

CHM 131

1: A substance that enters into a chemical reaction is called a

a: mole.

b: product.

c: coefficient.

d: reactant.

Answer1: d

2: The word equation "magnesium reacts with chlorine to produce magnesium chloride" would be represented by which of the following formula equations?

a: $\text{Mg} \rightarrow \text{Cl}_2 + \text{MgCl}_2$

b: $\text{MgCl}_2 \rightarrow \text{Mg} + \text{Cl}_2$

c: $\text{MgCl}_2 + \text{Mg} \rightarrow \text{Cl}_2$

d: $\text{Mg} + \text{Cl}_2 \rightarrow \text{MgCl}_2$

Answer2: d

3: Which of the following is true of a balanced equation?

a: The number of atoms per molecule remains the same.

b: The total number of molecules remains the same.

c: The number of atoms of each element remains the same

d: The kinds of atoms remain the same.

Answer3: c

4: When the equation, $\text{Fe} + \text{Cl}_2 \rightarrow \text{FeCl}_2$, is balanced, what is the coefficient for Cl_2 ?

a: 1

b: 2

c: 3

d: 4

Answer4: c

5: Which of the following symbols means a substance is in water solution?

a: (aq)

b: (w)

c: (s)

d: (l)

Answer5: a

6: According to the law of conservation of mass, the total mass of the reacting substances is

a: Always more than the total mass of the products.

b: Always equal to the total mass of the products.

c: Always less than the total mass of the products.

d: Sometimes more and sometimes less than the total mass of the products.

Answer6: b

7: After the first steps in writing an equation, the equation is balanced by

a: Adjusting subscripts to the formula(s).

b: Adjusting coefficients to the smallest whole-number ratio.

c: Changing the products formed.

d: Making the number of reactants equal to the number of products.

Answer7: b

8: The reaction $2\text{KClO}_3(\text{s}) \rightarrow 2\text{KCl}(\text{s}) + 3\text{O}_2$ is a(an)

a: Synthesis reaction.

b: Combustion reaction.

c: Decomposition reaction.

d: Ionic reaction.

Answer8:c

9:Balance this chemical reaction: $\text{Fe(s)} + \text{O}_2\text{(g)} \rightarrow \text{Fe}_2\text{O}_3\text{(s)}$

a: $5\text{Fe(s)} + 2\text{O}_2\text{(g)} \rightarrow 3\text{Fe}_2\text{O}_3\text{(s)}$

b: $3\text{Fe(s)} + 4\text{O}_2\text{(g)} \rightarrow 2\text{Fe}_2\text{O}_3\text{(s)}$

c: $2\text{Fe(s)} + 4\text{O}_2\text{(g)} \rightarrow 3\text{Fe}_2\text{O}_3\text{(s)}$

d: $4\text{Fe(s)} + 3\text{O}_2\text{(g)} \rightarrow 2\text{Fe}_2\text{O}_3\text{(s)}$

Answer9:d

10:What are the coefficients that will balance the skeleton equation below?

$\text{Al(s)} + \text{HCl(aq)} \rightarrow \text{AlCl}_3\text{(aq)} + \text{H}_2\text{(g)}$

a:2, 6, 2, 3

b:6, 3, 2, 2

c:3, 6, 2, 2

d:2, 3, 2, 6

Answer10:a

11:How many atoms are there in 6g of carbon?

a: 6.0×10^{23} atoms

b: 4.5×10^{23} atoms

c: 3.0×10^{23} atoms

d: 3.0×10^{23} atoms

Answer11:c

12:Calculate the number of hydrogen atoms in 0.350mole of glucose.

a: 2.53×10^{24} atoms

b: 2.53×10^{23} atoms

c: 2.53×10^{23} atoms

d: 2.63×10^{24} atoms

Answer12:a

13:What are the percentages by mass of all the components elements in sodium nitrate?

a:Na 37.1%, N 6.5%, O 65.5%

b:Na 27.1%, N 16.5%, O 66.5%

c:Na 7.1%, N 6.5%, O 86.5%

d:Na 27.1%, N 16.5%, O 56.5%

Answer13:d

14:A sample of a compound of boron (B) and hydrogen (H) contains 6.444g of B and 1.803 of H. The molar mass of the compound is 30g. What is its molecular formula?

(B=10.8, H= 1)

a: B_3H_6

b: B_2H_6

c: $2\text{B}_2\text{H}_6$

d: B_6H_2

Answer14:b

15:Reagents used up first in a reaction are called?

a:Excess reagents

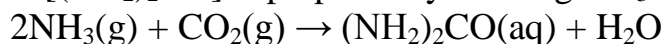
b:Catalyst reagents

c:Limiting reagents

d:Reactants

Answer15:c

16:Urea $[(\text{NH}_2)_2\text{CO}]$ is prepared by reacting NH_3 with CO_2 according to the equation below:



In one process, 637.2g of NH_3 are treated with 1142 g of CO_2 . Which of the reagents is the limiting reagent?

a: H_2O

b: NH_3

c: $(\text{NH}_2)_2\text{CO}$

d: CO_2

Answer16:b

17:_____ and _____ are factors that affects percentage yield

a: Number of moles and temperature

b: Temperature and volume

c: Temperature and pressure

d: Pressure and volume

Answer17:c

18: $5\text{Ca} + \text{V}_2\text{O}_5 \rightarrow 2\text{CaO} + 2\text{V}$

In the equation above, $1.54 \times 10^3 \text{g}$ of V_2O_5 reacts with $1.96 \times 10^3 \text{g}$ of Ca. Calculate the theoretical yield of V. (Ca=40.08, V =50.94)

a: 881.9 g

b: 761.9 g

c: 661.9 g

d: 861.9 g

Answer18:d

19: One of the following is the fundamental difference between the three states of matter

a: Compressibility

b: Degree of movement of their particle

c: Volume of the particles in their container

d: Shape of their particle in a container



Answer19:b

20: $PV=K$ is a mathematical representation of Boyle's law. The proportionality constant K equals_____

a: nRT

b: nRV

c: nR/P

d: nR/T

Answer20:a

21: Another form of mathematical expression of Charles's law is _____

a: $V=KT$

b: $P=1/V$

c: $P=KT$

d: $V=Kn$

Answer21:c

22: If $R=PV/nT$, the unit of R is none of the following except_____

a: $\text{dm}^3 \text{atmK}^{-1} \text{mol}^{-1}$

b: $\text{dm}^3 \text{atmKmol}$

c: $\text{dm}^1 \text{atmK}^{-1} \text{mol}$

d: $\text{dm}^3 \text{atm}^{-1} \text{K}^{-1} \text{mol}$

Answer22:a

23: What is the volume occupied by 49.8g of HCl at STP?

a: 40.48dm^3

b: 30.48dm^{-3}

c:40.48dm⁻³

d:30.48dm³

Answer23:d

24:A sample of oxygen gas initially at 0.97atm is cooled from 21°C to -68 °C constant volume. What will be its final pressure?

a:0.88atm

b:0.68mm Hg

c:0.68atm

d:0.88mm Hg

Answer24:c

25:The pressure in a natural-gas tank is maintained at 2.20atm. On a day when the temperature is -15 °C, the volume of gas in the tank is 3.25x10³m³. What is the volume of the same quantity of gas on a day when the temperature is 31 °C?

a:4.82x10³m³

b:3.82x10³m³

c:5.82x10³m³

d:2.82x10³ m³

Answer25:b

26:If the density of a gas d equals to PM/RT, then the density of the gas depends on all of the following except____. Where M, P, R and T are molar mass, pressure, molar gas constant and temperature of the gas respectively

a:P

b:M

c:R

d:T

Answer26:c

27:What is the density of uranium hexafluoride (UF₆ at 779mm Hg and 62°C? (U = 238, F=19)

a:14.12g/L

b:13.12kg/L

c:13.12g/L

d:14.12kg/L

Answer27:c

28:The density of a gaseous compound is 3.38g/L at 40°C and 1.97atm. What is its molar mass?

a:44.10g/mol

b:34.10g/mol

c:44.10kg/mol

d:34.10kg/mol

Answer28:a

29:A gaseous compound is 78.14% boron and 21.86% hydrogen. At 27 °C, 74.3mL of the gas exerted a pressure of 1.12atm. If the mass of the gas was 0.0934g, what is its molecular formula?

a:B₃H₆

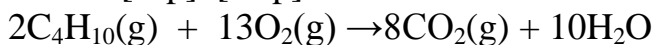
b:B₃H₃

c:BH₃

d:B₂H₆

Answer29:d

30: Calculate the volume of oxygen required for the complete combustion of 14.9dm^3 of butane at constant temperature and pressure.



a: 96.00dm^3

b: 96.85dm^3

c: 97.85dm^3

d: 96.00dm^3

Answer30:b

31: What is the total pressure exerted by a mixture of 2.0g of hydrogen and 8.0g of nitrogen gas at 0°C in a 10.0dm^3 vessel?

a: 3.88atm

b: 2.88atm

c: 8.22atm

d: 88.2atm

Answer31:b

32: A sample of natural gas contains 8.24moles of CH_4 , 0.421mole of C_2H_6 and 0.11moles of C_3H_8 . If the total pressure of the gas is 1,041.2mm Hg. What are the partial pressures of the gases?

a: $\text{CH}_4 = 1.286\text{atm}$, $\text{C}_2\text{H}_6 = 0.066\text{atm}$, $\text{C}_3\text{H}_8 = 0.018\text{atm}$

b: $\text{CH}_4 = 1.286\text{torr}$, $\text{C}_2\text{H}_6 = 0.066\text{torr}$, $\text{C}_3\text{H}_8 = 0.018\text{torr}$

c: $\text{CH}_4 = 1.286\text{mm Hg}$, $\text{C}_2\text{H}_6 = 0.066\text{mm Hg}$, $\text{C}_3\text{H}_8 = 0.018\text{mm Hg}$

d: $\text{CH}_4 = 1.286\text{atm}$, $\text{C}_2\text{H}_6 = 0.018\text{atm}$, $\text{C}_3\text{H}_8 = 0.066\text{atm}$

Answer32:a

33: The root-mean square speed of a gas molecule is given by $U_{rms} = \sqrt{\frac{3RT}{M}}$. If its unit is m/s and R is $8.314\text{JK}^{-1}\text{mol}^{-1}$, the unit of its molecular mass M is?

a: g/mol

b: kJ/mol

c: Kg/mol

d: mol/kg

Answer33:c

34: Calculate the U_{rms} of nitrogen molecule at 25°C .

a: $6.15 \times 10^2\text{m/s}$

b: $5.15 \times 10^2\text{m/s}$

c: $5.15 \times 10^2\text{m/s}$

d: $5.15 \times 10^2\text{m}^2/\text{s}^2$

Answer34:c

35: All of the following real gases behave ideally except

a: Gas A at 4atm

b: Gas B at 80°C

c: Gas A at 100°C

d: Gas A at 200atm

Answer35:d

36: One of the following is not a type of system

a: Closed Open

b: Surrounding

c: Isolated

d: Open

Answer36:b

37: Properties that are determined by the state of a system is called ____

- a: Isolated function
- b: State function
- c: Internal Energy
- d: Heat

Answer37:b

38: All of the following are state functions except ____

- a: Heat
- b: Enthalpy
- c: Pressure
- d: Volume

Answer38:a

39: ____ system is a type of system which does not allow the transfer of either mass or energy

- a: Closed
- b: Surrounding
- c: Isolated
- d: Open

Answer39:c

40: The difference between the enthalpy of the products and the enthalpy of the reactants is called ____

- a: Change in enthalpy of a reaction
- b: Heat of reaction
- c: Internal energy
- d: Endothermic reaction

Answer40:a

41: When $\Delta H < 0$, the reaction is said to be ____

- a: Endothermic
- b: Thermochemical
- c: Exothermic
- d: Catalyzed

Answer41:c

42: The relationship between heat capacity (c) and specific heat capacity (s) of a substance is?

- a: $m = cs$
- b: $s = mc$
- c: $c = ms$
- d: $c = m/s$

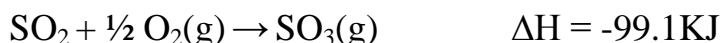
Answer42:c

43: Elements are in a standard state at ____

- a: 273K
- b: 1 mm Hg
- c: 1 dm^3
- d: 1 atm

Answer43:d

44: Calculate the heat evolved when 74.6g of SO_2 converted to SO_3 by the thermochemical equation below:



- a: -115.5KJ
- b: 115.5KJ
- c: -135.5KJ

d:-125.5KJ

Answer44:a

45:First law of thermodynamic was based on what law?

a:Law of multiple proportions

b:Law of mass action

c:Law of conservation of energy

d:Periodic law

Answer45:c

46:_____ equation is a more useful form of the first law of thermodynamic

a: $\Delta E = q + PV$

b: $\Delta E = q + w$

c: $\Delta E = w + PV$

d: $\Delta H = H_f - H_i$

Answer46:c

47:If $\Delta V < 0$ and $-P\Delta V$ is a positive quantity, this means that

a:Work done by the system

b:Work done under the system

c:Work done inside the system

d:Work done on the system

Answer47:d

48:Calculate the work done on the system when 6.0L of a gas is compressed to a 1.0L by constant external pressure of 2.0atm.

a: $1.0 \times 10^3 \text{ J}$

b: $2.0 \times 10^3 \text{ J}$

c: $1.0 \times 10^4 \text{ J}$

d: $1.0 \times 10^4 \text{ J}$

Answer48:a

49:A gas expands from 264mL to 971mL at constant temperature. Calculate the work done by the gas if it expands against a vacuum.

a: $-2.86 \times 10^2 \text{ J}$

b: $1.0 \times 10^2 \text{ J}$

c:0

d: $-1.0 \times 10^3 \text{ J}$

Answer49:c

50:A gas is allowed to expand at constant temperature from a volume of 10.0L to 20.0L against an external pressure of 1.0atm. If the gas also absorbs 250J of heat from the surroundings, what is the value of ΔE ?

a: $-1.0 \times 10^3 \text{ J}$

b:-750J

c:250J

d:750J

Answer50:b

51:What is the rate of change of NO concentration, if the rate of formation of O_2 is 0.054M/s in the reaction: $2\text{NO}(\text{g}) \rightarrow \text{O}_2(\text{g}) + \text{N}_2$

a:-0.108M/s

b:-0.801M/s

c:0.108M/s

d:-0.108m/s

Answer51:a

52: In the reaction: $3\text{H}_2(\text{g}) + \text{N}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$, what is the molecularity of the reaction?

- a:3
- b:2
- c:5
- d:4

Answer52:d

53: The followings are factors affecting the rate of a chemical reaction except ____

- a: Nature of reactants
- b: Pressure
- c: Contact time
- d: Surface area

Answer53:c

54: The reaction: $\text{A} \rightarrow \text{P}$, is said to be zero-order when?

- a: The rate of reaction depends on the concentration of A
- b: Concentration of A is directly proportion to rate of reaction
- c: The rate of reaction is independent on the concentration of A
- d: Concentration of A depends on P

Answer54:c

55: The reaction: $2\text{A} \rightarrow \text{P}$ is a first order reaction in A with a rate constant of $2.8 \times 10^{-2} \text{s}^{-1}$ at 80°C . How long will it take for A to decrease from 0.88M to 0.14M?

- a: 66s
- b: 67s
- c: 68s
- d: 64s

Answer55:a

56: A certain first order reaction $\text{A} \rightarrow \text{B}$ is 40% complete in 75s. What is the half-life of the reaction?

- a: 102
- b: 103s
- c: 102min
- d: 102s

Answer56:d

57: What is the rate equation for the reaction: $2\text{N}_2\text{O}_5(\text{g}) \rightarrow 4\text{NO}_2(\text{g}) + \text{O}_2(\text{g})$

- a: $-\frac{d[\text{N}_{2\text{O}_5}]}{2dt} = \frac{d[\text{NO}_2]}{4dt} = \frac{d[\text{O}_2]}{dt}$
- b: $-\frac{d[\text{NO}_2]}{4dt} = \frac{d[\text{N}_{2\text{O}_5}]}{2dt} = \frac{d[\text{O}_2]}{dt}$
- c: $-\frac{d[\text{N}_{2\text{O}_5}]}{2dt} = \frac{d[\text{NO}_2]}{4dt} = \frac{d[\text{O}_2]}{dt}$
- d: $-\frac{d[\text{N}_{2\text{O}_5}]}{4dt} = \frac{d[\text{NO}_2]}{2dt} = \frac{d[\text{O}_2]}{dt}$

Answer57:c

58: This equation: $k_d t = -\ln[\text{A}]$ expresses ____

- a: Rate of reaction dependence on the concentration of the reactant
- b: How concentration of reactant varies with time
- c: Rate of reaction is independent on the initial concentration of reactant
- d: Rate of change of concentration dependence on time

Answer58:a

59: The unit of rate constant K for first-order reaction is ____

- a: s^{-1}
- b: $\text{mol dm}^{-3} \text{s}^{-1}$

c:mols⁻¹

d:moldm³s⁻¹

Answer59:a

60:A reaction is reversible because

a:reactants are reactive

b:products are reactive

c:products are stable

d:reactants are stable

Answer60:b

61:A large value of K_c means that at equilibrium

a:less reactants and more products

b:more reactants and less product

c:same amount

d:none

Answer61:a

62:Extent of HI in the reaction: $\text{H}_2 + \text{I}_2 \rightarrow 2\text{HI}$ can be increased by

a:increasing pressure

b:increasing product

c:increasing temp

d:adding a catalyst

Answer62:c

63:In an exothermic reversible reaction increase in temperature shifts the equilibrium to

a:reactant side

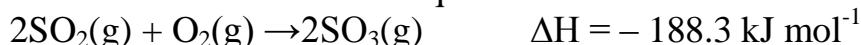
b:product side

c:remains unchanged

d:none

Answer63:a

64:Which statement about the equilibrium below is correct?



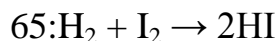
a:the value of K_p falls with a rise in temperature

b:the value of K_p falls with increasing pressure

c:adding V₂O₅ catalyst increase the equilibrium yield of sulphurtrioxide

d:the value of K_p is equal to K_c

Answer64:a



In the above equilibrium system, if the concentration of reactants at 25°C is increased, the value of K_c will ____

a:increase

b:decrease

c:remains constant

d:depends upon nature of reactants

Answer65:a

66:In a chemical reaction, equilibrium is said to have been established when

a:opposing reactions stops

b:concentrations of reactants and products are equal

c:rate constants of opposing reactions are equal

d:none of the above

Answer66:c

67:What can affect the magnitude of equilibrium constant K_p of a reversible gaseous reaction

- a:temperature
- b:pressure
- c:catalyst
- d:none of above

Answer67:b

68:Law of mass action was presented by

- a:Henderson
- b:Lewis
- c:Guldberg and Waage
- d:Arrehenius

Answer68:c

69:The unit of K_c for reaction $N_2 + O_2 \rightarrow 2NO$

- a: mol dm^{-3}
- b: $\text{mol}^{-1} \text{dm}^{-3}$
- c: $\text{mol}^{-2} \text{dm}^6$
- d:no units

Answer69:d

70:If the equilibrium constant $K \ll 1$, this mean that

- a:the equilibrium will lie to the left and favour the reactants
- b:the equilibrium will lie to the right and favour the products
- c:it does not have effect on the position of equilibrium
- d:all of the above

Answer70:a

71:A cube of sugar in a cup containing hot water dissolves faster than a cube of sugar in a cup containing cold water. Which factor is responsible for such effect?

- a:temperature
- b:surface area
- c:pressure
- d:catalyst

Answer71:a

72:Catalysts increase the rate of chemical reactions by

- a:increasing the activation energy
- b:lowering the activation energy
- c:increasing the entropy of activation
- d:lowering the entropy of activation

Answer72:b

73:Rate of chemical reaction can be measured through the following EXCEPT

- a:amount in moles of product formed
- b:amount in moles of reactants used
- c:volume of gas evolved
- d:none of the above

Answer73:d

74:Which of the following reactions can be affected by change in pressure?

- a: $\text{CaCO}_3(\text{s}) + 2\text{HCl}(\text{aq}) \rightarrow \text{CaCl}_2(\text{aq}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{g})$
- b: $\text{NaOH}(\text{aq}) + \text{HCl}(\text{aq}) \rightarrow \text{NaCl}(\text{aq}) + \text{H}_2\text{O}(\text{l})$
- c: $3\text{H}_2(\text{g}) + \text{N}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$
- d: $\text{H}_2(\text{g}) + \text{Br}_2(\text{g}) \rightarrow 2\text{HBr}(\text{g})$

Answer74:c

75:An endothermic reaction is a reaction in which

a:heat is given out.

b:heat is taken in.

c: ΔH is negative.

d: ΔH is less than 0

Answer75:b

76:Which of the following cells converts electrical energy into chemical energy?

a:electrolytic cell

b:electrochemical cell

c:Galvanic cell

d:Daniel cell

Answer76:a

77:Which of the following factors alters both the equilibrium position and equilibrium constant

a:Pressure

b:Volume

c:Temperature

d:concentration

Answer77:c

78:A salt bridge helps to ----- EXCEPT

a:complete the circuit

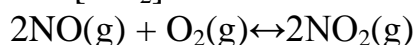
b:enable the movement of ions from one half to the other

c:prevent the two solutions from mixing

d:hold the two electrodes

Answer78:d

79:Calculate the K_c for the reaction below at 230°C , if the $[\text{NO}] = 0.0542 \text{ M}$, $[\text{O}_2] = 0.127 \text{ M}$ and $[\text{NO}_2] = 15.5 \text{ M}$.



a: 6.44×10^5

b: 5.44×10^5

c: 6.44×10^9

d: 7.44×10^6

Answer79:a

80:The factor(s) affecting the preferential discharge of ions during electrolysis is(are)

a:position of ions in the electrochemical series

b:concentration of ions in solution

c:nature of the electrode used

d:all of the above

Answer80:d

81:An electrolytic cell uses electrical energy to drive

a:chemical reaction

b:physical reaction

c:no reaction

d:none of above

Answer81:a

82:An electrochemical cell is also called

a:battery cell

b:galvanic cell

c:cell

d:chargeable cell

Answer82:b

83:In a dry cell anode is made up of

a:zinc

b:calcium

c:sodium

d:graphite

Answer83:d

84:Electrolyte among the following is

a:NaOH

b:urea

c:glucose

d:benzene

Answer84:a

85:Process in which substance gains electrons is called

a:oxidation

b:hydrogenation

c:sublimation

d:reduction

Answer85:a

86:On industrial scale sodium metal is prepared by electrolysis of fused

a:NaOH

b:NaCl

c:NaO

d:NH₃

Answer86:b

87:Corrosion can be prevented by

a:Alloying

b:Tinning

c:Galvanizing

d:all of above

Answer87:d

88:Electrolyte used for tin plating is

a:sulphide ore

b:stannous sulphate

c:hydrogen sulphate

d:sodium chloride

Answer88:b

89:An electrolytic cell uses electrical energy to drive

a:chemical reaction

b:physical reaction

c:no reaction

d:none of above

Answer89:a

90:Which of the following element act as inert electrode

a:Cu

b:Ag

c:Pt

d:None

Answer90:c

91: Which of the following is true in the case of Zn-Cu cell?

- a: The flow of electrons takes place from copper to zinc
- b: E° of copper electrode is less than that of zinc electrode
- c: Zinc acts as an anode and copper as cathode
- d: All are correct

Answer91: c

92: In an electrolytic cell current flows?

- a: From cathode to anode in outer circuit
- b: From anode to cathode outside the cell
- c: From cathode to anode inside the cell
- d: both b & c

Answer92: b

93: In which of the following reactions occur at cathode?

- a: $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$
- b: $\text{Cu} + 2\text{e}^- \rightarrow \text{Cu}^{2+}$
- c: $\text{Hg} + \text{O}_2 \rightarrow \text{HgO}$
- d: $\text{Mg} + \text{O}_2 \rightarrow \text{MgO}$

Answer93: a

94: In electrolytic cell electricity carries

- a: spontaneous reaction
- b: non-spontaneous reaction
- c: neutralization
- d: all of the above

Answer94: b

95: Reaction at anode is called

- a: oxidation
- b: reduction
- c: redox
- d: decomposition

Answer95: a

96: For the measurement of standard electrode potential Zn is dipped in

- a: 1 M ZnO solution
- b: 1 M ZnSO_4 solution
- c: 1.5 M ZnSO_4 solution
- d: 0.1 M ZnSO_4 solution

Answer96: b

97: $\text{Zn(s)}/\text{Zn}^{2+}(\text{aq}) 1\text{M} \parallel \text{Cu}^{2+}(\text{aq}) 1\text{M}/\text{Cu(s)}$ is representation of reaction in

- a: Daniel cell
- b: Downs cell
- c: Voltaic cell
- d: Nelsons cell

Answer97: c

98: Salt bridge transfers

- a: electrons
- b: anion
- c: currency
- d: ions

Answer98: d

99: Temperature for the measurement of standard electrode potential is

a:300K

b:298K

c:305K

d:273K

Answer99:b

100:Potential of SHE is considered as

a:zero

b:unity

c:constant

d:multiple of 1

Answer100:a

101: Democritus discovered “.....” meaning indivisible in Greek.

a:atoms

b:atom

c:atomi

d:atoma

Answer101:d

102:In 1803, who proposed an atomic theory with spherical solid atoms based upon measurable properties of mass?

a:Michael Faraday

b:John Dalton

c:J. J. Thomson

d:Earnest Rutherford

Answer102:b

103:The charge to mass ratio of an electron according to J. J. Thomson was found to be

a: $1.759 \times 10^8 \text{ Cg}^{-1}$

b: $1.759 \times 10^8 \text{ Cg}^{-1}$

c: $1.602 \times 10^{-19} \text{ Cg}^{-1}$

d: $1.602 \times 10^{19} \text{ Cg}^{-1}$

Answer103:a

104:Which scientist discovered that the atomic mass of an element equals the number of protons in the atom of the element and what is the name of the experiment used?

a:J.J.Thomson, x-ray tube

b:Mosely, cathode ray tube

c: J. J. Thomson, gold foil

d:Mosely, x-ray tube

Answer104:d

105:The theory “electrons had a dual nature – similar to both particles and waves was discovered by in

a:Neils Bohr, 1923

b:De Broglie, 1923

c:Neils Bohr, 1913

d:De Broglie, 1913

Answer105:b

106:Which of the following series corresponds to energy level 4 in the atomic spectrum of hydrogen?

a:P fund

b:Paschen

c:Bracket

d:Balmer

Answer106:a

107: The spiralling rings structure of atom represents

a:Thompton's plum model

b:Rutherford's atomic model

c: Bohr's atomic model

d:Dalton's atomic model

Answer107:c

108:Which law of chemical combination was proposed by Lavoisier?

a:Law of multiple proportion

b:Law of definite proportion

c:Law of constant proportion

d:Law of conservation of mass

Answer108:d

109:Methods for the determination of atomic mass include the following except

a:Dulong and Petit's method

b:Vapour density method

c:Diffusion method

d:Isomorphism method

Answer109:c

110:Determine the relative molecular mass of $\text{Al}(\text{NO}_3)_3$.

(Al = 27; N = 14; O = 16)

a:89

b:185

c:213

d:261

Answer110:c

111:How many atoms are there in 2 moles of oxygen?

(O = 16; $L = 6.02 \times 10^{23}$)

a: 6.02×10^{-23}

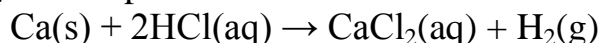
b: 1.204×10^{24}

c: 6.02×10^{-24}

d: 1.204×10^{-24}

Answer111:b

112:If 3.10g of calcium metal reacts with HCl according to the equation below, what mass of CaCl_2 will be produced?



(Ca = 40; H = 1; Cl = 35.5)

a:0.155g

b:3.100g

c:5.658g

d:8.603g

Answer112:d

113:Calculate the percentage composition by mass of S in $\text{Al}_2(\text{SO}_4)_3$.

(Al = 27; S = 32; O = 16)

a:28.07%

b:2.807%

c:0.2807%

d:0.002807%

Answer 113: a

114: The following processes take place in mass spectrometry EXCEPT

a: Ionization

b: Detection

c: Decomposition

d: Acceleration

Answer 114: c

115: How many electrons are there in $^{35}_{17}\text{Cl}$

a: 17

b: 18

c: 20

d: 35

Answer 115: a

116: Given that the relative abundance of $^{35}_{17}\text{Cl}$ and $^{37}_{17}\text{Cl}$ are 75% and 25% respectively. Calculate the relative atomic mass of Cl.

a: 35.0

b: 35.2

c: 35.5

d: 36.5

Answer 116: c

117: The minimum energy required by the reactants to collide and form product(s) is called

a: activation complex

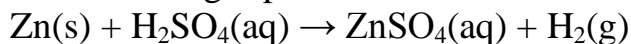
b: activation energy

c: Gibb's energy

d: heat energy

Answer 117: b

118: If 10.0g of Zn metal reacts with dilute H_2SO_4 according to the equation below, calculate the mass of ZnSO_4 gas produced.



(Zn = 65; H = 1; S = 32; O = 16)

a: 10.00g

b: 3.10g

c: 2.48g

d: 0.40g

Answer 118: c

119: The following pairs are isotopes EXCEPT

a: $^{12}_6\text{C}$; $^{13}_6\text{C}$

b: ^1_1H ; ^2_1H

c: $^{16}_7\text{O}$; $^{16}_7\text{O}$

d: $^{35}_{17}\text{Cl}$; $^{37}_{17}\text{Cl}$

Answer 119: c

120: Catalysts increase the rate of chemical reactions by

a: increasing the activation energy

b: lowering the activation energy

c: increasing the entropy of activation

d: lowering the entropy of activation

Answer 120: b

121: Rate of chemical reaction can be measured through the following EXCEPT

a: amount in moles of product formed

b:amount in moles of reactants used

c:volume of gas evolved

d:none of the above

Answer121:d

123:Which of the following scientists did not contribute to atomic structure?

a:Thomson

b:de Broglie

c:Rutherford

d:Le Chatelier

Answer123:d

124:A cube of sugar in a cup containing hot water dissolves faster than a cube of sugar in a cup containing cold water. Which factor is responsible for such effect?

a:temperature

b:surface area

c:pressure

d:catalyst

Answer124:a

127:Quenching of chemical reaction means

a:the time between the start and end of a chemical reaction

b:the formation of product

c:stopping the course of a chemical reaction by chemical or physical method

d:a substance that reduces the rate of chemical reaction

Answer127:c

128:Which of the following units of K is for a second order reaction?

a: $M^{-1}s^{-1}$

b: $M^{-2}s^{-1}$

c: $M^{-3}s^{-1}$

d: s^{-1}

Answer128:a

129:Millikan in 1909 using oil film experiment determined the charge of an electron as

a: 9.11×10^{-28} g

b: 1.759×10^8 C/g

c: 1.602×10^{-19} g

d: 1.602×10^{-19} C

Answer129:d

130:Which of the following laws states that "Matter can neither be created nor destroyed but can only be transformed during chemical reactions"?

a:law of definite proportion

b:law of conservation of mass

c:law of multiple proportion

d:law of constant composition

Answer130:a

131:Which of the following experiments was used by J.J. Thomson in the discovery of electron?

a:Gold foil

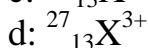
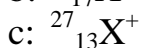
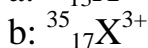
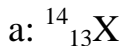
b:cathode ray tube

c:oil film

d:x-ray tube

Answer131:b

132: If a neutral atom X having 13 protons and 14 neutrons loses 3 electrons, its ion is



Answer 132: d

133: Given that the relative abundance of the three isotopes of oxygen, ^{16}O , ^{17}O , ^{18}O are 99.76, 0.04 and 0.20 respectively. Determine the relative atomic mass of oxygen.

a: 18.0044 a.m.u.

b: 17.0044 a.m.u.

c: 16.0044 a.m.u.

d: 15.0044 a.m.u

Answer 133: c

134: Bromine forms several compounds with fluorine. Deduce the chemical formula of a compound with % masses of Br and F as 45.68% and 54.32% respectively.



Answer 134: b

135: An endothermic reaction is a reaction in which

a: heat is given out.

b: heat is taken in.

c: ΔH is negative.

d: ΔH is less than 0

Answer 135: b

136: The first scientist to postulate atom was -----

a: Thomson

b: Moseley

c: Democritus d: Chadwick

Answer 136: c

137: The nucleus of every atom contains

a: electron and neutron

b: electron and proton

c: electron, neutron and proton

d: neutron and proton

Answer 137: d

138: Moseley X-ray emission spectra vary with

a: atomic number

b: atomic mass

c: mass number

d: nucleon number

Answer 138: a

139: Atomic number equals

a: number of electrons

b: number of neutrons

c:number of protons

d:mass number

Answer139:c

140: $^{16}_8\text{O}$ is an isotope of Oxygen, the sotope has

a:8 protons and 16 neutrons

b:8 protons and 6 neutrons

c:8 protons and 8 neutrons

d:16 protons and 8 neutrons

Answer140:c

141:One mole of oxygen atoms

a:contains Avogadro's number of atoms

b:has 6.02×10^{23} molecules

c:can be represented as O_2

d:has a formula mass of 16g

Answer141:a

142:The relative molecular mass of lead (II) trioxonitrate (V), $\text{Pb}(\text{NO}_3)_3$, is (Pb = 108, N = 14, O = 16)

a:132

b:170

c:222

d:232

Answer142:d

143:The shell electronic configuration of an element $^{12}_6\text{C}$ is

a:2, 4

b:2, 6

c:2, 8

d:2, 8, 2

Answer143:a

144:Which of the following scientists discovered the atomic number, Z via the X-ray emission spectra?

a:Moseley

b:Rutherford

c:Thomson

d:Priestley

Answer144:a

145:Democritus believed that atom possesses the following EXCEPT

a:atoms differ in size and shape

b:atoms were in constant motion in void

c:atoms are destructible

d:atoms collide with each other during chemical reactions

Answer145:c

146:Bohr's atomic postulates include the following EXCEPT

a:electrons occupy on allowed energy level

b:energy of atoms are quantized

c:electron excites to a higher energy level when it gains energy

d:atomic number equals the number of protons

Answer146:d

147: Given that the Bohr's radius for hydrogen atom = $5.292 \times 10^{-11}\text{m}$, calculate the radius of the first allowed Bohr orbit of Na^+

- a: $3.28 \times 10^6\text{m}$
- b: $7.06 \times 10^{-11}\text{m}$
- c: $5.29 \times 10^{-11}\text{m}$
- d: $4.33 \times 10^{-11}\text{m}$

Answer147:d

148: The law of conservation of mass was proposed by ----- and verified by -----.

- a: Rutherford, Thomson
- b: Lavoisier, Landolt
- c: Landolt, Lavoisier
- d: Dalton, Bohr

Answer148:b

149: A balanced chemical equation verifies the

- a: law of conservation of mass
- b: law of multiple proportion
- c: law of definite proportion
- d: law of reciprocal

Answer149:a

150: At standard temperature and pressure, gases combine in volumes which bear simple ratio to one another and to the product. This is the

- a: Avogadro's hypothesis
- b: Boyle's law
- c: Gay Lussac's law
- d: Dalton's law

Answer150:c

151: What volume of water vapour would be produced if 50cm^3 of hydrogen combines with excess oxygen at s. t. p. according to the equation below? $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{g})$

- a: 25cm^3
- b: 50cm^3
- c: 75cm^3
- d: 100cm^3

Answer151:b

152: The total pressure in a gas cylinder containing hydrogen, helium and carbon(IV) oxide is measured as 62atm. If the pressure exerted by hydrogen and helium are 12atm and 18atm respectively, calculate the partial pressure of carbon (IV) oxide

- a: 12atm
- b: 30atm
- c: 32atm
- d: 64atm

Answer152:c

153: Calculate the volume occupied by 14.2g of Chlorine at s. t. p. [$\text{Cl} = 35.5$; Molar gas volume = 22.4dm^3]

- a: 8.96dm^3
- b: 4.48dm^3
- c: 2.50dm^3
- d: 1.58dm^3

Answer153:b

154: What is the valency of Mg in MgSO_4 ?

a:+2

b:-2

c:+1

d:-1

Answer154:a

155:The vapour density of a gas X is 22gcm^3 . Find its relative molecular mass.

a:2.2

b:4.4

c:22

d:44

Answer155:d

156:The following are methods of determination of molecular mass EXCEPT

a:Diffusion method

b:Geiger Muller counter

c:Vapour density method

d:Victor Meyer method

Answer156:b

157:Determine the number of atoms in 24g of Carbon [C = 12; Avogadro's constant = 6.02×10^{23}]

a: 3.01×10^{24}

b: 3.01×10^{23}

c: 1.20×10^{24}

d: 1.20×10^{23}

Answer157:c

158:What is the equivalent mass of 2 moles of oxygen? [O = 16]

a:8

b:16

c:32

d:64

Answer158:d

159:How many moles are there in 0.40g of NaOH? [Na = 23; O = 16; H = 1]

a:1.00 mol

b:0.10 mol

c:0.01 mol

d:0.001 mol

Answer159:c

160:What mass of Ca metal would be required to react with 2.83g of HCl according to the equation given below? [Ca = 40; H = 1; Cl = 35.5]

a:1.55g

b:2.83g

c:3.10g

d:5.66g

Answer160:a

161: Calculate the percentage by mass of Na in Na_2SO_3 .

[Na = 23; S = 32; O = 16]

a: 44.7%

b: 36.5%

c: 22.3%

d: 18.3%

Answer 161: b

162: The percentage by mass of chlorine in a metallic chloride, MCl_2 is 64.0%. If the relative atomic mass of M is 40 determine the relative molecular mass of MCl_2 .

a: 111

b: 104

c: 100

d: 76

Answer 162: a

163: If the percentage by mass of nitrogen in its acidic oxide is 30.43, deduce the molecular formula of the oxide. [N = 14, O = 16]

a: N_2O

b: NO

c: NO_2

d: N_2O_2

Answer 163: c

164: _____ is used to determine the abundance of isotopic forms of elements in a given sample.

a: weighing balance

b: mass spectrometer

c: Dumas bulb

d: conductimeter

Answer 164: b

165: How many moles of $[\text{H}^+]$ are there in 1dm^3 of 0.5M solution of H_2SO_4 ?

a: 2.0 mol

b: 1.0 mol

c: 0.5 mol

d: 0.25 mol

Answer 165: c

166: An element X has three isotopes ^{20}X , ^{21}X and ^{22}X with the relative abundance of 114.0, 0.2 and 11.2 respectively. Calculate the relative atomic mass of X.

a: 20.2

b: 21.0

c: 22.1

d: 41.8

Answer 166: a

167: The nucleus of the isotope tritium contains

- a:two neutrons with no protons
- b:one neutron and one proton
- c:two neutron and one proton
- d:two neutron, one proton, and one electron

Answer167:c

168:The most significant discovery which led to the idea that atoms contain electrical components was made by

- a:Sir William Crook
- b:Ernest Rutherford
- c:Joseph John Thomson
- d:Michael Faraday

Answer168:d

169:The theory that electrons move in waves and do not have exact location within their orbit was postulated by

- a:De Broglie
- b:Erwin Schrodinger
- c:Millikan
- d:Moseley

Answer169:b

170:----- develops the idea that an atom was made up of electrons scattered unevenly within an elastic sphere surrounded by a soup of positive charge to balance the electron's charge like plums surrounded by pudding.

- a:Bohr
- b:Faraday
- c:Newton
- d:Thomson

Answer170:d

171:Rutherford's gold foil experiment led to the postulates that atoms contain a small spherical core, positive in charge surrounded by negative electrons which he named

- a:electron
- b:nucleus
- c:neutron
- d:proton

Answer171:b

172:The limitations of Planetary model of electrons include the following EXCEPT

- a:electrons collapse with the nucleus
- b:short atomic life span
- c:continuous emission of spectra
- d:electron excitation

Answer172:d

173:Given that the energy required for excitation of an electron from energy level 2 to energy level 3 is 3.024×10^{-19} J. Calculate the frequency of the excitation.

$$(h = 6.63 \times 10^{-34} \text{ m}^2 \text{ kg s}^{-1})$$

- a: $2.19 \times 10^{-14} \text{ m}^{-1} \text{ s}^{-1}$

b: $4.56 \times 10^{-14} \text{ m}^{-1} \text{ s}^{-1}$

c: $2.19 \times 10^{14} \text{ m}^{-1} \text{ s}^{-1}$

d: $4.56 \times 10^{14} \text{ m}^{-1} \text{ s}^{-1}$

Answer173:d

174:Derive the expression for wavenumber, $\bar{\nu}$ of an oscillating electron between two successive orbits of an atom in terms of their energy difference. [$\Delta E = h\nu$; $c = \nu\lambda$]

a: $\bar{\nu} = \Delta E c / h$

b: $\bar{\nu} = \Delta E / hc$

c: $\bar{\nu} = hc / \Delta E$

d: $\bar{\nu} = \Delta E hc$

Answer174:b

175:Avogadro's hypothesis states that equal volume of all gases at the same temperature and pressure contains

a:the same number of molecules

b:the same number of ions

c:different number of molecules

d:different number of ions

Answer175:a

176:The valency of the most stable ion of an element X is -2. If the neutron number and mass number of X is 8 and 16 respectively, determine the other atomic particles of the ion.

a:8 electrons and 8 protons

b:8 electrons and 10 protons

c:10 electrons and 8 protons

d:10 electrons and 10 protons

Answer176:c

177:The three isotopes of hydrogen are

a:protium, deuterium and tritium

b:proton, deuterium and tritium

c:proton, neutron and electron

d:protium, neutron and tritium

Answer177:a

178:Which noble gas is isoelectronic with O^{2-} ?

a:He

b:Ne

c:Ar

d:Xe

Answer178:b

179:Identify the odd group

a:H, H^- , O^{2-} , Al

b: H^+ , H^- , O^{2-} , Al^{3+}

c: H_2 , O_2 , N_2 , Cl_2

d:He, C, Na, Al

Answer179:a

180: The molecular formula for Calcium hydrogen trioxocarbonate (IV) is

a: CaHCO_4

b: CaHCO_3

c: $\text{Ca}(\text{HCO}_4)_2$

d: $\text{Ca}(\text{HCO}_3)_2$

Answer 180: d

182: Isotopes are

a: atoms of the same element having the same atomic and mass numbers

b: atoms of the same element having different atomic and mass numbers

c: atoms of the same element having the same atomic numbers but different mass number

d: atoms of the same element having the same mass numbers but different atomic numbers

Answer 182: c

183: An element Y has two isotopes $^{20}_{10}\text{Y}$ and $^{22}_{10}\text{Y}$ present in the ratio of 1:3 respectively. Calculate the relative atomic mass of Y.

a: 22.0

b: 21.5

c: 21

d: 20

Answer 183: b

184: In the Planetary model of an atom

a: electrons orbit the nucleus the same way the planets orbit the sun

b: electrons occupy certain allowed energy levels

c: are having energy corresponding to their occupied level

d: electrons cannot emit or absorb energy

Answer 184: a

185: Democritus atomic theory was postulated in

a: 1879 AC

b: 1830 AC

c: 1803 AC

d: 460 BC

Answer 185: d

186: According to _____ theory, electron possesses a dual nature similar to both particle and wave

a: Avogadro

b: Bohr

c: De Broglie

d: Schrodinger

Answer 186: c

187: A pure chemical compound always contains the same elements combined together in the fixed ratio of their weights. This is the law of

a: conservation of matter

b: constant proportion

c: multiple proportion

d:reciprocal proportion

Answer187:b

188:Calculate the percentage composition of oxygen in H_2SO_3 [H = 1; O = 16; S = 32]

a:32.3%

b:39.0%

c:58.5%

d:65.3%

Answer188:c

189:Modern Periodicity law states that the

a:periodic properties of elements are a function of their atomic masses

b: periodic properties of elements are a function of their atomic numbers

c:periodic properties of elements are a function of their mass numbers

d:periodic properties of elements are a function of their nucleon numbers

Answer189:b

190:Periodic properties include the following EXCEPT

a:atomic size

b:electronegativity

c:empirical formula

d:melting point

Answer190:c

192:In the mass spectrometer, the number of peaks produced indicates the -----
present in a given sample.

a:isotopic abundance

b:isotopic masses

c:isotopic forms

d:atomic masses

Answer192:c

193:What is the unit of relative molecular mass

a:g

b: gmol^{-1}

c: gdm^{-3}

d:no unit

Answer193:d

194:What amount in mol is present in 20.0 g of CaCO_3 ? [Ca = 40, C = 12; O =16]

a:0.2 mol

b:0.4 mol

c:0.5 mol

d:2.0 mol

Answer194:a

195:How many atoms are present in $\text{Fe}_2(\text{SO}_4)_3$?

a:9

b:15

c:17

d:19

Answer195:c

196:One mole of a substance is the amount containing as many elementary entities as the number of atoms in exactly 12g of carbon-12

a:1/12 g of carbon-12

b:12 g of carbon-12

c:1/12 g of carbon-13

d:12 g of carbon-13

Answer196:b

197:Victor Meyer's method of determining molecular mass is based on

a:Avogadro's hypothesis and Graham's law of diffusion

b:Avogadro's hypothesis and Charle's law

c:Avogadro's hypothesis and Gay Lussac's law of combining volume

d:Avogadro's hypothesis and Dalton's law of partial pressure

Answer197:d

198:According to Graham's law of diffusion, the rate of diffusion of gases is

a:directly proportional to the square root of their atomic masses

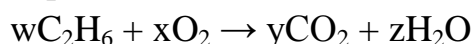
b:directly proportional to the square root of their molecular masses

c:inversely proportional to the square root of their atomic masses

d:inversely proportional to the square root of their molecular masses

Answer198:d

199:In equation of the reaction below, find w, x, y and z



a:2, 7/2, 2 and 3

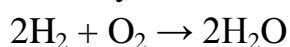
b:2, 7, 2 and 3

c:1, 7/2, 2 and 3

d:1, 7, 2 and 3

Answer199:c

200:If 50 cm^3 of H_2 gas combines with 20 cm^3 of O_2 gas at s. t. p., what is the limiting reagent and by how much?



a: H_2 , 30 cm^3

b: H_2 , 5 cm^3

c: O_2 , 30 cm^3

d: O_2 , 5 cm^3

Answer200:d