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:$Mg \rightarrow Cl_2 + MgCl_2$
b:$MgCl_2 \rightarrow Mg + Cl_2$
c:$MgCl_2 + Mg \rightarrow Cl_2$
d:$Mg + Cl_2 \rightarrow MgCl_2$
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, $Fe + Cl_2 \rightarrow FeCl_2$, 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 $2KClO_3(s) \rightarrow 2KCl(s) + 3O_2$ is a(an)
a:Synthesis reaction.
b:Combustion reaction.
c:Decomposition reaction.
d:Ionic reaction.

Answer8:c
9:Balance this chemical reaction: $Fe(s) + O_2(g) \rightarrow Fe_2O_3(s)$
a:$5Fe(s) + 2O_2(g) \rightarrow 3Fe_2O_3(s)$
b:$3Fe(s) + 4O_2(g) \rightarrow 2Fe_2O_3(s)$
c:$2Fe(s) + 4O_2(g) \rightarrow 3Fe_2O_3(s)$
d:$4Fe(s) + 3O_2(g) \rightarrow 2Fe_2O_3(s)$
Answer9:d
10:What are the coefficients that will balance the skeleton equation below?
$Al(s) + HCl(aq) \rightarrow AlCl_3(aq) + H_2(g)$
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:$2B_2H_6$
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 [$(NH_2)_2CO$] is prepared by reacting NH_3 with CO_2 according to the equation below:
$2NH_3(g) + CO_2(g) \rightarrow (NH_2)_2CO(aq) + H_2O$

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:$(NH_2)_2CO$
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:$5Ca + V_2O_5 \rightarrow 2CaO + 2V$
In the equation above, $1.54x10^3$g of V_2O_5 reacts with $1.96x10^3$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:$dm^3atmK^{-1}mol^{-1}$
b: $dm^3atmKmol$
c:$dm^1atmK^{-1}mol$
d:$dm^3atm^{-1}K^{-1}mol$
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:30.48dm^3
Answer23:d
24:A sample of oxygen gas initially at 0.97atm is cooled from 21^oC to -68 ^oC 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 ^oC, the volume of gas in the tank is 3.25x10^3m^3. What is the volume of the same quantity of gas on a day when the temperature is 31 ^oC?
a:4.82x10^3m^3
b:3.82x10^3m^3
c:5.82x10^3m^3
d:2.82x10^3 m^3
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 (UF_6 at 779mm Hg and 62^oC? (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^oC 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 ^oC, 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:B_3H_6
b:B_3H_3
c:BH_3
d:B_2H_6
Answer29:d

30:Calculate the volume of oxygen required for the complete combustion of 14.9dm[sup]3[/sup] of butane at constant temperature and pressure.
$2C_4H_{10}(g) + 13O_2(g) \rightarrow 8CO_2(g) + 10H_2O$
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[sup]o[/sup]C in a 10.0dm[sup]3[/sup] 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:CH_4 = 1.286atm, C_2H_6= 0.066atm, C_3H_8= 0.018atm
b:CH_4 = 1.286torr, C_2H_6= 0.066torr, C_3H_8= 0.018torr
c:CH_4 = 1.286mm Hg, C_2H_6= 0.066mm Hg, C_3H_8= 0.018mm Hg
d:CH_4 = 1.286atm, C_2H_6= 0.018atm, C_3H_8= 0.066atm
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$JK^{-1}mol^{-1}$, 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^oC.
a:6.15x10^2m/s
b:5.15x10^2m/s
c:5.15x10^2m/s
d:5.15x$10^2m^2/s^2$
Answer34:c
35:All of the following real gases behave ideally except
a:Gas A at 4atm
b:Gas B at 80^oC
c:Gas A at 100 ^oC
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:1dm[sup]3[/sup]
d:1atm
Answer43:d
44:Calculate the heat evolved when 74.6g of SO_2 converted to SO_3 by the thermochemical equation below:

$SO_2 + ½ O_2(g) \rightarrow SO_3(g)$ $\Delta H = -99.1KJ$

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 a1.0L by constant external pressure of 2.0atm.
a:$1.0x10^3$J
b:$2.0x10^3$J
c:$1.0x10^4$ J
d:$1.0x10^4$ 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:$-2.86x10^2$J
b:$1.0x10^2$J
c:0
d:$-1.0x10^3$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:-1.0x10[^{3}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: $2NO(g) \rightarrow O_2(g) + N_2$
a:-0.108M/s
b:-0.801M/s
c:0.108M/s
d:-0.108m/s
Answer51:a

52:In the reaction: $3H_2(g)+ N_2(g) \rightarrow 2NH_3(g)$, 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
54The reaction: A → 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: 2A → P is a first order reaction in A with a rate constant of $2.8x10^{-2}s^{-1}$ at 80^oC. 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 A →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: $2N_2O_5(g) \rightarrow 4NO_2(g) + O_2(g)$
a:$-\frac{d[N_{[sub]2[/sub]}O_{[sub]5[/sub]}]}{2dt} = \frac{d[NO_{[sub]2[/sub]}]}{dt} = \frac{d[O_{[sub]2[/sub]}]}{dt}$
b:$-\frac{d[NO_{[sub]2[/sub]}]}{4dt} = \frac{d[N_{[sub]2[/sub]}O_{[sub]2[/sub]}]}{2dt} = \frac{d[O_{[sub]2[/sub]}]}{dt}$
c:$-\frac{d[N_{[sub]2[/sub]}O_{[sub]5[/sub]}]}{2dt} = \frac{d[NO_{[sub]2[/sub]}]}{4dt} = \frac{d[O_{[sub]2[/sub]}]}{dt}$
d:$\frac{d[N_{[sub]2[/sub]}O_{[sub]5[/sub]}]}{2dt} = \frac{d[NO_{[sub]2[/sub]}]}{4dt} = \frac{d[O_{[sub]2[/sub]}]}{dt}$
Answer57:c
58:This equation: Kdt = - d[A]/[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:$moldm^{-3}s^{-1}$

c:$mols^{-1}$
d:$moldm^3s^{-1}$
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 Kc 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: $H_2 + I_2 \rightarrow 2HI$ 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?
$2SO_2(g) + O_2(g) \rightarrow 2SO_3(g) \qquad \Delta H = -188.3\ kJ\ mol^{-1}$
a:the value of Kp falls with a rise in temperature
b:the value of Kp falls with increasing pressure
c:adding V_2O_5 catalyst increase the equilibrium yield of sulphurtrioxide
d:the value of Kp is equal to Kc
Answer64:a
65:$H_2 + I_2 \rightarrow 2HI$
In the above equilibrium system, if the concentration of reactants at 25^oC is increased, the value of Kc 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 Kp 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 Kc for reaction $N_2 + O_2 \rightarrow 2NO$
a:$moldm^{-3}$
b:$mol^{-1}dm^{-3}$
c:$mol^{-2}dm^{6}$
d:no units
Answer69:d
70:If the equilibrium constant K << 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:$CaCO_3(s)+2HCl(aq) \rightarrow CaCl_2(aq) + CO_2(g) + H_2O(g)$
b:$NaOHaq)+HCl(aq) \rightarrow NaCl(aq)+H_2O(l)$
c:$3H_2(g) + N_2(g) \rightarrow 2NH_3(g)$
d:$H_2(g) + Br_2(g) \rightarrow 2HBr(g)$
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^oC, if the [NO] = 0.0542 M, $[O_2]$ = 0.127 M and $[NO_2]$ = 15.5 M.
$2NO(g) + O_2(g) \leftrightarrow 2NO_2(g)$
a:$6.44x10^5$
b:$5.44x10^5$
c: $6.44x10^9$
d: $7.44x10^6$
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:NH_3
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[sup]θ[/sup] red 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:$Cu^{2+}+2e^{-} \rightarrow Cu$
b:$Cu+ 2e^{-} \rightarrow Cu^{2+}$
c:$Hg + O_2 \rightarrow HgO$
d:$Mg + O_2 \rightarrow MgO$
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: $Zn(s)/Zn^{2+}$ (aq) 1M | | Cu^{2+}aq) 1M/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:curreny
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 ration of an electron according to J. J. Thomson was found to be
a:$1.759 \times 10^{8}\ Cg^{-1}$
b:$1.759 \times 10^{8}\ Cg^{-1}$
c:$1.602 \times 10^{-19}\ Cg^{-1}$
d: $1.602 \times 10^{19}\ Cg^{-1}$
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 $Al(NO_3)_3$.
(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 = 6.02×10^{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?
$Ca(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + H_2(g)$
(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 $Al_2(SO_4)_3$.
(Al = 27; S = 32; O = 16)
a:28.07%
b:2.807%
c:0.2807%
d:0.002807%

Answer113:a
114:The following processes take place in mass spectrometry EXCEPT
a:Ionization
b:Detection
c:Decomposition
d:Acceleration
Answer114:c
115:How many electrons are there in $^{35}_{17}Cl$
a:17
b:18
c:20
d:35
Answer115:a
116: Given that the relative abundance of $^{35}_{17}Cl$ and $^{37}_{17}Cl$ are 75% and 25% respectively. Calculate the relative atomic mass of Cl.
a:35.0
b:35.2
c:35.5
d:36.5
Answer116: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
Answer117: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.

$Zn(s) + H_2SO_4(aq) \rightarrow ZnSO_4(aq) + H_2(g)$

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

a:10.00g
b:3.10g
c:2.48g
d:0.40g
Answer118:c
119:The following pairs are isotopes EXCEPT
a: $^{12}_{6}C$; $^{13}_{6}C$
b: $^{1}_{1}H$; $^{2}_{1}H$
c: $^{16}_{7}O$; $^{16}_{7}O$
d: $^{35}_{17;}$ $^{37}_{17}Cl$
Answer119: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
Answer120: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
a: $^{14}_{13}X$
b: $^{35}_{17}X^{3+}$
c: $^{27}_{13}X^{+}$
d: $^{27}_{13}X^{3+}$
Answer132: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
Answer133: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.
a:BrF_3
b:BrF_5
c:FBr_3
d:FBr_5
Answer134: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
Answer135:b
136:The first scientist to postulate atom was ----------
a:Thomson
b:Moseley
c:Democritusd:Chadwick
Answer136: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
Answer137:d
138:Moseley X-ray emission spectra vary with
a:atomic number
b:atomic mass
c:mass number
d:nucleon number
Answer138:a
139:Atomic number equals
a:number of electrons
b:number of neutrons

c:number of protons
d:mass number
Answer139:c
140: $^{16}_{8}O$ 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), $Pb(NO_3)_3$, 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 $^{12}_{6}C$ 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 = 5.292×10^{-11}m, calculate the radius of the first allowed Bohr orbit of Na^{+}
a: 3.28×10^{6}m
b:7.06×10^{-11}m
c:5.29×10^{-11}m
d:4.33×10^{-11}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 50cm3 of hydrogen combines with excess oxygen at s. t. p. according to the equation below? $2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$
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. [Cl = 35.5; Molar gas volume = 22.4dm[sup]3[/sup]]
a:8.96[sup]3[/sup]
b:4.48[sup]3[/sup]
c:2.50[sup]3[/sup]
d:1.58[sup]3[/sup]
Answer153:b
154:What is the valency of Mg in MgSO[sub]4[/sub]?

a:+2
b:-2
c:+1
d:-1
Answer154:a
155:The vapour density of a gas X is 22gcm[sup]-3[/sup]. 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[sup]23[/sup]]
a:3.01 × 10[sup]24[/sup]
b:3.01 × 10[sup]23[/sup]
c:1.20 × 10[sup]24[/sup]
d:1.20 × 10[sup]23[/sup]
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[sub]2[/sub]SO[sub]3[/sub].
[Na = 23; S = 32; O = 16]
a:44.7%
b:36.5%
c:22.3%
d:18.3%
Answer161:b
162:The percentage by mass of chlorine in a metallic chloride, MCl[sub]2[/sub] is 64.0%. If the relative atomic mass of M is 40 determine the relative molecular mass of MCl[sub]2[/sub].
a:111
b:104
c:100
d:76
Answer162: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
dN_2O_2
Answer163: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
Answer164:b
165: How many moles of [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
Answer165: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
Answer166: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:Earnest 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.
($h = 6.63 \times 10^{-34} m^2 kgs^{-1}$
a:$2.19 \times 10^{-14}\ m^{-1}s^{-1}$

b:$4.56 \times 10^{-14}\ m^{-1}s^{-1}$
c:$2.19 \times 10^{14}\ m^{-1}s^{-1}$
d:$4.56 \times 10^{14}\ m^{-1}s^{-1}$
Answer173:d
174:Derive the expression for wavenumber, $\bar{\upsilon}$ 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:$\bar{\upsilon} = \Delta Ec/h$
b: $\bar{\upsilon} = \Delta E/hc$
c: $\bar{\upsilon} = hc/\Delta E$
d: $\bar{\upsilon} = \Delta Ehc$
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:$Ca(HCO_4)_2$
d:$Ca(HCO_3)_2$
Answer180: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
Answer182:c
183: An element Y has two isotopes $^{20}_{10}Y$ and up $^{22}_{10}Y$ 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
Answer183:b
184:In the Planetary model of an atom
a:electrons orbit the nucleus the same way the planets orbit the sun
b:electrons occupies certain allowed energy levels
c:are having energy corresponding to their occupied level
d:electrons cannot emit or absorb energy
Answer184:a
185:Democritus atomic theory was postulated in
a:1879 AC
b:1830 AC
c:1803 AC
d:460 BC
Answer185:d
186:According to _____ theory, electron possesses a dual nature similar to both particle and wave
a:Avogadrp
b:Bohr
c:De Broglie
d:Schrodinger
Answer186: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 $Fe_2(SO_4)_3$[/sub]?
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

$$wC_2H_6 + xO_2 \rightarrow yCO_2 + zH_2O$$

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?

$$2H_2 + O_2 \rightarrow 2H_2O$$

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