |  |

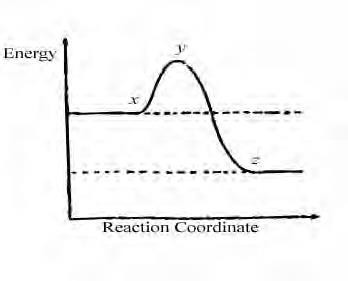
28. MnO (aq) + 8H +(aq) + Fe2+(aq) Mn2+(aq) +5Fe3+ +

4

4H2O(1). The oxidation number of manganese in the above reaction change from

A. +7 to +2 B. +6 to+2

C. +5 to +2 D. +4 to+2

29.

In the diagram above, the activation energy is represented by

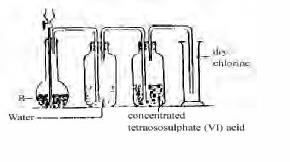
A. y-x B. x

C. x-z D. y

1. Which of the following is TRUE of Le Chatelier ’s principle for an exothermic reaction?
   1. Increase in temperature will cause an increase in equilibriumconstant
   2. Increase in temperature will cause adecrease in the equilibrium constant
   3. Addition of catalyst will cause an increase in the equilibrium constant.

C. Addition of catalyst will cause a decrease in the equilibrium constant.

In the diagram above, R is a mixture of

1. potassium tetraoxochlorate(Vii) and concentrated H2SO4
2. potassium tetraoxomanganate (vii) and concentrated HCl
3. manganese(1V) oxide and concentrated HCl
4. manganese (1V) oxide and concentrated HCl
5. Which of these metals CANNOT replace hydrogen from alkaline solutions?
   1. Aluminium
   2. Zinc
   3. Tin
   4. Iron
6. Clothes should be properly rinsed with water after bleaching because
   1. the bleach decolourizes the clothes
   2. chlorine reacts with fabrics during bleaching
   3. the clothes are sterilized during bleaching
   4. hydrogen chloride solution is produced during bleaching.
7. Which of these solutions will give a white precipate with a solution of barium chloride acidified with hydrochloride acid?
   1. Sodium trioxocarbonate(1V)
   2. Sodium tetraoxosulphate
   3. Sodium trioxosulphate(1V)
   4. Sodium sulphides
8. SO3 is NOT directly dissolved in water in the preparation of H2SO4 by the contact process because.
9. When sodium ethanoate is treated with a few drops of concentrated tetraoxosulphate(V1) acid one of the products is
   1. CH3COOH
   2. CH3COOH3
   3. CH3COOC2H5
   4. C2H4COOCH
10. One mole of a hydrocarbon contains 48 g of carbon. If its vapour density is 28, the hydrocarbon is
    1. an alkane
11. the reaction between SO3 and water is violently exotheremic
12. acid is usually added to water and never water to acid
13. SO3 is an acid not dissolve in water readily
    1. an alkene
    2. an alkyne
    3. aromatic

[C= 12, H = 1]

1. SO3 is an acidgas.
2. In an electrolytic set-up to protect iron from corrosion, the iron is
   1. made the cathode
   2. made the anode
   3. used with a metal of lower electropositive potential
   4. initially coated withtin
3. Which of the following is NOT true of metals?
   1. They are good conductors of electricity
   2. They ionize by electron loss
   3. Their oxides are acidic
   4. They have highmelting points.
4. Which of the following is the correct order of decreasing activity of the metal Fe, Ca, Al and Na?
   1. Fe > Ca > Al > Na
   2. Na > Ca > Al > Fe
   3. Al > Fe > Na > Ca
   4. Ca > Na > Fe > Al.
5. H CH3 H H H¯C ¯ C¯ C P- C

H CH3

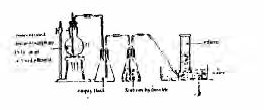
H

The IUPAC name of the compound above is

* 1. 2,2-dimethyl but-1-yne
  2. 2,2-dimethyl but-1-ene
  3. 3,3-dimethyl but-1-ene
  4. 3,3-dimethyl but-1-yne

1. When sodium is added to ethanol, the products are
   1. sodium hydroxide and water
   2. sodium hydroxide and hydrogen
   3. sodium ethnocide and water
   4. sodium ethnocide and hydrogen.
2. The general formula of alkanones is
   1. RCHO
   2. R2CO
   3. RCOOH
   4. RCOOR

## Use the diagram below to answer questions 47 and 48.



The reaction taking place in flask G is known as

1. hydrolysis
2. double decomposition
3. dehydration
4. pyrolysis
5. The caustic soda solution in the conical flask serves to
   1. dry ethene
   2. remove carbon (1V) oxide fromethene
   3. remove carbon (11) oxide from ethene
   4. remove sulphur (1V0 oxide from ethene.
6. Which of the following orbital of carbon are mixed with hydrogen in methane?
   1. 1s and 2p
   2. 1s and 2s
   3. 2s and 2p
   4. 2s and 3p
7. Which of the following reagents will confirm the presence of instaurations in a compound?
   1. Fehling’s solution
   2. Bromine water
   3. Tollen’s reagent
   4. Benedict’s solution

# Chemistry 1995

1. Chromatography is used to separate components of mixtures which differ in their rates of
   1. diffusion B. migration

C reaction D. sedimentation.

1. Which of the following is an example of chemical change?
   1. Dissolution of salt in water.
   2. Rusting of iron
   3. Melting ofice.
   4. Separating a mixture by distillation.
2. The number of hydrogen ions in 4.9 g of tetraoxosulphate (VI) acids is
   1. 3.01 x 1022 B. 6.02 x 1022

C.3.01 x 1023 D. 6.02 x 1022.

(S = 32, O= 16, H=1, N = 6.02 x 1023).

A

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

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

1. A gas sample with initial volume of 3.25 dm3 is heated and allowed to expand to 9.75 dm3 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 absolutetemperature?
   1. 3:1 B. 5:2 C. 5:4

D. 8:3

1. Two cylinders A and B each contains 30 cm3 of oxygen and nitrogen respectively at the same temperature and pressure. If there are 5.0 moles of nitrogen, then the mass of oxygen is
   1. 3.2 g B. 6.4g

C. 80.0g D. 160.0g.

1. A liquid begins toboil when
   1. its vapour pressure is equal to vapour pressure of its solid at the given temperature
   2. molecules start escaping from its surface
   3. its vapour pressure equals the atmosheric pressure
   4. its volume is slightly increased.
2. A particle that contains 8 protons, 9 neutrons and 7 electrons could be written as
   1. 16 O B. 17 O+

C. 178 O+ D. 178 O.

1. Which letter represents a non-metal that is a solid at room temperature?
   1. T B. R.

C. J. D. X.

1. In the oil drop experiment, Milikan determined the
   1. charge to mass ratio of theelectron
   2. mass of theelectron
   3. charge of the electron
   4. mass of the proton.
2. The stability of ionic solids is generally due to the
   1. negative electron affinity of most atoms
   2. crystal lattice forces
   3. electron pair sharing
   4. positive ionization potentials.
3. Which of the following statements is FALSE about isotopes of the same element?
   1. They have the same number of electrons in their outermost shells.
   2. they have different atomicmasses.
   3. They have the same atomic number and the same number of electrons.
   4. they have the same atomic number but different number of electrons.
4. Helium is often used in observation balloons because it is
   1. light and combustible
   2. light and non-combustible
   3. heavy and combustible
   4. heavy and non-combustible.
5. When plastic and packaging materials made from chloromethane are burnt in the open, the mixture of gases released into the atmosphere is most likely to contain
   1. ethane B. chlorine

C. hydrogen chlorine D. ethane.

1. Deliquescent substances are also
   1. efflorescent B. anhydrous

C. hydroscopic D. insoluble.

9 8 17. The difference between colloids and suspensions is

## Use the section of the periodic table below to answer questions 9 and 10.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  |  |  |  |  |  | 2L |
| 3G | X | 5 | 6 | 7 | 8J  T | 9E | 10 |
| 11 | M  12 | R  13 | 14 | 15 | 16 | 17 | 18 |

1. Which of the letters indicate an alkali metal and a noble gas respectively?

brought out clearly by the fact that while colloids

* 1. do not scatter light, suspensions cannot be so separated
  2. can be separated by filteration, suspension cannot be separated
  3. can be separated by a membrane, suspensions cannot
  4. do not settle out on standing, suspensions do.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | M and E. | B. | G and E. |
| C. | R and L. | D. | G and L. |

1. In general, an increase in temperatue increases the solubility of a solute in water because
   1. more solute molecules collide with each other
   2. most solutes

dissolve with the evolution of heat

* 1. more solute molecules dissociate at higher temperature
  2. most solutes dissolve with absorption of heat.

1. Neutralization involves a reaction between H O+ and

3

* 1. Condensation of water vapour.
  2. Boiling a sampled of water
  3. Cooling a saturated solution.

1. Which of the following equibrai is shifted to the right as a result of an increase in pressure?

A. H + I

2H

* 1. CI- B. OH- C.

NO - D. CO 2-.

2(g) 2(g)

* 1. 2N O

(g)

N2O

3 3 2 2(g) 4(g)

C.PCl PCl + Cl

1. Which of the following solutions will have a pH < 7?

D. 2O 3O .

5(g)  3(g) 2(g)

* 1. Na2SO

4(aq)

* 1. NaCI

(aq)

3(g)  2(g)

C. Na2CO3(aq) D. NH4CI(aq).

1. What is the pH of a 2.50 x 10-5 M solution of sodium

hydroxide?

* 1. 3.6 B. 5.0

C. 9.4 D. 12.0.

14



12

10

8

6

25VOL OF BASE

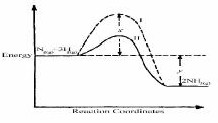
1. The graph above shows the pH changes for the titration of a
   1. strong acid versus strong base
   2. weak acid versus strong base
   3. strong acid versus weak base.
   4. weak acid versus weak base.
2. In the process of silver-plating a metal M, the metal M is the
   1. anode and a direct current is used
   2. cathode and an alternating current is used
   3. anode and an alternating current is used.
   4. cathode and a direct current is used.
3. How many moles of copper would be deposited by passing 3F of electricity through a solution of copper

(II) tetraoxosulphate (VI)?

1. 0.5 B. 1.0

C. 1.5 D. 3.0

(F = 96 500 C mol-1).

1. The arrangement above can be used for the collection of
   1. sulphur (IV) oxide
   2. ammonia
   3. nitrogen
   4. hydrogen chloride.
2. 

The activation energy of the uncatalysed reaction is A.x

1. x +y
2. x- y
3. y
4. It can be deduced that the rate of the reaction
   1. for path I is higher than path II
   2. for path II is higher than path I
   3. is the same for both paths at all temperatures
   4. depends on the values of both x and y at all pressures.
5. In the industrial production of hydrogen from natural gas, carbon (IV) oxide produced along with the
6. 2Cl-

CI2(g) = 2e-

The above half-cell reaction hydrogen is removed by

(aq) ’!

(aq).

occurring at the anode during the electrolysis of dilute ZnCI2 solution is

* 1. ionization B. oxidation

1. reduction. D. recombination.
2. Which of the following is a redox reaction?
   1. KCI(ag) + H2SO4(aq)  KHSO4(aq) + HCI(aq)
   2. 2FeBr2(ag) + Br2( !2FeBr3(aq)

C. AgNO3(ag) + FeCI3!3AgCl(aq) + CO Fe(NO3)3(aq)

1. H2CO3(aq) H2O(l) + CO2(g).

|  |  |  |  |
| --- | --- | --- | --- |
| A. | isomerism | B. | allotrophy |
| C. | isotopy | D. | isomorphism. |

1. washing under pressure
2. passing the mixture into the lime water
3. using ammoniacal copper (I)chloride
4. drying over phosphorus (V) oxide.
5. Sulpur exists in six forms in the solid state. This property is known as
6. Cr O 2- + 14H+ + 6I- 2Cr3 + 3I + 7H O(1)+.

+

2 7 (aq) (ag) (aq) ’! (ag) 2(g) 2

The change in the oxidation number of oxygen in the equation above is

A. O. B. 1 C. 2 D. 7.

1. If an equilibrium reaction has “H < O, the reaction will proceed favourably in the forward reaction at
   1. low temperature
   2. high temperatures
   3. all temperatures
   4. all pressures.
2. Which of the following processes lead to increase in entrophy?
   1. mixing a sample of NaCl andsand
3. A gas that will turn orange potassium heptaoxodichromate (VI) solution to clear green is
   1. sulpur (VI) oxide
   2. hydrogen sulphide
   3. sulpur (IV) oxide
   4. hydrogen Chloride.
4. Which of the following ions will give a white precipitate with aqueous NaOH and soluble in excess of the base?
   1. Ca2+ B. Mg2

C. Zn2+ D. Cu2+.

1. In the extraction of iron in the blast furnace, limestone is used to
   1. release CO2 for the reaction
   2. reduce the iron
   3. Increase in the strenght of Iron
   4. remove impurities.
2. Which of the following compound will impart abrick- red colour to a non-luminous Busenflame?
   1. NaCl B. LiCl

C. CaCl2 D. MgCl .

1. . Group 1 A metals are not found free in nature because they
   1. are of low melting and boiling points
   2. have weak metallic bonding
   3. conduct electricity and heat
   4. are veryreactive.
2. CH COOH + CH CH OH Conc H SO X + Y. X and Y in the

3 3 2 2

reaction of above are respectively

* 1. CH3 COCH3 and H2O
  2. CH3 CH2 COCH2 and H2O2
  3. CH3 COOCH2 CH3 and H2O3
  4. CH3CH2 CHO and CH4.

1. CHCl3 + Cl2  HCl + CCl4. The reaction above is an example of
   1. an addition reaction
   2. a substitution reaction
   3. chlorination reaction
   4. a condensation reaction.
2. CH3 – CH –CH = CH –CH3 CH3. The IUPAC

nomenclature for the compound above is

* 1. 1.1-dimenthyilbut –ene
  2. 2-methlypnet 3 –ene
  3. 4,4 –dimethy –1but –2 –ene
  4. 4 –methylpent –2 –ene.

1. Which of the following pairs has compounds that are isomers?
   1. propanal and propanone
   2. ethanoic acid and ethylmethanoate
   3. ethanoic acid and thane –1 ,2 –diol
   4. 2 –methylbutnae and 2,2 –dimethylbutane
2. Aromatic and aliphatic hydrocarbons can be distinguished from each other by the
   1. action of bromine
   2. use of polymerizationreaction.
   3. Action of heat
   4. Use of oxidation reaction
3. The role of sodium chloride in the preparation of soap is to
   1. purify the soap
   2. separate the soap from glycerol
   3. accelerate the decomposition of the fat or oil
   4. react with glycerol. O

CH3CH2=CH2- C - H

1. The functional group represented in the compound above is
   1. alkanol B. alkanal

C. alkanone D. alkanoate

1. CxHy + 4O2 3CO2 + 2H2O. The hydrocarbon, Cx Hy in the reaction above is
   1. propane B. propene

C. propyne D. propanone.

1. An example of a secondary amine is
   1. propylene B. di-butylamine C . methylamine D. trimethylamine.
2. The relatively high boiling points of alkanol are due to
   1. ionic bonding
   2. aromatic character
   3. covalent bonding
   4. hydrogen bonding.

# Chemistry 1997

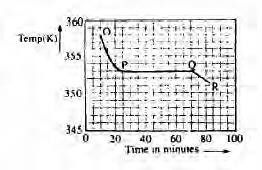
1. 35 cm3 of hydrogen was sparked with 12cm3 of oxygen at 110o C and 760 mm Hg to produce steam. What percentage of the total volume gas left after the reaction is hydrogen

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 11% | B. | 31% |
| C. | 35% | D. | 69% |

1. 2.85 g of an oxide of copper gave 2.52g of copper on reduction and 1.90 g of another oxide gave 1.52 g of copper on reduction. The data above illustrates the law of
   1. constant composition
   2. conservation of mass
   3. reciprocal proportions
   4. multiple proportions.

Use the graph below to answer question 3 and 4 10. In the periodic table, what is the property that decrease

along the period and increases down the group

* + 1. Atomic number
    2. Electron affinity.
    3. Ionization potential
    4. Atomic radius.

1. Two elements, P and Q with atomic numbers 11 and 8 respectively, combine chemically values of x and y are

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 1 and 1 | B. | 1 and 2 |
| C. | 2 and 1 | D. | 3 and 1 |

1. Oxygen is a mixture of two isotopes 16 O and 18

8

8 O with

A sample, X, solid at room temperature, was melted, heated to a temprature of 358 K and allowed to cool as shown in OPQR.

1. The section PQ indicate thatX is
   1. a mixture of salt
   2. a hydrated salt
   3. an ionic salt
   4. a pure compound.
2. . The section OP suggests that X is in the
   1. Liquid state
   2. Solid/liquid state
   3. Solid state
   4. Gaseous state.
3. An element, X, format a volatile hydride XH3 with a vapour density of 17.o. The relation mass of X is

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 34.0 | B. | 31.0 |
| C. | 20.0 | D. | 14.0 |

1. A mixture of 0.20 mole of Ar, 0.20 mole of N2 and 0.30 mole of He exerts a total pressure of 2.1 atm. The partial pressure of He in the mixture is
   1. 0.90atm B. 0.80 atm

C. 0.70atm D. 0.60 atm

1. If 30cm3 of oxygen diffuses through a porous plug in 7s, how long will it take 60 cm3 of chlorine to diffuse through the same plug

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 12 s | B. | 14 s |
| C. | 21 s | D. | 30 s |

1. The temperature of a body decreases when drops of liquid placed on it evaporates because
   1. the atmospheric vapour pressure has a cooling effect on the body
   2. a temperature gradient exists between the drops of liquid and the body
   3. the heat of vapourization is drawn from the bodycausing it to cool
   4. the random motion of the liquid molecules causes a cooling effect on the body.
2. The electron configuration oftwo elements with similar chemical properties arerepresented by
   1. Is22s2 2p5 and Is22s22p4
   2. Is22s2 2p4 and Is22s22p63s1 C Is22s22p63s1 and Is22sI

D. Is22s2 2p4 and Is22sI

relative abundance of 90% and 10% respectively. The relative atomic mass of oxygen

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 16.0 | B. | 16.2 |
| C. | 17.0 | D. | 18.0 |

1. 200cm3 of air was passed over heated copper in a syringe several times to produce copper (11) oxide. When cooled the final volume of air recorded was 158cm3. Estimate the percentage of oxygen in the air.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 31% | B. | 27% |
| C. | 21% | D. | 19% |

1. Which of the following gases is the most dangerous pollutant
   1. Hydrogen sulphide
   2. Carbon (1V) oxide
   3. Sulphur (1V) oxide
   4. Carbon (11) oxide
2. A major process involve in the softening of hard water is the
   1. conversion of a soluble calcium salt to its trioxocarbonate (1V)
   2. decomposition of calcium trioxocarbonate (1V)
   3. conversion of an insoluble calcium salt to its trioxocrbonate (1V)
   4. oxidation of calcium atom to its ions.
3. On recrystallization, 20g of magnesiumtetraoxosulphate (V1) forms 41 g of magnesium tetraoxosulphate (1V) crystals, MgSO4.yH2O. The value of y is
   1. 1 B. 3

C. 5 D. 7

(Mg = 24, S=32, O=16, H= 1)

17 A satyrated solution of AgCI was found to have a concentration of 1.30 x 100-5 mol dm-3. The solution product of AgCI. thereforeis.

1. 1.30x 10-5 mol 2 dm-6
2. 1.30 x 10-7 mol2 dm-6
3. 1.69 x 10-10 mol2 dm-6
4. 2.60 x 10-12 mol2 dm –6
5. The hydroxyl ion concentration, (OH-), in a solutionof sodium hydroxide of pH 10.0 is
   1. 10-10 moldm-3
   2. 10-6 mol dm-3
   3. 10-4 mol dm-3
   4. 10-2 mol dm-3
6. Which of the aqueous solution with the pH values below will liberate hydrogen when it reacts with magnesium metal?
   1. 13.0 B. 7.0

C. 6.5 D. 3.0

1. Given that 15.00cm3 of H2SO4 was required to completelyneutralize 25.00 cm3 of 0.125 mol dm-3 NaOH, calculate the molar concentration of the acid solution.
   1. 0.925 moldm-3 B. 0.156 moldm-3

C. 0.104 mol dm-3 D 0.023 mol dm –3

1. When platinum electrodes are used during the electrolysis of copper (11) tetraoxosulphate (1V) solution, the solution gets progressively
   1. acidic B. basic

C. neutral D. amphoteric

1. Howmany faradays of electricity are required to deposit

0.20 mole of nickel, if 0.10 faraday of electricity deposited 2.98 g of nickel during electrolysis of its aqueous solution?

A. 0.20 B. 0.30

C. 0.40 D. 0.50

( Ni =058.7, IF=96 500C mol-1)

1. What is the oxidation unmber of Z in K ZCI6 ?

3

* 1. -3 B. +3

C. –6 D. +6

1. 2H2S(g) + SO2(g) +H2O(1)  3S (s) +3H2O(1)….(I)

3CuO(s) + 2NH3 (g)  3Cu(s)+3H2)(1)+N2(g)… (ii)

In the equation above, the oxidizing agent in (I) and the reducing agent in (ii) respectivelyare

1. H2S and NH3
2. SO2 and CuO
   1. SO and NH
3. One method of driving the positon of equilibrium of an endothermic reaction forward isto
   1. increase temperature at constant pressure
   2. decrease pressure at constant temperature
   3. cool down the apparatus with water
   4. decrease temperature at constant pressure.
4. Oxidation of concentrated hydrochloric acid with manganese(1V) oxide liberates a gas used in the
   1. manufacture of tooth pastes
   2. treatment of simple goiter
   3. valcanization of rubber
   4. sterilization ofwater.
5. mE+ nF pG + qH

In the equation above, the equlibrium constant is given by

* 1. (E)m(F)n
     1. p(H)q
  2. (E)(F)
     1. (H)
  3. (G)p(H)q

(E)m(F)n

* 1. (G)(H)

(E) (F)

1. A compound that will NOT produceoxygen on heating is
   1. potassium dioxonitrate(111)
   2. lead (1V)oxide

2 3

D. H2S and CuO

1. 2SO 2(g)+O2(g)  2 SO3(g)

In the reaction above, the standard heats of formation

of SO (g) and SO (g) are –297 kJ mol-1 and –396 kJ mol-1 respectively.

2 3

The heat change of the reaction is

* 1. -99 kJ mol-1 B. –198 kJ mol-1

C. +198 kJ mol-1 D. +683 kJmol-1

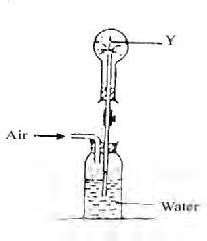
1. ½ N2(g) +1/2 O2(g); H- = 89 kJ mol-1

If the entropy change for the reaction above at 25oC is

11.8 J, calculate the change in free energy, G , for the reaction at 250C

1. 88.71 KJ
2. 85.48kJ
3. –204.00 kJ
4. –3427.40 kJ
5. If the rate law obtained for a given reaction is rate=k(X)n(Y)m, what is the overall order of the reaction?
   1. potassium trioxochlorate (V)
   2. potassium trioxochlorate (V)
6. Coal gas is made up to carbon (11) oxide, hydrogen and
   1. nitrogen B. air

C. argon D. methane

1. 

In the diagram above, the gas Y could be

* 1. hydrogen chloride
  2. oxygen
  3. carbon (1V) oxide

|  |  |  |
| --- | --- | --- |
| 1. nm 2. n | D. | chlorine. |
| m  C. n+m | 34. 2X- (aq | + 2+  ) + MnO2(s) + 4H X + Mn + 2H O  (aq) 2(g) (aq) 2 (1) |
| D. n-m |  |  |

The reaction above can be used for the laboratory preparation of all halogens except fluorine because it is

1. a poisonous gas
2. an oxidizing agent
3. electronegative in nature
4. highly reactive.
5. The reaction that occurs during the laboratory test for the presence of tetraoxosulphate (V1)
   1. 3-ethyl-1, 1, 4-trimethypentane
   2. 3-ethyl-2,5,5-trimethypentane
6. The reaction of an alkanol with an alkanoic acid in the presence of concentrated H2SO4 will produce an
   1. Alkanal
   2. Alkanonate
   3. Alkanone
   4. Alkayne.

2-

A. SO

4(aq)

+ Ba2+

(aq)

dilHNO3

BaSO4

1. The final product of the reaction of ethyne with hydrogen iodide is
   1. Cu ++4H

+ 2SO2- CuSO (s) + 2H O A. CH CHI

(s) (aq) 4(aq) 4 2 (1) 3 2

+SO

2(g)

* 1. CH I CH 1
  2. 4H+(aq)+ 2SO2-4(aq) +2e- SO2-4(aq) +2H2

O

(1)

2 2

C. CH3 CI3

D CH2=CHI

+ SO

2(g)

* 1. CuO + 2H+ + SO2-  CuSO +H O CH3

(s) (aq) 4(aq) 4(aq) 2 (1)

1. The removal of rust from iron by treatment with tetraoxosulphate (V1) acid is based on the
2. hydrolysis of the iron
3. reaction of acid with base
4. oxidation of the rust
5. dehydration of the iron.
6. Which of the following additives could improve the quality of steel?

A. Silicon B. Sulphur and phosphorus

C. Carbon. D. Chromium andnickel.

1. Sodium hydroxide is prepared commercially from sodium chloride solution by.
2. electrolysis using mercury as cathode
3. hydrolysis in steam using a catal.yst
4. electrolysis using iron as anode
5. treating sodium chloride with ammonia and carbon (1V) oxide.

39 A sample of a substance containing only C and H burns in excess O2to yield 4.4 g of CO2and 2.7 g of H2O. The empirical formular of the substance is

1. CH3 B. CH2

C. CH4 D. C2H5

(C= 12, O=16, H= 1)

1. An undesirable paraffin in the petroleum industry which is particularly prone to knocking is
   1. iso-octane
   2. n-heptane
   3. iso-heptane
   4. n-octane
2. CH3CH2 C CH3

CH3

How many more isomers of the compound above can

be obtained?

* 1. 5 B. 4

1. 3 D. 2
2. Synthesis detergents are preferred to soap for laundry using hard water because
   1. detergent are water soluble while soap not
   2. the calcium salts of detergent are water soluble
   3. the magnesium salt of soap is soluble in hard water
   4. soap does not have a hydrocarbon terminal chain.
3. The synthetic rubber obtained by the polymerization of chlorobutadiene in the presence of sodium is called

|  |  |  |  |
| --- | --- | --- | --- |
| A. | Teflon | B. | Isoprene |
| C. | Polythene | D. | Neoprene |

1. 25cm3 of 0.02 M KOH neutralized 0.03 g of a monobasic
2. 4-ethyl-2, 5-dimethylexane

CH3

1. CH3 CHCHCH2 ~~C~~H

CH3 CH2 CH3 CH3

The IUPAC nomenclature of the organic compund with the above structural formular is

* 1. 3-ethyl-2, 5-dimethylhexane

organic acid having the general formula CnH2n+1COOH. The molecular formula of the acid is

|  |  |  |  |
| --- | --- | --- | --- |
| A.  C. | HCOOH  CH3COOH | B.  D. | C2H5COOH C3H7COOH |
|  |  |  | (C= 12, H=1, 0=16) |

48 When Fehling’s solution is added to two isomeric carbonyl compounds X and Y with the molecular formula

C5H10O, compound X gives a red precipitate while Y does not react. It can be inferred that X is

O

A .CH3 C CH2 CH2 CH3

* 1. CH3 CH2 CH2 CH2 C ~~H~~

|  |  |  |  |
| --- | --- | --- | --- |
|  | O |  | A. sp3 hybridized carbon atoms only |
|  |  |  | B. sp3 hybridized carbon atoms only |
| C. | CH3 CH2 | C CH C2 H | 1. sp3 and sp hybridized carbon atoms 2. sp3 and sp2 hybridized carbon atoms. |

49.

O

1. CH3 CH C CH2CH3 CH3

CH3

H H H O

1. H C C

C C

H

H H H CH3

The compound above is the product of the oxidation of

* 1. 2 – methylbutan – 2 - o1
  2. 2 – methylbutan –1 - o1
  3. 2,3 – dimenthylpropan – 1 – o1
  4. Pentan –2 – o1

The compound above contains

# Chemistry 1998

1. The addition of water to calcium oxide leads to
   1. a physical change
   2. a chemical change
   3. the formation ofmixture
   4. an endothermic change.
2. A mixture of iron and sulphur can be separated by dissolving the mixturein
   1. steam
   2. dilute hydrochloric acid
3. A given amount of gas occupies 10.0 dm3 at 4 atm. and 2730C. The number of moles of the gas present is
   1. 0.089 mol
   2. 1.90 mol
   3. 3.80 mol
   4. 5.70 mol

[Molar volume of gas at s.t.p.= 22.4 dm3]

1. If sulphur oxide and methane are released simultaneously at the opposite ends of narrow tube, the rates of diffusion R and R will be in the ratio
   1. dilute sodium hydroxide A. 4:1 so2 B. CH4 2:1
   2. benzene
2. 8.0 g of an element X reacted with an excess of copper

(11) tetraoxosulphate (1V) solution to deposit 21.3 g of copper. The correct equation for the reaction is

Cu

* 1. 1:2 D. 1:4

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

1. A solid begins to melt when
   1. constituent particles acquire a greater kinetic
2. X



(s)

+CuSO

4(aq)

(s)

+ XSO

4(aq)

energy

X(s) +2CuSO4(aq) 2 Cu(s) + X(SO4)(aq)

1. 

2X +2CuSO Cu + X (SO )

(s) 4(aq) (s) 2 4 (aq)

* 1. energy of vibration of particles of the solid is less than the intermolecular forces

D.

2X

(s)

+3CuSO

4(aq)

3Cu

(s)

+ X2(SO)

3(aq)

* 1. Constituent particles acquire energy of the above the average kinetic energy

1. C3H8(g) + 5O2(g)  4H2O(g) +3CO2(G)

From the equation abovem the volume of oxygen at 9.

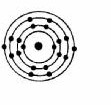
s.t.p. required to burn 50cm3 of propane is

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 250cm3 | B. | 150cm3 |
| C. | 100cm3 | D. | 50cm3 |

1. 30cm3 of hydrogen was collected over water at 27oC and 780 mm Hg. If the vapour pressure of water at the temperature of the experiement was 10mm Hgm calcuale the volume of the gas at 760mm Hg and 70C.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 40.0cm3 | B. | 35.7cm3 |
| C. | 28.4cm3 | D. | 25.2cm3 |

* 1. energy of vibration of particles of the solid equals the intermolecular forces.



The diagram above represents an atom that can combine

with chlorine to form

* + 1. a convalent bond
    2. an electrovalent bond
    3. a hydrogen bond
    4. a co-ordinate bond

1. Which of the following electron configurations indicates an atom with the highest ionization energy?
   1. 2, 8, 7 B. 2, 8, 8, 1
2. 2, 8, 8, 2 D. 2, 8, 8, 7
3. The lines observe in the simple hydrogen spectrum are due to emission of
   1. electron from the atom
   2. energy by proton transition
   3. energy by electron transition
   4. neutrons from theatom

12 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

1. 90.0 g of MgCI was placed in 50.0cm3 of water to give a saturated solution at 298 K. If the solubility of the salt is 8.0-mol dm-3 at the same temperature, what is the mass of the salt felt undissolve at the given temperature?
   1. 52.0 g B. 58.5 g

2

C. 85.5 g D. 88.5 g [Mg = 24,CI=35.5]

1. Soap leather is an example of a colloid in which a
   1. Liquid is dispersed in gas
   2. Solid isdispersed in liquid
   3. Gas is dispersed inliquid
   4. Liquid isdispersed in liquid.
2. The pH of a solution obtained by mixing 100cm3 of a 0.1 M HCI solution with 100cm3 of a 0.2 M solution of NaOHis
   1. 1.3 B. 7.0

C. 9.7 D. 12.7

1. In the conductance of aqueous potassium
   1. x X + n X tetraoxosulphate (1V) solution, the current carriers are

y 1 Y – 1

o

Z+1

* 1. Y X + 1 n  Y + 1 X

Z o Z

the

|  |  |  |  |
| --- | --- | --- | --- |
| A. | ions | B. | electrons |
| C. | hydrated ions | D. | hydrated electrons |

* 1. y X + 1 n Y

X

Z o Z+1

Z+1

1. What volume of 0.1 mol dm-3 solution of tetraoxosulphate (1V) acid would be needed to dissolve

Y X + 1 n

Y + 1

X 2.86 g of sodium trioxocarbonate (1V) decahydrate

1. Z

o Z-1

crystals?

A. 20 cm3 B. 40 cm

3

1. The property used in obtaining oxygen and nitrogen industrially from air is the
   1. boiling point
   2. density
   3. rate of diffusion
   4. solubility
2. Excess phosphorus was burnt in gas jar and the residual gas passed successively over concentrated KOH solution and concentrated H2SO4 before being collected in a flask. The gases collectedare
   1. carbon (1V) oxide nitrogen and the rare gases
   2. nitrogen (1V) oxide and the rare gases
   3. nitrogen and the rare gases
   4. carbon (1V) oxide nitrogen (1V) oxide and the rare gases.
3. Potassium tetraoxomanganate (v11) is often added to impure water to
   1. reduce organic impurities
   2. reduce inorganic impurities
   3. destroy bacteria and algae

C. 80 cm3 D. 100 cm3

[H=1, C=12, 0= 16,

S= 32, Na =23]

1. 1.2 of electricity are passed through electrolytic cells containing Na+, Cu2+ and AI3+ in series. How many moles of each metal would be formed at the cathode of each cell?
   1. 0.6 mole of Na, 1.2 moles of Cu and 1.2 moles of AI
   2. 1.2 moles of Na, 0.6 mole of Cu and 0.4 mole of AI
   3. 1.3 mmoles of Na, 2.4 moles of Cu and 2.4 moles of AI
   4. 1.2 moles of Na, 2.4 moles of Cu and 3.6 moles of AI
2. What mass of gold is deposited during the electrolysis of gold (111) tetraoxosulphate (V1)when a current of 15 A is passed for 193 seconds?
   1. 1.97 g B. 3.94 g

C. 5.91 g D. 19.70g [Au = 97, F=96 5000C mol-1]

* 1. remove permanent hardness. 24. Fe

(s)

+ Cu 2+ (aq)  Fe2+(aq) +Cu

(s)

1. The soil around a batterymanufacturing factory is likely to contain a high concentration of
   1. Ca2+ salts B. Pb2+ salts

C. Mg2+ salts D. AI3+ salts.

From the reaction above it can be inferred that

1. Fe is the oxidizing agent
2. Fe is reduced
3. Cu2+ loses electrons
4. Cu2+ is the oxidizing agent.
5. 2FeCI2(s) + CI2(g) 2FeCI3(s)

The reducing agent in the reaction above is

* 1. FeCI2 B. CI2

C. FeCI3 D. Fe

1. The reaction that is accompanied by a decrease in entropy when carried out constant temperature is
   1. N



2O4(g)

NO2

* 1. N2 + 3H2 2NH3
  2. CaCO3 CaO + CO2
  3. 2N2H4 3N2 + 4H2O

1. 32g of anhydrous copper 11 tetraoxosulphate (1V) dissolved in 1 dm3 of water generated 13.0kJ of heat. The heat of solution is
   1. 26.0 kJmol-1 B. 65.0kJ mol-1

C. 130.0kJ mol-1 D. 260.0 kJ mol-1

1. 3CuO(s) +2NH3(g) 3Cu(s) + 3H2O(1) + N2(g)
   1. 2NH3(s) + 3CI2(g) 6HCI(s) + N(1) + H2O



* 1. 4NH3(s) + 3CI2(g) 6H2O(I) + 2N2(g) + HCl

The reactions represented by the equations above

demonstrate the

* + 1. basic properties ofammonia
    2. acidicproperties of ammonia
    3. reducing properties of ammonia
    4. oxidizingproperties of ammonia.

1. A gas that trun a filter paper previously soaked in lead ethanoate solution black is
2. hydrogen chloride
3. hydrogen sulphide
4. sulphur (1V) oxide
5. sulphur (VI) oxide.
6. A solution containing chloride gives a white precipitate with silver trioxonirate (V) solution.
7. Mg2+(ag) + 2e-(aq) Eo (volts) = -2.370 The precipitate will be insoluble in dilute

Zn2+(ag) + 2e-(aq) Zn(s) Eo (volts) = -0.763 A. HNO but solublein ammonia solution

3

Cd2+

+ 2e-

Cd(s) Eo (volts) = -0.403

* 1. HNO and in ammonia solution

(ag) (aq)

2+ + 2e- Cu o C.

3

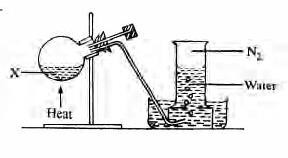
Cu (ag)

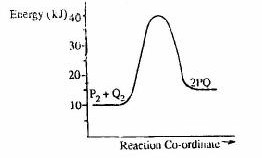
(aq)

(s) E

(volts) = +0.403

HCI but soluble in ammonia solution

D. HCI and in ammonia solution.

1. 

In the electrochemical series above the strongest reducing agent is

* 1. Cu(s) B. Cd(s)

C. Zn(s) D. Mg(s)

In the diagram above, the activation energy for the backward reaction is

A. +5 kJ B. +15 kJ

C. +25kJ D. +30kJ

In the experiment above, X could be a solution of

1. Sodium, trioxonirate (V) and ammonium chloride
2. Sodium trioxonirate (111) and ammonium chloride
3. lead (11) trioxonirate (V) and copper turnings
4. potassium, trioxonirate (V) and copper turnings.
5. The oxide that remains unchanged when heated in
6. 2X(g)

+ Y Z hydrogen is

(g) (g) A. CuO B. Fe2O3

In the equation above the rate of formation of Z is found to be independent of the concentration of Y and to quadruple when rate equation for the reaction is

* 1. R= k [X][Y]
  2. R= k [X]2[Y]
  3. R = k[X]2[Y]2
  4. R = k[X]2[Y]0
  5. PbO2 D. ZnO

1. Whichof thefollowingisobservedwhenasolutionof Iron(111) chlorideismixedwithasolutionof sodium hydroxide?

A. calcium B. aluminium

C. iron D. zinc

1. 2CI + 2H O 4HCI +O Ho = +115kJ mol-1 39. Acommoncharacteristicsharedbyironandaluminum



2(g) 2 (g) (g) 2(g)

In the above equilibrium reaction a decrease in temperature will.

* 1. favour the reverse reaction
  2. favour the forward reaction
  3. have no effect on the equilibrium state
  4. double the rate of the reverse reaction

is that both

1. areextractedbyreductionmethods
2. formonlybasicoxides
3. showoxidationstatesof +2and+3
4. formsolublehydroxides.
5. Alloys are often used in preference to pure metals bacause
   1. metals are toohard
   2. metals are ductile
   3. metallic properties are improved in alloys
   4. alloys are a mixture of metals.

OH

1. CH3 CH2CHCH(CH3)2

The IUPAC nomenclature for the above compound is

* 1. 4-methylpentan –3-ol
  2. 2-methylpentan –3-0l
  3. 3- methylpentan –3 –0l
  4. 1,1-dimenthylbutan-2-0l

1. Dehydration of CH3 CH2 CH2 CH2 OH gives
   1. CH2 - CH - CH - CH2 - CH3
   2. CH3CH- CH - CH2 - CH3



* 1. H - C - C - CH2 - CH3
  2. CH3C - C -CH3

1. nCH2 =CH2 O2 (initiator) ( CH2 CH2 CH2

The above equation represents the manufacture of

* 1. rubber B. polythene

C. polystyrene D. butane

1. One mole of a hydrocarbon contains 6 g of hydrogen. If the molecular weight is 54, the hydrocarbon is an.
   1. alkanone B. alkane

C. alkene D. alkyne

1. The products obtained when a pure hydrocarbon is burn in excess oxygen are
   1. carbon and hydrogen
   2. carbon and water
   3. carbon (11) oxide andhydrogen
   4. carbon (1V) oxide and water.
2. How many structural isomers can be drawn for the non- cyclic alkanol with molecular formula C4H10O
   1. 1 B. 2

C. 3 D. 4

1. On cracking medicinal paraffin, a gas is evolved which gives a pop sound with a lighted splinter and a oily liquid which decolourizes bromine solution is also obtained. The products of the cracking are
   1. carbon (1V) oxide andalkyne
   2. carbon (11) oxide and alkane
   3. hydrogen gas and alkane
   4. hydrogen gas and alkane
2. An example of aromatic compound is
   1. CH6H13OH
   2. C6H13CI
   3. C6H5OH
   4. C6H14
3. Terylene is synthesized from ethane –1, 2- diol and benzene –1, 4- dicarboxylic acid by
   1. addition reaction
   2. consensation reaction
   3. elimination reaction
   4. substitution reaction.
4. Which of the following is true concerning the properties of benezene and hexane?
   1. Both undergo subtitution reaction.
   2. Both undergo addtion reaction
   3. Both are solids
   4. Both can decolourize brominewater.

# Chemistry 1999

1. 200 cm3 each of 0.1 M solution of lead (11) trioxonirate

(V) and hydro chlorioc acid were mixed. Assuming that lead (11) chloride is completely insoluble, calculate the mass of lead (11) chloride that will be precipate.

* 1. 2.78 g B. 5.56 g

C. 8.34 g D. 11.12 g

[Pb = 207, CI = 35.5, N = 14, O = 16]

1. 56.00cm3 of a gas at s.t.p weighed 0.11 g, What is the vapour density of the gas?

A. 11.00 B. 22.00

C. 33.00 D. 44.00

[Molar volume of a gas at s.t.p = 22.4 dm3]

1. Which of the following gases will diffuse fastest when passed through a porous plug?

A. Propane B. Oxygen

C. Methane D. Ammonia [H = 1, C = 12, N= 14, O = 16]

1. Which of the following will have its mass increased when heated in air?

A. Helium B. Magnesium

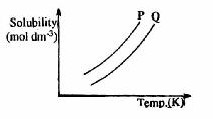
C. Copper pyrites D. Glass

1. What is the temperature of a given mass of a gas initially OoC and 9 atm, if the pressure is reduced to 3

atmosphere at constant volume?

A. 91 K B. 182 K

C. 273 K D. 819 K

1. 

In the diagram above, the mixture of the two solid P and Q can be separated by

1. distillation
2. fractional distillation
3. crystallization
4. fractional crystallization.
5. Mg(s) + 2HCl (aq)  MgCl2(aq) + H2(g). From the equation above, the mass of magnesium required to react with 250cm3 of .5 M HCl is

A. 0.3 g B. 1.5 g

C. 2.4 g D. 3.0 g

[ M = 27, Cl = 35.5]

1. A gaseous metallic chloride MClx consist od 20.22% of M by mass. The formula of the chloride is

A. MCl B. MCl2

1. The element that is likely to participate in covalent rather than ionic bonding is
   1. Z B. Y

C. X D. W

1. The least reactive elements is
   1. W B. X

C. Y D. Z

1. ls22s22p63s23p63d74s2. An element with theelectron configuration above is a
   1. non-metal
   2. metal
   3. transition element
   4. group two element
2. Given that electronegativity increases across a period and decreases down a group in the periodic table, in which of the following compounds will the molecules be held together by the strongest hydrogen bond?
   1. HF(g) B. NH(g)

C. CH4(g) D. HCl(g)

1. 0.25 mole of hydrogen chloride was dissolved in distilled water and the volume made up to 0.50dm3. If 15.00cm3 of the solution requires 12.50 cm3 of aqueous sodium trioxocarbonate (1V0 for neutralization, calculate the concentration of the alkalinesolution.
   1. 0.30 moldm-3 B. 0.40 moldm-3

C. MCl3

D. M2Cl6

C. 0.50 mol dm-3 D. 0.60 mol dm-3

[M = 27, Cl = 35.5]

1. In which of the following are water molecules in the most disorderlyarrangement?

A. Ice at –10oC B. Ice at OoC

C. Water at 100oC D. Steam at 100oC

1. In order to remove one electron from 3s-orbital of gaseous sodium atom, about 496 kJ mol-1 ofenergy is required. This energy is referred to as

A. electron affinity B. ionization energy

C. activation energy D. electronegativity

1. Nitrogen obtained from the liquefaction of air has a higher density than that obtained from nitrogen containing compounds because the former contains A Water vapour B. Oxygen

C. Carbon (1V) oxide D. Rare gases Use the table below to answer question 13 and 14.

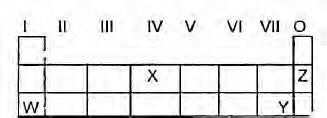
1. The method that can be used to convert hard water to soft water is

A. Chlorination

B Passage over activated charcoal

C. the use of an ion exchange resin

D. aeration

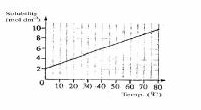
Use the table below to answer question 13 and 14

1. The correct order of increasing oxidation number of the transition metal ions for the compounds

K Cr O , V O and KmnO is

2 2 7 2 5 4

* 1. V2O5 < K2Cr2O7, < KMnO4
  2. K2Cr2O7, < KMnO4 < V2O5
  3. KMnO4 <K2Cr2O7, <V2O5
  4. KMnO4 < <V2O5 < K2Cr2O7,

1. The set of pollutants that is most likely to be produced when petrol is accidentally spilled on plastic materials and ignited is
   1. CO, CO2 and SO2
   2. CO, HCl and SO2
   3. CO, CO2 andHCl
   4. SO2, CO2 and HCl
2. What is observed when aqueous solution of each of tetraoxosulphate(V1) acid, potassium trioxides (V) and potassium iodine are mixed together?
   1. white precipitate isformed
   2. a green precipitate is formed
   3. The mixture remains colourless
   4. The mixture turns reddish-brown.

From the diagram above, the mass of crystals

deposited when 1 dm3 of a saturated solution of NaCl is cooled from 80oC to 60oC is

* 1. 117.00 g B. 58.50 g

C. 11.70 g D. 5.85 g

[Na = 23, Cl = 35.5]

1. The solution with the lowest pH value is
2. When a current 1 was passed through an electrolyte solution for 40 minutes, a mass Xg of a univalent metal was deposited at the cathode. What mass of the metal will be deposited when a current 21 is passed through the solution for 10 minutes?
   1. x/4 g B. x/2 g
3. 2X g D. 4X g
   1. 5 ml of m/n HCl 30. RS(aq) + HF (aq) RF(s) + HS(aq)  H =-65.7 kJ mol1.
   2. 10 ml of m/n HCl
   3. 15 ml of m/n HCl
   4. 20 ml of m/n HCl
4. The solubility product of Cu(lO3)2 is 1.08 x 10-7. Assuming that neither ions react appreciably with water to form H+ and OH-, what is the solubility of this salt?
   1. 2.7 x 10-8 mol dm-3
   2. 9.0 x 10-8 mol dm-3
   3. 3.0 x 10-8 mol dm-3
   4. 9.0 x 10-8 mol dm-3
5. The entropy and enthalpy of a system are a measure of
   1. degree of disorderliness and heat content respectively
   2. heat content and degree of disorderliness respectively
   3. heat content of a system only
   4. degree of disorderliness only.
6. 2SO2(g) + O (g) 2NO2(g). In thechemical

2

From the equation above, it can be deduced that.

* 1. the heat content of the reactants is lower than that of the reactants ucts
  2. the heat content of the reactants is higher than that of the products
  3. the reaction is slow
  4. a large amount of heat is absorbed.

1. Which of the following statements is true of the electrochemical series?
   1. Electropositivity of metals increase down the series
   2. Electropositivity of non-metals decrease down the series
   3. Electronegativity of non-metals increase down the series
   4. Electropositivity of metal decreases down the series
2. The gas that will form a white precipitate with acidified silver trioxonirate (V)is
   1. NH3 B. SO2

reaction above, the substance that will increase the rate of production of sulphur (V1) oxide is

C. CO2

1. HCl
   1. manganese (1V)oxide
   2. finely dividedion
   3. vanadium (V0oxide
   4. nickel
2. N2O4(g)  2NO2g). Increases in total pressure of the equilibrium reaction above will
   1. Produce more of NO2(g) in the mixture
   2. Convert all of N2O4(g) to NO2(g)
3. Have no effect on the concentrations of

N2O4(g) and N2O4(g)

1. Produce more odf N2O4g) in th mixture
2. What quantity of electricity will liberate 0.125 mole of oxygen molecules during the electrolysis of dilute sodium chloride solution?
   1. 24 125 coulombs
   2. 48 250 coulombs
   3. 72 375 coulombs
   4. 96 500 coulombs [F = 96 500C mol-1]
3. X +Y  Z. The rate equation for the chemical reaction above is – [X]=[X]2[Y]



t The overall order of the reaction is

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

1. Chlorine bromine and iodine resemble one another in that they
   1. dissolve in alkalis
   2. react violentlywith hydrogen without heating
   3. are liquids
   4. displace one another from solutions of their salts.
2. The salt that reacts with dilute hydrochloric which decolourizes acidified purple smelling gas which decolourizes acidified purple potassium tetraoxomanganate(V11) solution is
   1. Na2SO4 B. Na2SO3

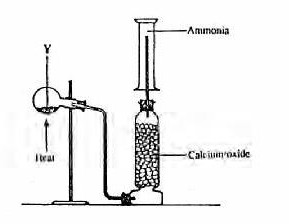
C. Na2S D. Na2CO3

1. A pair of compounds that can be used to generate a gas which physiological effect on human beings is
   1. sodium trioxonirate(V) and calcium chloride
   2. sodium dioxonitrate

(111) and ammonium chloride

* 1. sodium trioxonirate(V) an ammonium chloride
  2. sodium dioxonitrate (11l) and potassium chloride.

1. Hydrogen is used in oxy-hydrogen flames for melting metals because it
   1. evolves a lot of heat when burnt
   2. combines explosively withoxygen
   3. is a very light gas
   4. is a rocket fuel.



In the diagram above Y is mixture of

* 1. Calcium hydroxide and ammonium chloride
  2. Calcium hydroxide and sodium chloride(V)
  3. Sodium chlorideand ammonium trioxonirate(V)
  4. Sodium dioxonitrate(lll) and ammonium chloride.

1. Which of the following is a solvent for perfumes? A C5H12 B. C4H6

C. CH3COOH D. C2H5OH

1. When excess ethanol is heated to 145oC in the presence of concentrated H2SO4 the product is
   1. ethyne
   2. diethyl sulphate
   3. diethyl ether
   4. acetone
2. How many grammes of bromine will saturate 5.2 g of but-l-ene-3-yne?
   1. 64.0 g B. 48.0 g

C. 32.0 g D. 16.0 g

[C = 12, H= 1, Br = 80]

1. Polyvinyl chloride is used to produced
   1. bread B. pencils

C. ink D. pipes

1. An organic compound that does not undergo a reaction with both hydrogen cyanide and hydroxylamine can be an

|  |  |  |  |
| --- | --- | --- | --- |
| A. | alkenes | B. | alkanal |
| C. | alkanone | D. | Alkanoic acid |

1. What properties of duralumin make it more useful than its constituent metals?
   1. it is heavy with a high melting point
   2. it is malleable andhas high density
   3. it is strong and light
   4. it is hard and ductile
2. When two end alkyl groups of ethyl ethanoate are interchanged, the compound formed is known as
   1. methylethanoate
   2. ethyl propionate
   3. methylpronoste
   4. propel ethanoate.
3. The pair of metals in the reactivity series that are usually extracted by the electrolysis of their ores is
   1. Magnesium and zinc
   2. Magnesium andcalcium
   3. Copper and zinc
   4. Lead and calcium
4. A metal that can be extracted from cassiterite is

|  |  |  |  |
| --- | --- | --- | --- |
| A. | calcium | B. | magnesium |
| C. | tin | D. | copper |

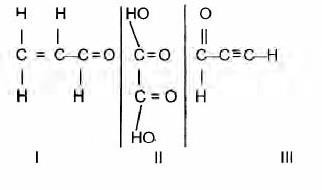
1. Which of the following metals is passive to concentrated trioxonirate(V) acid?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | iron | B. | tin |
| C. | copper | D. | zinc |

1. The hydrocarbon the burns in air with a sooty flameis
   1. C6H6 B. C3H6

C. C4H10 D. C6H6

1. 2-methylprop-1-ene is an isomerof
   1. but-2-ene
   2. pent-l-ene
   3. 2-methylbut-ene
   4. 2-methylbut-l-ene



Which of the compounds above would react to take up two molecules of bromine during bromination?

* 1. 1 only
  2. 111 only
  3. 1 and 11only
  4. 11 and 111only

# Chemistry 2000

1. A mixture of iodine and sulphur crystals can be separated by treatment with
2. water of filter offsulphur
3. carbon (1V) sulphide to filter off iodine
4. ethanoic acid to filter offsulphur
5. Elements in the same group have the number of electron shells
6. The non-metallic properties of the elements tent to decrease across each period
7. methanol to filter offiodine 10. The electron configuration of X2+ ion is

22

* 1. ls2 2s2 2p6 3s2 3p6 4s2 3d2

1. Sieving is a technique used to separate mixtures containing solid particles of
   1. small sizes B. large sizes

C. different sizes D. the same size

1. Which of the compounds is composed of Al, Si, O and H?
   1. Epson salt B. Limestone

C. Clay D. Urea

1. 50cm3 of carbon (11) oxide was exploded with 150cm3 of air containing 20% oxygen by volume, which of the reactants was in excess?
   1. Carbon (11) oxide
   2. Carbon (1V) oxide
   3. Oxygen
   4. Nitrogen
2. How many moles of HCl will be required to react with potassium heptaoxodichromate (V1) to produce 3 moles of chlorine?
   1. 14 B. 12

C. 11 D. 10

1. The ratio of the initial to the final pressure of a given mass of gas is 1:1:5. Calculate the final volume of the gas if the initial volume was 300cm3 at the same temperature.
   1. 120 cm3 B. 200cm3

C. 450 cm3 D. 750cm3

1. The partial pressure of oxygen in a sample of air is 452mm Hg and the total pressure is 780mmHg. What is the mole fraction ofoxygen?
   1. ls2 2s2 2p6 3s2 3p6 4s2 3d1
   2. ls2 2s2 2p6 3s2 3p6
   3. ls2 2s2 2p6 3s2 3p6 4p2
2. Which of the following types of bonding does not involves the formation of new substance?
   1. Metallic B. Covalent

C. Co-ordinate D. Electrovalent

1. The knowledge of half-life can be used to
   1. create an element
   2. detect an element
   3. split an element
   4. irradiate anelement
2. The shape of CO ,H O and CH respectivelyare

2 2 4

* 1. bent linear and tetrahedral
  2. bent tetrahedral and linear
  3. linear bent and tetrahedral
  4. tetrahedral, linear and bent.

1. The distance between the nuclei of chlorine atoms in a chlorine molecule is 0.914 nm. The atomic radius of chlorine atom is
   1. 0.097 nm
   2. 0.914 nm
   3. 2.388 nm
   4. 2.388 nm
2. The noble gas, argon, is used for
   1. electric are welding
   2. welding brass
   3. underwater welding
   4. steal welding

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A. | 0.203 | B. | 0.579 |  |  |
| C. | 2.030 | D. | 5.790 | 16. | A side effect of soft water is that |

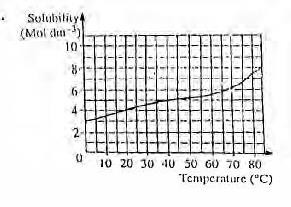
1. The fundamental difference between the three states of matter is the
   1. shape of theirparticles
   2. number of particles in each state
   3. shape of the container they occupy
   4. degree of movementof their particles
2. Which of the following the following statements is correct about the periodic table?
   1. Element in thesame period have the same number of valence electrons
   2. The valence electrons of the elements in the same period increase progressively across the period
3. it gives offensive taste
4. excess calcium sprecipitate
5. it attacks lead contained in pipes
6. it encourages the growth of bacteria

17 Water molecules can be ligands especially when they are bonded to.

1. alkaline earthmetals
2. alkali metals
3. transition metals
4. group V11elements
5. The air pollutant unknown in nature is
   1. NO B. CO

C. HCHO D. DDT

1. 10dm3 of distilled water used to wash 2.0 g of a precipitate of AgCl. If the solubility product of AgCl is 2.0 x10-10 moldm-6, what quantity of silver was lost in the process?
   1. 2.029 x10-3 mol dm-3
   2. 1.414 x 10-3 mol dm-3
   3. 2.029 x 10-5 mol dm-3
   4. 1.414 x 10-5 mol dm-3
2. Hydration of ions in solution is associated with
   1. absorption ofheat
   2. reduction of heat
   3. conduction of heat
   4. liberation of heat



The diagram above is the solubility curve of solute,

X. Find the amount of X deposited when 500cm3 of solution of X is cooled from 60oC to 20oC

1. 0.745 mole B. 0.950 mole
   1. 2.375 moles D. 4.750 moles.

+ H O

electricity required to discharge zinc

A. 0.965 x 104 C B. 4.820 x 104 C

C. 9.650 x 104 C D. 48.200 x 104 C

[F = 96 500 C mol-1]

1. Given that M is the mass of substance deposited in an electrolysis and Q the quantity of electricity consumed, then Faraday’s law can be written as
   1. M = Z Q
   2. M = Q Z
   3. M = Z 2Q

E. M =QZ

28 0.46g of ethanol when burned raised the temperature of 50 g water by 14.3 K. Calculate the heat of combustion of ethanol.

A. +3 000 kJ mol-1

B. +300kJ mol-1

1. -300kJ mol-1
2. -3 000 kJ mol-1

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

Specific heat capacity of water = 4.2 jg-1K-1

1. Powdered marble reacts with hydrochloric acid solution than the granular form because the powdered form has
   1. more molecules
   2. more atoms
   3. large surface are
   4. relatively largemass
2. HCl(aq)

2 (1)

H3O+ (aq) + Cl- (aq)

In the reaction above, Cl-

1. Conjugate acid
2. Acid
3. Conjugate base
4. Base.

(aq)

is the 30. The graph that describes a zero order reaction is

* 1. Rate



1. In which order are the following salts sensitive to light?
   1. Agl ›AgCl ›AgBr
   2. AgCl ›Agl ›AgBr
   3. AgBr ›AgCl ›AgI
   4. AgCl ›AgBr ›AgI
2. Thee pOH of a solution of 0.25 mol dm-3 of hydrochloric acid is

|  |  |  |  |
| --- | --- | --- | --- |
| A. | 12.40 | B. | 13.40 |
| C. | 14.40 | D. | 14.60 |

1. MnO + 8H+ ’! Mn2+(aq)+4H O

4(aq) (aq) 2 (1)

Y in the equation above represents

* 1. 2e-
  2. 3e-
  3. 5e-
  4. 7e-
  5. Rate
  6. Rate



Conc.

* 1. Rate

Conc.

Conc.



1. ½Zn2+ (aq)+e-  ½Zn(s) Conc.



In the reaction above, calculate the quantity of

1. A. increase the quantity of N2
2. increase the yield of NO
3. decrease the yield of NO
4. decrease the quantity of O2
5. For a reaction in equilibrium, the species involved in the equilibrium constant expressionare
   1. gaseous and solid species
   2. liquid and solid species
   3. solid and dissolved species
   4. gaseous and dissolved species
6. A phenomenon where an element exists in different forms in the same physical state is known as

|  |  |  |  |
| --- | --- | --- | --- |
| A. | isomerism | B. | amorphism |
| C. | allotropy | D. | isotropy |

1. The substance often used for vulcanization of rubber is
   1. chlorine
   2. hydrogen peroxide
   3. sulphur
   4. tetraoxosulphate (V1) acid
2. A gas that is not associated with global warming is

|  |  |  |  |
| --- | --- | --- | --- |
| A. | CO2 | B. | SO3 |
| C. | CH4 | D. | H2 |

1. The refreshing and characteristics taste of soda water and other soft drinks is as a result of the presence in them of
   1. carbon(1V)oxide
   2. carbon(11) oxide
   3. soda
   4. glucose
2. A form of carbon used for absorbing poisonous gases and purification of noble gases is
   1. wood charcoal’
   2. animal charcoal
   3. carbon fibres
   4. carbon black.
3. Synthesic gas is a mixture of
   1. CH and H O

C. Iron E. copper.

1. The least easily oxidized of the metals below is
   1. Ca B. Na

C. Zn D. Al

1. The repeating unit in natural rubber is
   1. alkynes
   2. isoprene
   3. n-propane
   4. neoprene
2. Unsaturated organic compounds are identified by decolourization of.
   1. silver bromide and potassium tetraoxomanganate(v11) solution
   2. bromine water and acidified potassium tetraoxomanganate(V11) solution
   3. silver bromine solution and bromine water
   4. bromine water and alkaline potassium tetraoxomanganate (V11) solution.
3. The conditions necessary for thee extraction of a water molecule form two molecules of ethanol are.
   1. less acid and a lower temperature
   2. excess acid and a lower temperature
   3. excess acid and a higher temperature
   4. less acid and a higher temperature.
4. The chlorinated alkane often used industrially to remove grease is
   1. tetrachloromethane
   2. chloromethane
   3. trichloromethane
   4. dichloromethane.
5. The reaction of carbide with water gives
   1. ethyne B. ethane

C. ethane D. Ethanal O

1. CH3-CH2-C--OCH2CH3

The compound above is an

4 2

* 1. CH4 and H2
  2. CO2 and H2
  3. CO and H2

1. Potassium vapour burns with a
   1. blue-flame
   2. brick-red flame
   3. violet flame
   4. golden-yellow flame
2. A common characteristics of copper andsilver in their usage as coinage metals is that they
   1. have high metalliclustre
   2. are not easily oxidized
   3. are easily oxidized
   4. are not easily reduced
3. Haematite is an ore of
   1. Zinc B. Lead

A. ether B. ester

C. alkanal D. alkanol

1. Alkanone are generally obtained by the oxidation of
   1. primary alkanols
   2. secondary alkanols
   3. tertiary alkanols
   4. alkanoic acid
2. Sucrose is made up to
   1. glucose and glucose
   2. glucose and fructose
   3. fructose and fructose
   4. galactose and glucose.

# Chemistry 2001

1. 25cm3 of a gas X contains Z molecules at 15oC

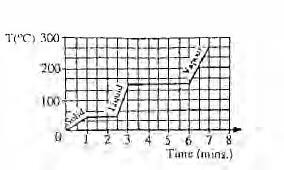
and 75 mm Hg. How many molecules will 25cm3 of another gas Y contain at the same temperature and pressure?

A, 2Y, B. 2Z. C. Y, D. Z.

1. What mass of water is produced when 8.0g of hydrogen reacts with excess oxygen?

A. 72.0g, B. 36.0g, C. 16.0g, D. 8.0g

## Use the graph below to answer questions 3 and 4



1. How long does it take all the solid to melt?
   1. 6.0mins, B. 3.0mins,

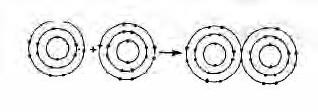
C. 2.5mins, D. 1.0min

1. If the gas is cooled, at what temperature will it start to condense?
   1. 175oC, B. 250oC,

C. 125oC, D. 150oC

1. Four elements W,X,Yand Z have atomic numbers 2,6,16 and 20 respectively. Which of these elements is ameal?
   1. X, B. Z,

C. W, D. Y



1. The diagram above represents the formation of
   1. a metallic bond, B. a covalent bond,

C. an electrovalent bond.

D a coordinate covalent bond

1. An element X with relative atomic mass 16.2 contains two isotopes 16 X with relative abundance of 90% and mX

with relative abundance of 10%. The value of m is

* 1. 14, B. 12,

C. 18, D. 16

1. Cancerous growth are cured by exposure to
   1. x-rays, B. betta-rays,

C. alpha-rays, D. gamma-rays

1. Which of the following statement is correct about the average kinetic energy of the molecules of agas?
   1. it increases with increase in pressure,
   2. it increases with increase in temperature,
   3. It increaseswith increase in volume,
   4. It increases at constant pressure.
2. Millikan’s contribution to the development of atomic theory is the determination of
   1. positive rays, B. cathode rays,

C. charge to mass ratio , D. charge on electron.

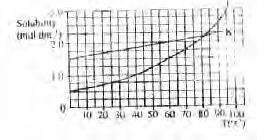
1. A particle that contains 9 protons, 10 neutrons and 10 electrons is
   1. positive ion B.neutral atom of a metal
2. neutral atom of a non-metal
3. negative ion.
4. An oxide XO2 has a vapour density of 32. What is the atomic massof X?
   1. 20
   2. 32
   3. 14
   4. 12
5. The chemical used for coagulation in water purification is
   1. copper tetraoxosulphate (VI)
   2. sodium tetraoxosulphate (VI)
   3. aluminium tetraoxosulphate(VI)
   4. calcium tetraoxosulphate(VI)
6. Environment pollution is worsened by the release from automobile exhausts of
   1. heavy metals B. water vapour

C. smoke D. steam

1. Phosphorus is stored under water to prevent it from

|  |  |  |  |
| --- | --- | --- | --- |
|  | A. smelling | B. | dehydrating |
|  | C. catching fire | D. | becoming inert |
| 16. | Pure solvents are obtained by  A. evaporation B. | |  |
|  | extraction |
|  | C. condensation D. | | distillation |

8 8

1. As the concentration of an electrolyte reduces, the conductivity

|  |  |  |  |
| --- | --- | --- | --- |
| A. decreases  C. reduces to zero | | B.  D. | increases  is unaffected. |
| C(s) + 2S(g) | CS2 | H =89kJmol  -1 | |

The chemical equation above implies that

At what temperature are the solubilities of Lan the same?

|  |  |  |  |
| --- | --- | --- | --- |
| 17. |  | d K | 1. 89kJ of energy is absorbed 2. each of carbon and sulphur has 89 kJ of energy |
|  |  |  | C. both carbon and sulphur contribute 89kJ of |
| A. 750C  C. 900C | B.  D. | 1000C  820C | energy  D. 89 kJ of energy is released |

1. If 1 dm3 of a saturated solution of L at 600C is cooled to 250C, what amount in mole will separate?
   1. 0.25 B. 0.50

C. 0.75 D. 1.00

1. Deliquescent substance are used for
   1. drying B. melting

C. wetting D. cooling

1. What is the decrease in volume of air when pyrogallol is shaken with 30.00cm3 of air?
   1. 0.63cm3 B. 0.06cm3

C. 15.00cm3 D. 6.30cm3

1. The pollution from petroleum spillage in rivers and takes can best be dispersed by
   1. passing of ships through the area
2. Which of the following best explains the increase in the rate of a chemical reaction as the temperature rises?
   1. A lower proportion of the molecules has the necessary minimum energy to react
   2. The bonds in the reacting molecules are more readily broken
   3. The collision frequency of the molecules increases
   4. The molecular collisions become more violent.
3. In which of the following reaction have the oxidation number of nitrogen increased?
   1. 2NO(g) + Br2 (l) 2NOBr(1)
   2. FeSO4 (aq) + NO(g) Fe(NO)SO4(s)
   3. 2NO(g) + CI2(g) 2NOCI(l)
   4. 2NO(g) + O2(g) 2NO2(g)
   5. pouring detergents
   6. pouring organic solvents
4. P + Q

(g)

(s) (g)



3R +S

* 1. evaporation

(g)

1. 3Cu(s) + 8HNO (aq) 3Cu(NO ) (aq) +

which of the following will increase the yield of R?

* 1. Removing some S
  2. Using a larger closed vessel

3 3 2

4H20(i)+2NO(g)

In the equation above, copper is

* + 1. a base
    2. an oxidizing agent
    3. a reducing agent
    4. an electron acceptor.

1. NH3(g) + HCI(g) ’! NH4CI(s)

The entropy change in the system above is

* 1. zero B. indeterminate

C. positive D. negative

1. What current in amperes will deposit 2.7gof aluminum in 2hours?
   1. 32 B. 16

C. 8 D. 4

{AI= 27, F 96 500C mol-1

1. Adding a positive catalyst
2. Increasing the temperature

|  |  |  |  |
| --- | --- | --- | --- |
| 31 | Ethanoic acid is |  | |
|  | A. tribasic | B. | unionizeable |
|  | C. dibasic | D. | monobasic |

1. A metal M displaces zinc from zinc chloride solution. This shows that
   1. M is more electronegative than zinc
   2. Zinc is above hydrogen in the series
   3. Electron flow from zinc to M
   4. M is more electropositive that zinc
2. In which of the following reactions does reduction take place?
   1. 2O2-——————O2 + 4e-
3. 2SO (g)+O (g) 2SO (g)

CB.

Fe2+ - e———————Fe3+

2 2 3

2H+-——————H

The equilibrium constant for the reaction above is increased by

* 1. increasing the pressure of the system
  2. increasing the temperature of the system
  3. increasing the surface area of the vessel
  4. the addition of a catalyst to the system

2

D. Cr – 2e———————Cr2+

1. When H is negative, a reaction is said to be
   1. Endothermic B. Exothermic

C. Rerverisble D. Ionic.

ethyne?

1. sp B. sp3

C. sp2d D. sp2

1. Protein in acid solution undergo
   1. Polymorphism
   2. Hydrolysis
   3. Fermentation
   4. Substitution
2. Fermentation is the
   1. breaking down of carbohydrate to glucose
   2. breaking down of sugar to carbohydrate
   3. conversion of sugar to alcohol in the presence of yeast
   4. conversion of alcohol to sugar in the presence of yeast.
3. Catalytic hydrogenation of benzene produces

function as

* 1. a reducing agent B. a catalyst

C. a dehydrating agent D. an oxidizing agent

1. During the vulcanization of rubber sulphur is added to
   1. lengthen the chain of rubber
   2. break down rubber polymer
   3. act as a catalyst
   4. bind rubber molecules together
2. When sodium reacts with water, the resulting solution is
   1. Alkaline B. Acidic

C. Neutral D. Weakly acidic.

1. The general formula for the alkanals is
   1. RCOOR1 B. R CO

1

C. RCHO D. ROH

1. Which of the following metals burns with a brick red flame?
   1. Ca B. Na

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A. | Cyclohexene | B. | Oil | C. | Mg | D. | Pb |
| C. | Margarine | D. | Cyclohexane. |  |  |  |  |

1. A characteristics reaction of the compounds with the general formula Cn2n is
   1. Substitution B. Esterification

C. Decarboxylation D. Polymerization

1. When chlorine is passed into water and the resulting solution exposed to sunlight, the products formed are
   1. Chlorine gas and hydrogen
   2. Hydrochloric acid and oxygen
   3. Chlorine gas and oxochlorate (1) acid
   4. Oxygen and oxochlorate (1) acid
2. The pair of organiccompounds that are isomers is
   1. But – 1-ene and but – 2-ene
   2. Ethanol and propanone
   3. Trichlorometheane and tetrachloromethane
   4. Benzene and methylbenzene
3. The gas that can best be collected by downward displacement of air is
   1. Chlorine B. Sulphur (IV) oxide

C. Carbon (IV) oxide D. Ammonia.

1. A trihydric alkanol is
   1. Phenol B. Glycol

C. Glycerol D. Ethanol

1. The main impurity in iron ore during the extractionof iron is
   1. Calcium trioxosilicate
   2. Silicon (IV) oxide
   3. Sulphur (II) oxide
   4. Carbon (IV) oxide.
2. A burning candle produces water and
   1. carbon (IV) oxide
   2. carbon (IV) oxide
3. C H O

+ H SO ———12C

+ 11H O

+ H SO

* 1. oxygen

12 22 (s)

2 4(aq)

(s)

2 (l)

2 4(aq)

* 1. hydrogen.

In the reaction above, tetraoxosulphate (VI) acid

# Chemistry 2002

1. The formula CH O for ethanoic acid is regarded as its

2

1. molecular formula
2. structural formula
3. general formula
4. Which of the following gases contains the least number of atoms at s.t.p?
   1. 7 moles ofargon
   2. 4 moles ofchlorine
   3. 3 moles of ozone
5. edmispsoirlivcealifnoremacuhlaother in the column
6. move at different speeds in thecolumn
7. react with the solvent
8. react with each other.
9. A compound contain 31.91% potassium, 28.93% chlorine and the rest oxygen. What is the chemical formula of thecompound?
   1. KClO B. KClO2

D. 1 mole of butane C. KClO

3

* 1. KClO4

1. The chromatographic separation of ink is based on the ability of the components to
2. A little quantity of trichloromethane (b.pt.60oC) was added to a large quantity of ethanol ((b.pt.78oC). The most probable boiling point of the resultant mixture is from.
   1. 60oC - 78oC B. 69 oC – 70oC

C. 70oC - 74oC D. 82oC - 84oC

1. The gas that gives brown colouration in brown ring test is
   1. CO B. NO

C. CO2 D. NO2

1. Which of the following gives a precipitate when treated with NaOH solution?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | NH4Cl | B. | Na2CO3 |
| C. | AlCl3 | E. | CH3COONa |

1. The reaction of an alkene with hydrogen in the presence of a catalyst is
   1. a nucleophilic reaction
   2. an addition reaction
   3. a substitution reaction
   4. an oxidative reaction
2. A rock sample was added to cold dilute HNO3. The gas evolved was passed into a solution of acidified K2Cr2O7 and the solution turned green.

The rock sample contains.

* 1. SO 2- B. SO 2-

1. The boiling of fat and aqueous caustic soda is referred to as.
   1. acidification B. hydrolysis

C. saponification D. esterification.

1. Ordinary glass is manufactured from silica, CaCO3 and

|  |  |  |  |
| --- | --- | --- | --- |
| A. | NaHCO3 | B. | K2SO4 |
| C. | K2CO3 | D. | Na2CO3 |

1. OH

CH3- C-CH2-CH3

CH3

The major product of the dehydration of the compound

above is

A H

CH3- C-CH2-CH3 CH

4 3

C. NO3- D. Cl-

1. The intermediate product formed when ethanol is progressively oxidized to ethanoic acid with potassium heptaoxodichromate (V1) is

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A. | methanal | B. | propanal |  |  |
| C. | ethanal | D. | butanal | C. | CH3 - CH-CH-CH23 |
| 11. | CH3 CH3 CH2--C-H  OH |  |  |  | CH3  CH3 CH2CH2CH3 CH2 |
|  |  |  | D. |

3

* 1. CH3- C= CH2-CH3 CH3

The compound above is a

* + 1. primary alkanols
    2. secondary alkanols

1. The number of isomers formed by C6H14 is
   1. 2 B. 3
      1. tertiary alkanols
      2. glycol
   2. 4
   3. 5

12, A red precipitate of copper (1) carbide is formed when ammonium solution copper (1) chloride is introduced into.

* + 1. CH3 - C =C -CH3
    2. CH3 -CH2 -C a= CH3
    3. CH2 =CH - CH2CH3

D CH3CH2 CH2 CH3

1. The most important use of hydrogen is in the
2. manufacture of methyl alcohol
3. manufacture of ethyl alcohol
4. hydrogenation of oils
5. manufacture ofammonia
6. Which of the following polymers is suitable for packaging and electrical insulation?

A. Polyethene B. Polystyrene

C. Polyamide D. Polycarbonate.

1. Which of these pairs are synthetic and natural macromolecules respectively?
   1. Nylon and polyethylene, creatine and haemoglobin
   2. Nylon and creative, polyethylene and haemoglobin
   3. Polyethylene and creatine, nylon and haemoglobin
   4. Haemoglobin and nylon, creatine and polyethylene
2. An example of an element that can catenate is
   1. nitrogen B. chlorine

C. carbon D. bromine

1. Ethanol can easily be produced by
   1. distillation of starch solution
   2. catalyst oxidation of methane
   3. destructive distillation of wood
   4. fermentation of starch.
2. Hydrogen is readily released when dilute hydrochloric acid reacts with
   1. Ag B. Au

C. Cu D. Na

1. Which of the following statement is true of a proton?
   1. The mass of a proton is 1.0008 g
   2. The mass of a proton is
   3. The mass of proton is 1840 times the mass of an electron
   4. The total mass of the proton in a particular nucleus is always half the nucleus is always half the nuclearmass.
2. 0.44 atmosphere
3. 0.55 atmosphere
4. When H2S is passed into a solution of iron (iii) chloride, the solution turns
   1. brown B. pale green

C. colourless D. pale red.

1. Which of the following equations shows that a reaction is inequilibrium?
   1. G = H– T S
   2. G <O
   3. G =O
   4. G >O
2. 14 C X + B 33. Cu S + O 2Cu + SO

6 2 (s) 2(g) (s) 2(g)

X in the equation above represents. What is the change in the oxidation number ofcopper



1. 14 N B. 13 C in the reaction above?

7 6

C. 12 C D. 12 B A. 0 to+2

6 5

1. A gas X diffuses twice as fast as gas Y under the same condition. If the relative molecular mass of X is 28, calculate the relative molecular mass of Y
   1. 14 B. 56

C. 112 D. 120

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

|  |  |  |  |
| --- | --- | --- | --- |
| A. | LiCl | B. | MgCl2 |
| C. | CaCl2 | D. | AlCl3 |

1. A fixed mass of gas has a volume of 92 cm3 at 3oC. What will be its volume at 18oC if the pressure remains constant?
   1. 552.0 cm3 B. 97.0 cm3

C. 87.3 cm3 D 15.3 cm3

34.

* 1. 0 to+1

C. +1 to 0 D.



+2 to+1

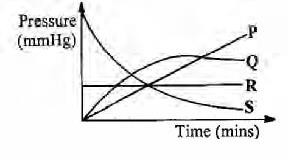
1. The processes which return carbon(1V) oxide to the atmosphere include
   1. Photosynthesis, respiration and transpiration
   2. Respiration, decay and combustion
   3. Photosynthesis, decay and respiration
   4. Ozone depletion, combustion and decay.
2. The postulate of Dalton’s atomic theory which still hold is that
   1. all element are made of small indivisible particles
   2. particles of different elements combine in a simple whole numberration
   3. atoms can neither be created nor destroy ed
   4. the particles of the same element are exactly alike
3. If 0.75 mole of cyclopropane and 0.66 mole of oxygen are mixed in a vessel with a total pressure of 0.7 atmosphere, what is the partial pressure of oxygen in the mixture?
   1. 0.22 atmosphere
   2. 0.33 atmosphere
   3. R

In the diagram above, the curve that represent production of oxygen gas from the decompositi

KClO3 in the presence of MnO2 catalyst is

A. P

B. Q



s the on of

* 1. S

1. In the reaction E + F G + H, the backward reaction is favoured if the concentration of
   1. E is reduced
   2. G is reduced
   3. F is increases
   4. E is increased



1. The products of the electrolysis of dilute sodium hydroxide using platinum electrodes are
   1. sodium metal and oxygen gas
   2. hydrogen and oxygen gases
   3. water and hydrogen gas
   4. water and sodium metal
2. PCl5(g) PCl3(g) + Cl2(g)

In the reaction above, a decrease in pressure will

* 1. increase the yield of PCl3
  2. increase the yields of PCl5
  3. accelerate the reaction
  4. decelerate the reaction



1. The Arrhenius equation expresses the relationship between the speed of a reaction and its
   1. catalyst
   2. activation energy
   3. molecular collisions
   4. heat of reaction
2. What amount of mercury would be liberated if the same quantity of electricity that liberated 0.65 g of zinc is supplied?
   1. 8.04 g B. 4.02 g

C. 2.01 g D. 1.00 g

[Zn = 65, Hg = 201]

1. When dissolved in water, NaOH flakes show
   1. a rapid reaction
   2. a slow reaction
   3. an exothermic change
   4. an endothermic change
2. Steam changes the colour of anhydrous cobalt (11) chloride from
   1. blue to white B. white to green

C. blue to pink D. white to red

1. Which of the following solutions containing only hydroxyl ions will liberate hydrogen gas when reacted with magnesium metal?
   1. 1.0 x 10-12 mol dm-3 B. 1.0 x 10-6 mol dm-3

C. 1.0 x 10-4 mol dm-3 D. 1.0 x 10-2 mol dm-3

1. The solubility of a salt of molar mass101 g at 20oC is 0.34mol dm-3. If 3.40 g of the salt is dissolved completely in 250 cm3 of water in beaker, the resulting solution is
   1. saturated B. unsaturated

C. supersaturated D. a suspension.

1. 25 cm3 of a 0.2mol dm-3 solution of Na CO requires 20cm3

2 3

of a solution of HCl for neutralization. The concentration of the HCl solution is

* 1. 0.2 mol dm-3 B. 0.4 mol dm-3

C. 0.5 mol dm-3 D. 0.6 mol dm-3

1. When a salt loses its water of crystallization to the atmosphere exposure, the process is said to be
   1. effervescence B. efflorescence

C. fluorescence D. deliquescence

1. Three drops of 1.0 mol dm-3 solution of NaOH are added to 20 cm-3 of a solution of pH 8.4. The pH of the resulting solution will be
   1. less than 8.4 B. greater than 8.4

C. unaltered D. close to that of pure water.

1. Tetraoxosulphate (Vl) acid burns the sk9in by

|  |  |  |  |
| --- | --- | --- | --- |
| A. | dehydration | B. | hydrolysis |
| C. | hydration | D. | heating |

1. The substance least considered as a source of environmental pollution is
   1. uranium
   2. lead compounds
   3. organphosphourous compounds
   4. silicate minerals.
2. The property which makes alcohol soluble in water is the
   1. ionic character
   2. boiling point
   3. covalent nature
   4. hydrogen bonding
3. The furring of kettles is caused by the presence in water of
   1. calcium hydrogentrioxocarbonate (1V)
   2. calcium trioxocarbonate(1V)
   3. calcium tetraoxosulphate(V1)
   4. calcium hydroxide
      1. What volume of oxygen is produced from the

# Chemistry 2003

decomposition of 2 moles of KClO3 at s.t.p

A. 22.4 dm3 B. 33.6 dm3

C. 44. 8 dm3 D. 67.2 dm3

[Molar volume of a gas s.t.p = 22.4 dm3]

1. Burning kerosene
2. Freezing ice-cream
3. evaporation D. absorption
   * 1. Which of the following is a physical change?
4. Exposing white phosphorus to air
5. 3Cu + pHNO 3Cu(NO ) + 4H O +xNO

3 3 2 2

1. Dissolving calcium inwater
   * 1. What is the percentage by mass of oxygen in Al2(SO4)3.2H2O?
        1. 14.29% B. 25.39%

C. 50.79% D. 59.25% [A = 27, S=32, H=1, O=16]

1. The filter in a cigarette reduces the nicotine content by
   1. burning B. adsorption

In the equation above, the values of p and x respectively

|  |  |  |  |
| --- | --- | --- | --- |
| are |  | | |
| A. | 1 and 3 | B. | 2 and 3 |
| C. | 6 and 2 | D. | 8 and 2 |

1. Neutral atoms of neon with atomic number 10 have the same number of electrons as
   1. O2+ B. Ca2+

C. K+. D. Mg+

1. The noble gases owe their inactivity to
   1. octet configuration
   2. cyclic shape
   3. hexagonal shape
   4. obtuse configuration
2. According to the kinetic theory, an increase in temperature causes the kinetic energy of particles to
   1. decrease B. increase

C. remain constant D. be zero

1. 1. H = Is1
2. N =Is22s22p3
3. O =Is22s22p4
4. Zn = Is22s22p63s23p64s23d10

From the above, which of the following pairs is likely to be paramagnetic?

* 1. I and II B. I and III

C. I and IV D. I andIV

1. A gas exerts pressure on its container because
   1. some of its molecules are moving faster than others
   2. of the collision of the molecules with each other
   3. of the mass of the molecules of gas
   4. the molecules of a gas collide with walls of the container.
2. 0.97 g B. 9.70 g

C. 19.42 g D. 97.10 g

[K CrO = 194.2 g mol dm-1]

2 4

1. Farmlands affected by crude-oil spillage can be decontaminated by
   1. adding acidic solution
   2. using aerobic bacteria
   3. pouring water on the affected area
   4. burning off the oil from the area.
2. When 10g of sodium hydroxide is dissolved in 100cm3 of water, the solution formed is approximately
   1. 0.01 mol dm-3 B. 0.10mol dm-1

C. 0.25 mol dm-1 D. 0.50 mol dm-1

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

1. A change in the temperature of a saturated solution disturbs the equilibrium between the
   1. dissolved solute and the solvent
   2. Solvent and the undissolved
   3. Dissolved solute and the undissolved solute
   4. Dissolved solute and the solution.
2. If an equilibrium reaction has H > 0, the reaction will proceed favourable in the forwarddirection.
   1. high temperature
   2. any temperature
   3. low temperature
   4. minimum temperature
3. When cathode rays are deflected onto the electrode of an electrometer, the instrumentbecomes
   1. negatively charged B. positively charged

C. neutral D. bipolar

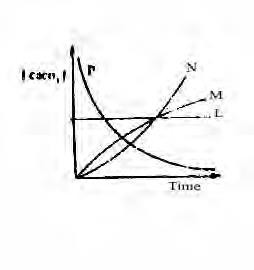
1. The weakest attractive forces that can be observed between two molecules is
   1. ionic B. covalent
2. coordinate covalent
3. Van der Waals.
4. A consequence of global warming is
   1. air pollution
   2. water pollution
   3. increased humidity
   4. flooding
5. Which of the following ions is acidic?
   1. K+ B. NO -

3

C. S2- D. H O+

3



n the oxide

2HCl(aq)+CaCO3 CaCl2(s) + CO2(g)+H2O(1)

From the reaction above, which of the curves i

diagram represents the production of carbon(IV) as dilute HCl is added?

A. L B. M

C. N D. P

The commonest feature of reaction at the anode i

1. The structural component that makes detergent dissolve more quickly in water than soap is
   1. -SO3-Na+ B. -COO- Na+

C. –SO -Na+ D. -COO- K+

4

1. A liquid that will dissolve fat is
   1. hydrochloric acid
   2. calcium hydroxide
   3. kerosene
   4. water
2. What a mass K CrO is required to prepare 250 cm3of
3. s that
   1. electrons are consumed
   2. oxidation is involved
   3. ions are reduced
   4. electrode dissolves
4. Which of the following will change when a catalyst is added to a chemicalreaction?
   1. The activation energy
   2. The potential energy of the reactants
   3. The heat of reaction
   4. The potential energy of the products.
5. If Y is an oxidizing agent that reacts with a reducing agent, Z, which of the following is correct?
   1. Y increases in oxidation number
   2. Y becomes reduced
   3. Z loses protons
   4. Z gains protons.
6. 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 2SO + O

3(g) 2(g) 2(g)

B. 2SO 2CO + O

2(g) (g) 2(g)

C. 2H +’!O 2H O

2(g) 2(g) 2 (g)

D. 2NO N + O

(g) 2(g) 2(g)

1. In the electrolysis of a concentrated solution of sodium chloride using inert electrodes, which of the following ions are discharge at the cathode and anode respectively? 
   1. Na+ and Cl-  B. Na+ and OH-

C. H+ and OH- D. H+ and Cl-

(g) 2 (g) 2(g) 2(g)

28. CO + H O CO + H

From the reaction above, calculate the standard heat

change if the standard enthalpies of formation of CO2(g)

H2O

C. Ca D. Sn

1. Which of the following statements is true of sulphur (1V) oxide?
   1. It forms tetraoxosulphate(V1) acid with water
   2. It is an odourless gas
   3. It is an acidanhydride
   4. It forms white precipitate with acidified barium chloride.
2. The salt that will form a precipitate soluble in excess ammonia solution is

|  |  |  |  |
| --- | --- | --- | --- |
| A. | Ca(NO3)2 | B. | Cu(NO3)2 |
| C. | Mg(NO3)2 | D. | Al(NO3)2 |

1. The metal liberates hydrogen from cold water in bubbles only is
   1. Na B. K

C. Ca D. Al

1. Chlorine gas turns a damp starch-iodine paper

|  |  |  |  |
| --- | --- | --- | --- |
| A. | pink | B. | colourless |
| C. | red | D. | dark blue |

1. The modern process of manufacturing steel form iron

, (g) and CO respectively.

(g)

in kJ mol-1 are –394, -242 and –110 is by

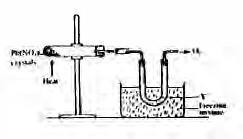
* 1. treatment with acids

1. -262 kJmol-1 B. –42 kJmol-1

C. +42 kJmol-1 D. +262 kJmol-1



1. When sugar is dissolved in a tea, the reaction is always accompanied by
   1. positive entropy change
   2. negative entropy change
   3. no entropy change
   4. a minimum entropychange.
2. Which of the following is an electrolyte?
   1. Alcohol
   2. Sodium acetate solution
   3. Solid potassium hydroxide
   4. Mercury
3. Chlorine gas is prepared in the laboratory by
   1. adding concentrated hydrochloric acid to solid manganese (1V) oxide
   2. adding concentrated tetraoxosulphate (V1) acid to solid sodiumchloride
   3. dropping concentrated hydrochloric acid onto potassium tetraoxomanganate (V11) crystals
   4. oxidizing concentrated hydrochloric using potassium heptadichromate (V1) crystals.
4. oxidation
5. blast reduction
6. treatment withalkalis



2 2

* 1. CH3 CH2Br
  2. C2 H2Br2

In the diagram above, Y is

A. NO B. NO2

C. N2O5 D. N2O4

Ethene reacts with hydrogen bromide to give

A. CH Br

* 1. CHBr3

1. Metal of the transition series have special properties which are different from those of groups 1 and 11

elements because they have partially filled

* 1. s orbitals B. p orbitals

1. Carbohydrates are compounds containing carbon hydrogen and oxygen in the ration
   1. 3: 1: 1 B. 2 : 1: 1

C. 1: 2: 1 D. 1 : 1: 1

42 How many isomers does pentane have?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| C. | d orbitals D. | f orbitals | A. | 6 | B. | 5 |
|  |  |  | C. | 4 | D. | 3 |

1. Hydrogen can be displace form a hot alkaline solution by.
   1. Fe B. Cu
2. The leachate of a certain plant ash is used in local soap making because if contains
   1. sodium hydroxide
   2. potassium hydroxide
   3. soluble carbonates and hydrogen carbonates.
3. The formula for ethyl butanoate is
   1. C3H7COOC2H5 B. C2H5COOC3H7

C. C4H9COOC2H5 D. C2H5COOC4H9

1. The type of reaction that is peculiar to benzene is
   1. addition B. hydrolysis

C. polymerization D. substitution

1. Ethanol reacts with excess acidified K2Cr2O7
   1. ethanedioc acid B. ethanol

C. ethyl ethanoate D. ethanoic acid

1. A compound contains 40.0% caron 6.7% hydrogen and 53.3% oxygen. If the molar mass of the compound is 180, find the molecular formula.
   1. CH2O B. C3H6O3

C. C6H12O6 D. C6H6O3 [ H = 1, C= 12, O = 16]

1. The process by which atoms are rearrange into different molecular structures in the petroleum refining process is referred to as
   1. catalytic cracking B. hydrocracking

C. plolymerization D. reforming

1. Which of the following is found in cotton
   1. Starch B. Cellulose

C. Fat D. Oil

1. The principal constituent of natural gas is
   1. methane B. ethane

C. propane D. butane.

# Chemistry 2004

1. In the electrolysis of brine, the anode is
   1. Zinc
   2. Platinum
   3. Carbon
2. Which of the following shows little or not net reaction when the volume of the system is decreased?
   1. 2O 3O
   2. Copper.
   3. H

3(g)

+ l

2(g)

2Hl

2(g)

2(g)

(g)

1. N 2NO



2 4(g)

O

2(g)

1. 2NO2(g N2O4(g)
2. PCl5(g PCl3(g) + Cl2(g

In the endothermic reaction above, more product

formation will be favoured by 2CO + O 2CO



* 1. a decrease in pressure

2 2

1. Given that

-1 and

* 1. a decrease in volume
  2. an increase in pressure
  3. a constant volume

1. The oxidation state of Chlorine in HClO4 is

|  |  |  |  |
| --- | --- | --- | --- |
| A. | -1 | B. | 5 |
| C. | +7 | D. | +1 |
| Which of the following hydrogen halides highest entropy value? | | | |

1. has the

|  |  |  |  |
| --- | --- | --- | --- |
| A. | HBr | B. | HF |
| C. | Hl | D. | HCl |

1. The mass of silver deposited when a current of 10A is passed through a solution of silver salt for 4830s
   1. 54.0 g B. 27.0 g

C. 13.5 g D. 108.0 g

[Ag = 108, F = 96500 C mol-1]

1. Which of the following acts as both a reducing and an oxidizing agent?
   1. H2S B. CO2

C.

H [CO] is – 110.4 kJmol

H[CO ]is –393o kJmol-1, the energy change for the reaction above is

2

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

ZnO + CO Zn + CO2

1. In the reaction above, Zinc has been
   1. displaced B. oxidized

C. reduced D. decomposed.

1. What volume of gas is evolved at s.t.p. if 2g of Calcium trioxocarbonate(iv) is added to a solution of hydrochloric acid?
   1. 224 cm3 B. 112cm3

C. 2240 cm3 D. 448 cm3

[Ca = 40, C=12, O=16, Cl =35.5, H= 1,

Molar volume of a gas at s.t.p =22.4 dm3]

1. A chemical reaction is always associated with
   1. a change in the nature of the reactants
   2. the formation of new substances
   3. a change in the volume of the reactants
   4. an increase in the composition of one of

H2 D. SO2 the substances,

1. When a solid substance disappears completely as a gas on heating, the substance is said to have undergone.
2. Alkanol + Alkanoic acid  Ester + Water

The reverse reaction of the equation above is known as.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| A. sublimation | B. | crystallization | A. | saponification | B. | hydrolysis |
| C. distillation | D. | evaporation | C. | fermentation | D. | hydration |

1. If a solution contains 4.9g of tetraoxosulphate (V1) acid, calculate the amount of copper (11) oxide that will react with it
   1. 40.0 g B. 80.0 g

C. 0.8 g D. 4.0 g

[Cu = 64, O =16, S =32, H =1]

1. Vulcanization involves the removal of
   1. the single bond B. a double bond

C. a polymer D. a monomer

1. The alkyl group can be represented by the general formula.
2. CH3 COOH(g)  CH4(g) + CO2(g)

The reaction above is

* 1. acidification B. esterification

C. decarboxylation D.carboxylation.

1. A characteristic of the alkane family is
   1. substitution reaction
   2. neutralization reaction
   3. addition reaction
   4. elimination reaction.
2. Pollution of underground water by metal ions is very likely in a soil that has high
   1. CnH2n

C. C H

B. CnH2n-2

D. C H

|  |  |  |  |
| --- | --- | --- | --- |
| A. | alkalinity | B. | nitrate content |
| C. | acidity | D. | chloride content |

n 2n+1 n 2n+2

1. C H OH Conc. H SO

4

Y 26. The solubility in mol dm-3 of 20g of CuSO dissolved in

2 5 (aq)

180oC

2

4

100g of water at 180oC is

In the reaction above, Y represent

A. C2H5 COOH B. CH4

C. CH3OCH3 D. C2H4

1. In the production of soap, concentrated sodium chloride is added to
   1. saponify the soap
   2. emulsify the soap
   3. decrease the solubility of the soap
   4. increase the solubility of the soap
2. Oxyacetylene flame is used for 1ron-welding because it
   1. evolves a tot heat when burnt
   2. dissociates to produce carbon (1V) oxide and oxygen
   3. makes the iron metal solidify very quickly combines with oxygen give a pop sound.
3. Which of these reagents can confirm the presence of a triple bond?
   1. Bromine gas
   2. Bromine water
   3. Acidified KMnO4 Copper (1) chloride
4. H CH3

H3C - C - C -CH2 - CH2-CH3 CH3 H

The IUPAC nomenclature of the compound above is

* 1. 3,4 -dimethylhexane
  2. 2,3 –dimethylhexane
  3. 2 – ethylhexane
  4. 2 – ethylpentane

1. An isomer of C5 H12 is
   1. 2 –ethyl butane
   2. butane
   3. 2- methyl butane 2- methyl propane

A. 0.25 B. 0.13

C. 2.00 D. 1.25

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

1. Which of these compounds is a normal salt?

|  |  |  |  |
| --- | --- | --- | --- |
| A. | Na2CO3 | B. | NaHCO3 |
| C. | NaHSO4 | D. | NaHS |

1. A carcinogenic substance is
   1. nitrogen (ll) oxide B. carbon (ll) oxide

C. asbestos dust D. sawdust.

1. What volume of 0.5mol dm-3 H SO will exactlyneutralize

2 4

20 cm-3 of 0.1moldm-3NaOHsolution?

1. 5.0 cm-3
2. 6.8 cm-3
3. 8.3 cm-3
4. 2.0 cm-3
5. Calcium tetraoxosulphate (V1) dissolves in water only sparingly to form a

|  |  |  |  |
| --- | --- | --- | --- |
| A. | colloid | B. | solution |
| C. | suspension | D. | precipitate |

31 Hardness of water is caused by the presence of the ions of

1. calcium and magnesium
2. calcium andsodium
3. magnesium and silver
4. sodium and potassium
5. It is difficult to achieve an orderly arrangement of the molecules of a gas because they.
   1. can collide with one another in the container
   2. are too small in size
   3. have little force of attraction between them
   4. have no definite shape
6. The shape of the s-orbital is
   1. elliptical B. spiral

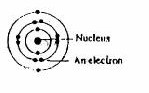
C. circular D. spherical

1. Which of the following mixtures of gases is likely to burn in flame?
   1. Helium and neon
   2. Neon and nitrogen
   3. Neon and hydrogen
   4. Nitrogen andhelium
2. The property of chlorine which cause hydrogen chloride to be more ionic than the chlorine molecule is its.
3. According to Charles’ law, the volume of a gas becomes zero at
   1. -100oC B. -273oC

C. -373oC D. 0oC

1. When steam is passed over red-hot carbon, the substances produced are
   1. hydrogen and carbon(11) oxide
   2. hydrogen and carbon(1V) oxide
   3. hydrogen and trioxocarbonate (1V) acid
   4. hydrogen, oxygen andcarbon (1V) oxide
2. Aluminum hydroxide is used in the dyeing industry as a

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| A. electronegativity | B. | electropositivity | A. | dye | B. | dispersant |
| C. electron affinity | D. | electrovalency. | C. | salt | D. | mordant |

1. 

In the experiment above, **X** is mixture of nitrogen, carbon 1V) oxide and

* 1. oxygen B. inert gas

C. water D. impurities

1. A given volumeof methane diffuses in 20s. How long will it take same volume of sulphur (V1) oxide to diffuse under the same conditions?
   1. 40s B. 60s

C. 20s D. 5s [C=12, H=1, S=32,O=16]

1. Chlorine consisting of two isotopes of mass numbers 35 and 37 in the ratio 3:1 has an atomic mass of 35.5. Calculate the relative abundance of the isotope of mass number 37.
   1. 60 B. 20

C. 75 D. 25

1. An electron can be added to a halogen atom to form a halide ion with
   1. 8 valence electrons
   2. 7 valence electron
   3. 2 valence electrons
   4. 3 valence electrons
2. 226 Ra  x Rn + alpha - particle
3. Transition metals possess variable oxidation states because they have.
   1. electrons in the s orbitals
   2. electrons in the d orbitals
   3. partially filled p orbitals
   4. a variable number of electrons in the p orbitals.
4. The allotrope of carbon used in the decolourization of sugar is
   1. soot B. lampblack

C. graphite D. charcoal

1. Carbon is tetravalent because
   1. the 2s and 2p atomic orbital hybridized
   2. all the atomic orbitals of carbon hybridize
   3. the electrons in all the orbital of carbon are equivalent
   4. the electrons in both the 2s and 2p orbital are equivalent.
2. Sodium metal is always kept under oil because it
   1. is reduced by atmospheric nitrogen
   2. readily reacts with water
   3. reacts with oxygen and carbon(1V)oxide
   4. reacts vigorous on exposure to air.
3. Alloys are best prepared by
   1. cooling a molten mixture of the metals
   2. reducing a mixture of their metallic oxides
   3. arc-welding
   4. electroplating
4. Sulphur (1V) oxide bleaches by

|  |  |  |  |
| --- | --- | --- | --- |
| A. | hydration | B. | reduction |
| C. | absorption | D. | oxidation. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 88 | 86 |  | | |
| A. | 226 | 50. Which of the following gases can | | be collected by the |
| B. | 220 | method of downward delivery? | | |
| C. | 227 | A. Oxygen | B. | Hydrogen |
| D. | 222 | C. Chlorine | D. | Ammonia |