CHEMISTRY

JEE MAIN AND ADVANCED

MOCK TEST 1

Example

1. Life Saving drug(s) used in cancer therapy are-

(a)Cisplatin ,

(b) AZT ,

(c) Taxol

A. (a) & (c)

B. (a) & (b)

C. (a) , (b) & (c)

D. (b) & (c)

Answer: A

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2. Which of the following given ratio of units of length gives the highest value?

A. $\frac{1Pm}{1fm}$

B. $\frac{1hm}{1Gm}$

C. $\frac{1dm}{1um}$

D. $\frac{1Mm}{1nm}$

Answer: D

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3. Given the density of the chloroform is $1.510 gcm^{-3}$, then the volume occupied by 20.050 g of chloroform (upto correct significant figures) is

A. $13.3 cm^3$

B. $13.278 cm^3$

C. $13.28 cm^3$

D. $13.2780 cm^3$

Answer: C

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4. Which one of the following pair of compounds illustrate the law of multiple proportion

A. CuO and Cu_2O

B. $SnCl_2$ and $PbCl_2$

C. CaC_2 and $CaSO_4$

D. H_2O and D_2O

Answer: A

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5. Out of the given values of temperature, which one is the highest?

A. 420 K

B. 130° C

C. 310° F`

D. 310 K

Answer: C

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6. Which of the following is/are pure substance(s)?

A. CuSO4.5H2O

B. Brass

C. Diamond

D. All of these

Answer: C

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7. If the masses of Cr and O are in the ratio 13:12 Cr_2O_3, then the ratio of O that cobines with the same mass of Cr in Cr_2O_3 and Cr_2O_7 is

A. $1:2$

B. $1:4$

C. $3:7$

D. $2:5$

Answer: C

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8. $CaCO_3$ decomposes to give CaO and CO_2, if the masses of CaO andCO_2 produced are 5.6 g and 4.4 g respectively by heating 12 g of an impure $CaCO_3$ sample then the $\%$ impurity of the sample will be

A. $33.33\ \%$

B. $16.67\ \%$

C. $83.33\ \%$

D. $20\ \%$

Answer: B

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9. Which of the following statement is/are correct?

(i) An element of a substance contains only one kind of atoms.

(ii) In CO_2, carbon and oxygen chemically combined in a fixed proportion of 3 : 8 by mass.

(iii) The constituents of the pure substances can be separated by single physical methods.

(iv) Milk is a homogeneous mixture.

A. (i) and (ii)

B. (i) , (iii) and (iv)

C. Only (i)

D. (i) , (ii) , (iii) and (iv)

Answer: A

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10. The value of 3.00 km in yards upto correct significant figures and the scientific notation is, (1m = 1.094 yards)

A. 3282

B. $32.8X10^2$

C. $3.28X10^3$

D. $328.2X10^1$

Answer: C

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11. An analytical balance has uncertainity in measurement equal to ± 1 mg. Then the result in terms of persentage would be if the weight of a compound is 10 g

A. $10 \pm 0.1\ \%$

B. $10 \pm 0.01\ \%$

C. $10 \pm 1\ \%$

D. $10 \pm 0.001\ \%$

Answer: B

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12. A metal forms two oxides. The higher oxide contains 80% metal. 0.72 g of the lower oxide gave 0.8 g of higher oxide when oxidiesd. Then the ratio of the weight of oxygen that combines with the fixed weight of the metal in the two oxides will be

A. $2:3$

B. $1:2$

C. $4:5$

D. $3:2$

Answer: B

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13. The result of the following addition, 3.0560 + 0.0348 + 5.340 upto correct significant figures is-

A. 8.4308

B. 8.43

C. 8.431

D. 8.4

Answer: C

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14. The answer to the correct scientific notation of the following given expression $\frac{2.320}{3.694} X 0.050$ is,

A. 0.03

B. $3.1X10^{-2}$

C. 0.031

D. $0.31X10^{-1}$

Answer: B

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15. Which of the following postulate is incorrect regarding Dalton's Atomic Theory?

A. Atoms are indivisible and indestructible

B. All the atoms of an element are not identical to each other. They have different masses and sizes

C. The relative numbers and kind of atoms are always the same in a given compound

D. Chemical reactions only rearrange the way in which atoms are combined , the atoms themselves are not changed

Answer: B

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16. Vapour density of a gas having formula $[CO]_x$ is 70. Find out X

A. 3.5

B. 4.5

C. 5

D. 6

Answer: C

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17. Mass of one atom of an element is $4.0X10^{-24}$ g. This is equal to

A. 2.4 u

B. 24 u

C. 0.024 u

D. 0.24 u

Answer: A

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18. Which of the folloing combination of volumes (mL) of C_2H_4(g) and O_2(g) respectively is required to obtain 400 mL of CO_2(g)? All volumes are measured at STP.

A. 100 , 300

B. 200 , 600

C. 200 , 200

D. 300 , 300

Answer: B

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19. An element A exist in two isotopic forms A^{15} and A^{16} . If the average atomic mass of A was found to be 15.24, then the % relative abundance of A^{15} will be

A. 0.1

B. 0.2

C. 0.4

D. 0.76

Answer: D

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20. What will be the mass of O_2 molecule in grams?

A. $5.31X10^{-23}$ g

B. $32g$

C. $16g$

D. $2.6X10^{-23}$ g

Answer: A

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21. Gram molecular mass of CH_4 is

A. 16 g

B. 16 u

C. 32 g

D. 32 u

Answer: A

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22. Four one litre flasks are separately filled with the gases CO_2, F_2, NH_3 and He at same room temperature and pressure. The ratio of total number of atoms of these gases present in the different flasks would be

A. $1:1:1:1$

B. $1:2:2:3$

C. $3:2:4:1$

D. $2:1:3:2$

Answer: C

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23. Two flasks A and B of equal capacity of volume contain SO_3 and CO gas respectively under similar conditions of temperature and pressure. Then, which of the following statement is true?

A. A has twice the number of moles as that of B

B. B has twice the number of moles as that of A

C. A and B have equal number of moles

D. B has twice the number of atoms as that of A

Answer: C

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24. Equal volume of all gases contain equal number of atoms at same temperature and pressure. This statement is

A. In accordance with Dalton's atomic theory and is known as Berzelius Hypothesis

B. Not in accordance with Dalton's atomic theory and is known as Avogadro's Hypothesis

C. Not in accordance with Dalton's atomic theory and is known as Berzelius Hypothesis

D. In accordance with Dalton's atomic theory and is known as Avogadro's Hypothesis

Answer: C

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25. The vapour densities of two gases are in the ratio of 2 : 5 Their molecular masses are in the ratio of -

A. $5:2$

B. $1:3$

C. $2:5$

D. $3:1$

Answer: C

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26. Atomic mass of an element is

A. Actual mass of one atom of the element

B. Relative mass of an atom of the element

C. Average relative mass of different atoms of the element

D. Always a whole number

Answer: C

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27. A compound was found of contain 14.34% oxygen. The minimum molecular weight of the compound is

A. 111.5 g

B. 223.15 g

C. 97.62 g

D. 195.26 g

Answer: A

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28. Loschmidt number is the number of -

A. Atoms present in 1 gram mole of a gas at STP

B. Atoms present in 1 mL of a gas at STP

C. Molecules present in 1 gram mole of a gas at STP

D. Molecules present in 1 mL of a gas at STP

Answer: D

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29. 1 amu is

A. $1.66X10^{-24}$ kg

B. $1.66X10^{-27}$ kg

C. $\frac{1}{NA}$

D. Both (2) & (3)

Answer: D

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30. A well stoppered thermos flask contains hot water .This is an example of

A. closed system

B. open system

C. isolated system

D. non thermodynamic system

Answer: C

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31. Incorrect relation is

A. for isothermal reversible change $W = -P_{ext}(V_f - V_i)$

B. for isothermal reversible change $Q = 2.303nRt\dfrac{\log V_f}{V_i}$

C. for isothermal reversible change $W = -2.303nRT\dfrac{\log P_f}{P_i}$

D. for adiabatic change $\Delta U = W$

Answer: C

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32. Which of the following is zero for an isochoric process?

A. ΔP

B. ΔV

C. ΔT

D. ΔE

Answer: B

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33. Identify an intensive property among the following

A. Gibbs free energy

B. volume

C. internal energy

D. temperature

Answer: D

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34. An adiabatic process occurs in

A. open system

B. closed system

C. isolated system

D. all of the three systems

Answer: C

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35. Which of the following is not a state function?

A. internal energy

B. temperature

C. work

D. enthalpy

Answer: C

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36. Which of the following is a feature of adiabatic expansion?

A. $\Delta V < 0$

B. $\Delta U < 0$

C. $\Delta U > 0$

D. $\Delta T = 0$

Answer: B

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37. Find out the correct match. a.First law of thermodynamics b.isothermal change c.state function d.adiabatic change i.$\Delta U = W$ ii.q=-W iii.q+W. iv.$\Delta U = q + W$

A. a(iv),b(ii),c(iii),d(iv)

B. a(ii),b(iii),c(iv),d(i)

C. a(iv),b(i),c(ii),d(iii)

D. a(I),b(iv),c(ii),d(iii)

Answer: A

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38. In an isothermal process

A. $q = 0$ and $\Delta U = 0$

B. $q \neq 0$ and $\Delta U = 0$

C. $q = 0$ and $\Delta U \neq 0$

D. $q \neq 0$ and $\Delta U \neq 0$

Answer: B

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39. The work done by a system is 8 Joule, when 40 joule heat is supplied to it .What is the increase in internal energy of the system?

A. 25J

B. 30J

C. 32J

D. 28J

Answer: C

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40. Work done during isothermal expansion of one mole of an ideal gas from 10 atm to 1atm at 300 k is

A. -4938.8J

B. 4138.8J

C. -5744.1J

D. 6257.2J

Answer: C

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41. Out of the following, choose the one which is not a part of internal energy?

A. kinetic energy

B. potential energy

C. chemical bond energy

D. gravitational energy

Answer: D

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42. Pressure volume (PV) work done by an ideal gas system at constant volume is

A. $-\frac{\Delta P}{P}$

B. Zero

C. $-\frac{V}{\Delta P}$

D. $-\Delta V$

Answer: B

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43. 6mole of an ideal gas expand isothermally and reversibly from a volume of 1 litre to a volume of 10 litre at 27° C .The maximum work is done

A. 47kJ

B. 100kJ

C. 0

D. 34.46kJ

Answer: D

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44. An ideal gas expands against a constant external pressure of 2 atmosphere from 20 litre to 40 litre and absorbs 10 kJ of heat from surrounding .What is the change in internal energy of the system?

A. 4053J

B. 5948J

C. 14052J

D. 9940J

Answer: B

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45. The equation $\frac{1}{2}H_2(g) + \frac{1}{2}Cl_2 \rightarrow HCl, \Delta H^\circ$ = -24080 calorie per mole means

A. the heat absorbed when one gram molecule of HCL is formed from its element at 25°C is 24080 kcal

B. the heat given out when one gram molecule of HCL is formed from its element at 298K is 24 080 kcal

C. the heat observed when one atom of hydrogen reacts with one atom of chlorine to form one molecule of at 25°C and atmospheric pressure is 24.0 80 kcal

D. the intrinsic heat of one molecule of HCL is 24.080kcal more than the intrinsic heat of one atom of hydrogen and one atom of chlorine

Answer: B

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46. when $50cm^3$ of 0.2 N $H_3SO_4 is mixed with$50cm^3 $of 1n KOH, the heat liberated is (Given$H^+(aq)+OH^-(aq)rarrH_2O(l)Delta_neulH=-57.3kJ`)

A. 11.46kJ

B. 57.3kJ

C. 0.563kJ

D. 0.573kJ

Answer: D

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47. molar heat capacity of Aluminium is $25JK^{-1}mol^{-1}$the heat necessary to raise the temperature of 54 gram of aluminium (atomic mass $27gmol^{-1}$)from 30°C to 50°C is

A. 1.5kJ

B. 0.5kJ

C. 1.0kJ

D. 2.5kJ

Answer: C

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48. What will be the heat of formation of ethane, in the heat of combustion of carbon is $-xkJ$,heat of formation of water is $-ykJ$, and heat liberated during complete combustion of ethane is zkJ

A. $(-2x-2y+z)kJ$

B. $(-2x-3y+z)kJ$

C. $(-2x+3y+z)kJ$

D. $(-2x-3y-z)kJ$

Answer: B

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49. If for H_2 gas,$C_p - C_v = a$ and for O_2 gas,$C_p - C_v = b$,where C_p and C_v is heat capacity in cal/$g-k$,then select the correct relation

A. b=8a

B. a=b

C. a=16b

D. a=4b

Answer: C

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50. In a constant volume calorimeter 5g of a gas with molecular weight 40 was burnt in excess of oxygen at 298 K.the temperature of the calorimeter was found to increase from 298 K to 298.75 K due to combustion process.Given that the heat capacity of the calorimeter is 2.5 kJK^{-1},a numerical value for the ΔU of combustion of the gas in $kJmol^{-1}$ is

A. 15

B. 12

C. 90

D. 8

Answer: A

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51. When 1 mole of oxalic acid is treated with excess of NaOH in dilute aqueous solution 108kJ of heat is liberated ,then the enthalpy of ionization of the oxalic acid is(Given $H^+(aq) + OH^{-(aq)} \rightarrow H_2O(l) \Delta_{\neq} \underline{H} = -57.3kJ$)

A. $4.6kJmol^{-1}$

B. $-4.6kJmol^{-1}$

C. $-6.6kJmol^{-1}$

D. $6.6kJmol^{-1}$

Answer: D

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52. If the bond dissociation energies of XY,X_2 and Y_2(all diatomic molecules)are in the ratio of $1:1:0.5$ and $\Delta_f H$ for the formation of XY is $-200kJ\ mol^{-1}$.The bond dissociation energy of X_2 will be

A. 100kJ mol^{-1}

B. 800kJ mol^{-1}

C. $300kJ\ mol^{-1}$

D. $400kJ\ mol^{-1}$

Answer: B

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53. The species which by definition has non zero standard molar enthalpy of formation at 298 K is

A. $Br_2(l)$

B. $Cl_2(g)$

C. $Hg(l)$

D. $I_2(g)$

Answer: D

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54. One mole of anhydrous salt AB dissolves in water and liberates $15Jmol^{-1}$ of heat .The value of $\Delta H^{\circ}_{hydration}$ of AB is $-20.05J\ mol^{-1}$ .Hence the enthalpy of dissolution of hydrated salt $AB.3H_2O(s)$ is

A. $-5.5J\ mol^{-1}$

B. $5.5J\ mol^{-1}$

C. $35.5J\ mol^{-1}$

D. $-35.5J\ mol^{-1}$

Answer: B

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55. choose the reaction in which ΔH is not equal to ΔU

A. $C_{gra\phi te} + O_{2(g)} \rightarrow CO_{2(g)}$

B. $C_2H_{4(g)} + H_{2(g)} \rightarrow C_2H_{6(g)}$

C. $N_{2(g)} + O_{2(g)} \rightarrow 2NO_g$

D. $H_{2(g)} + I_{2(g)} \rightarrow 2HI_g$

Answer: B

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56. Hess's law is applicable for the determination of heat of

A. reaction

B. formation

C. transition

D. All of these

Answer: D

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57. Enthalpy (H) is equal to

A. Internal energy (E)

B. Product of pressure (P) and volume (V) of gas

C. Internal energy (E)+PV(work)

D. work (W) done by a system

Answer: C

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58. If $\Delta_f H^\circ(C_2H_4)$and $\Delta_f H^\circ(C_2H_6)|$ are in $x_1|$ and x_2$kcal$mol ^(-1), $thenheatofhydro \geq nationof$C_2H_4` will be

A. $x_1 + x_2$

B. $x_1 - x_2$

C. $x_2 - x_1$

D. $x_1 + 2x_2$

Answer: C

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59. heat of combustion of gaseous compounds A(molar mass =16) B(molar mass=28) C(molar mass=30) and D(molar mass=40) are -890 ,-1411, -1560 and-1900 kJ/mole respectively.Which has the highest calorific fuel(J/g)?

A. A

B. B

C. C

D. D

Answer: A

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60. in which of the following case entropy increases

A. boiling of an egg

B. crystallization of sugar from solution

C. freezing of water

D. stretching of rubber

Answer: A

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61. if the reaction is reversible all is at equilibrium (ΔS universe $= 0$`), then the entropy of the system

A. will change abruptly

B. is greater than 1

C. will remain constant

D. is equal to 0

Answer: C

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62. the second law of thermodynamics states that

A. in any spontaneous process entropy of the universe always increases

B. energy can neither be created nor be destroyed

C. energy of the universe remains constant

D. DeltaS_universelt0 for a spontaneous reaction

Answer: A

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63. in the reaction, ΔH and ΔS both are more than zero then in which of the following cases the reaction would be spontaneous

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

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

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

D. $\Delta G > 0$

Answer: B

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64. the incorrect expression among the following is

A. $K = \frac{e^G}{R}T$

B. In $K = \frac{\Delta H^\circ - T\Delta S^\circ}{R}T$

C. $\Delta S_\sum = -\Delta H_s y\frac{s}{T}$

D. $\Delta S_s ys = q_r e\frac{y}{T}$

Answer: B

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65. $\Delta_t G^\circ$ for the following reaction $I_2(s) + H_2S(g) \rightarrow 2HI(g) + S(s)$ at 298 K is, given that $\Delta_I G^\circ HI(g) = 1.8kJmol^{-1}. \Delta_I G^\circ H_2S(g) = 33.8kJ\, mol^{-1}.$

A. 30200 kJ

B. 30.2 kJ

C. -30200J

D. -302 J

Answer: C

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66. a process $A \rightarrow D$ is difficult to occur directly instead it takes place in three successive steps, $\Delta S(A \rightarrow B)$=40 e.u., $\Delta S(B \rightarrow C)$ =30 e.u., $\Delta S(D \rightarrow C)$=20 e.u. where e.u. is entropy unit then the entropy change ΔS for the process $(A \rightarrow D)$ is

A. + 90 e.u.

B. + 50 e.u.

C. -90 e.u.

D. - 50 e.u.

Answer: B

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67. the entropy processes by certain substances at absolute zero is known as

A. Residual entropy

B. positive entropy

C. negative entropy

D. excess entropy

Answer: A

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68. the following equilibrium are given below, $A_2 + 3B_2 \Leftrightarrow 2AB_3 \ldots . K_1$, $A_2 + C_2 \Leftrightarrow 2AC \ldots . K_2$, $B_2 + \frac{1}{2}C_2 \Leftrightarrow B_2C \ldots . K_3$ the equilibrium constant of the reaction, $2AB_3 + \frac{5}{2}C_2 \Leftrightarrow 2AC + 3B_2C$, in terms of K_1, K_2, and K_3 is

A. $K_1\frac{K_2}{K_3}$

B. $K_1\frac{K_3^2}{K_2}$

C. $K_2\frac{K_3^3}{K_1}$

D. $K_1K_2K_3$

Answer: C

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69. consider the given reaction, $3A(g) + B(g) \Leftrightarrow 2C(g)$ at a given temperature if a mixture of 2 mol each of A, B and C exist at equilibrium and $K_c = 9$ then volume of the flask will be

A. 3L

B. 6L

C. 9L

D. 36L

Answer: B

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70. in a chemical reaction equilibrium is established when

A. backward and forward reaction ceases

B. concentration of reactants and products are equal

C. rate of backward reaction is equal to the rate of forward reaction

D. reaction ceases to generate heat

Answer: C

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71. consider the reaction $2A_g + B_g \Leftrightarrow 2C_g$ for which $K_c = 350$. if 0.001 mole of each of the reactant and product are mix in a 2.0 L flux in the reaction quotient and spontaneous direction of the system will be

A. Q_c= 0.002, the equilibrium shifts to the left

B. Q_c = 2000, the equilibrium shifts to the left

C. Q_c =0.002, the equilibrium shifts to right

D. Q_c = 2000, the equilibrium shifts to right

Answer: B

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72. for the homogeneous gaseous reaction $A(g) + 2B(g) \Leftrightarrow C(g)$ at 300K. the value of $K_c = 0.1$ When 2 mol of each of A and B are mixed then what will be the approx equilibrium pressure if 30% of A is converted to C? [given that $\frac{(3.18)^1}{2} = 1.78$]

A. 90 atm

B. 100 atm

C. 178 atm

D. 1.78 atm

Answer: C

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73. for the reaction $P + Q \Leftrightarrow R + 2S$, initially the concentration of P is equal to that of Q (1 molar) but at equilibrium the concentration of R will be twice of that of P, then the equilibrium constant of the reaction is

A. $\frac{4}{3}$

B. $\frac{32}{3}$

C. $\frac{3}{10}$

D. $\frac{1}{10}$

Answer: B

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74. stage comes when no more sugar dissolves, instead it settles down at the bottom of the solution is now said to be

A. condensed

B. in a state of equilibrium

C. saturated

D. both (2) & (3)

Answer: D

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75. Which of the following is non-polar molecular solid?

A. SiC

B. Naphthlene

C. HCl

D. AIN

Answer: B

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76. Solids for which physical properties like electric resistance or refractive index show different values when measured along different directions are called

A. Pseudo solids

B. Isotropic solids

C. Polymorphic solids

D. Anisotropic solids

Answer: D

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77. Which of the following given list has molecular solids only?

A. Carborundum, dry ice, diamond, solid H_2, benzene

B. Naphthalene, Na_2SO_4 copper, corundum, CCl_4

C. Corundum, camphor, silicon carbide, ice, solid CS_2

D. Solid H_2, camphor, dry ice, $solid CS_2$, naphthalene

Answer: D

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78. If all the three interaxial angles defining the unit ceil are equal in magnitude, the crystal cannot be!ong to

(I) Orthorhombic system

(II) Monoclinic system

(III) Hexagonal system

(IV) Tetragonal system

A. II, III

B. I, IV

C. III, IV

D. I, II

Answer: A

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79. Which of the following sets of axial angles and axial lengths represent maximum number in Bravais lattices?

A. $\alpha = \beta = \gamma = 90^\circ$ and $a = b \neq c$

B. $\alpha = \beta = \gamma = 90^\circ$ and $a \neq b \neq c$

C. $\alpha = \beta = \gamma \neq 90^\circ$ and $a = b = c$

D. $\alpha = \beta = \gamma = 90^\circ$ and $a = b = c$

Answer: B

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80. Which of the following given crystal system is the most symmetrical and the most unsymmetrical system respectively?

A. Cubic, Hexagonal

B. Orthorhombic, Monoclinic

C. Cubic, Tridinic

D. Rhombohedral, Tetragonal

Answer: C

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81. Sodium crystallizes in a face centred cubic lattice. The approximate number of unit cells in 5.0 g of sodium is (Atomic mass of sodium = 23 amu)

A. 32.7×10^{22}

B. $3.27X10^{22}$

C. 6.54×10^{22}

D. 65.4×10^{22}

Answer: B

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82. Three atoms A, B and C crystallize in a cubic solid lattice where A atoms are present at the body centre, B atoms are present at the edge centre as well as at the corners of the cube and C atoms are present at the face centres of the cube. Now if all the atoms are removed from the two 4-fold axis and the one 2-fold axis passing through the cube, then the formula of the compound is

A. B_7C_2

B. AB_2C_7

C. ABC_2

D. A_5C_2

Answer: A

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83. Three atoms P, Q and R crystallize in a cubic solid lattice where P atoms are at the altemate faces, R atoms are at the centre of edges and Q atoms are at the 2/3 rd of the total corners present, hence the fomula of the compound is

A. $P_2Q_9R_2$

B. $P_3Q_2R_9$

C. $P_3Q_4R_1$

D. $P_2Q_3R_4$

Answer: B

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84. A compound formed by elements X, Y and Z has a cubic structure in which X atoms are at the corner of the cube and also at alternate face centres. Y atoms are present at the body centre and Z atoms are present at the alternate edge centre. Then the molecular formula of the compound is

A. XYZ

B. XY_2Z

C. XYZ_3

D. X_2YZ

Answer: D

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85. An ionic compound is made up of A & B only. lons A occupy all the corners and alternate edge centers while atoms B occupy all the face centers. The formula of compound will be

A. AB_2

B. A_2B_3

C. A_2B

D. AB_3

Answer: B

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86. An ionic compound is made up of A & B only. lons of A occupy all the corners and alternate face centers while that of B occupy body center and edge centers. If B contains -1 charge then charge on atom A will be

A. 1

B. 2

C. 3

D. 4

Answer: B

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87. Which one of the following schemes of ordering closed packed sheets of equal sized spheres do not generate close packed lattice?

A. ABCABC

B. ABACABAC

C. ABBAABBA

D. ABCBCABCBC

Answer: C

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88. If the anions (X) form hexagonal closed packing and cations (Y) occupy only 3/8th of octahedral voids in it, then the general formula of the compound is

A. XY

B. YX_2

C. X_8Y_3

D. X_3Y_4

Answer: C

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89. A solid is formed and it has three types of atoms X, Y, Z. X forms an FCC lattice with Y atoms occupying one-fourth of tetrahedral voids and Z atoms occupying half of the octahedral voids. The formula of the solid is

A. $X_4Y_4Z_2$

B. X_2YZ_2

C. X_4YZ

D. X_2YZ

Answer: D

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90. The two ions A^+ and B^- have radii 40 pm and 120 pm respectively. In the closed packed crystal of compound AB, the coordination number of A^+ would be

A. 6

B. 8

C. 4

D. 12

Answer: C

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91. A crystal is made up of particles A. B and C. A forms fcc packing, B occupies all octahedral voids and C occupies all tetrahedral voids. If all the particles along one body diagonal are removed, then the formula of the crystal would be

A. ABC_2

B. A_2BC_2

C. $A_8B_4C_5$

D. $A_5B_4C_8$

Answer: D

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92. The number of nearest neighbours of each atom in cubic close packing (ccp) and body-centred cubic arrangement (bcc) is respectively

A. 12, 12

B. 12, 8

C. 8, 6

D. 8, 8

Answer: B

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93. Minimum distance between two tetrahedral voids if a is the edge length of the cube is

A. $\frac{a}{4}$

B. $\frac{a}{2\sqrt{2}}$

C. $\frac{a}{2}$

D. $\frac{\sqrt{3a}}{4}$

Answer: C

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94. The minimum distance between an octahedral and a tetrahedral void in fcc lattice is

A. $a\sqrt{3}$

B. $\frac{a\sqrt{3}}{2}$

C. $\frac{a\sqrt{3}}{3}$

D. $\frac{a\sqrt{3}}{4}$

Answer: D

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95. You are given 6 identical balls . The maximum number of square voids and triangular voids (in separate arrangements) that can be created respectively are

A. $2, 4$

B. $4, 2$

C. $4, 3$

D. $3, 4$

Answer: A

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96. The number of octahedral voids in case of hcp unit cell is

A. 6

B. 12

C. 4

D. 8

Answer: A

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97. The number of nearest neighbours of each sphere in hexagonal closed packing pattern in its own layer will be

A. 4

B. 6

C. 12

D. 8

Answer: B

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98. In an arrangement of type ABABA .... identical atoms of first layer (A) and third layer (A) are joined by a line passing through their centers . Identify the correct statement .

A. No void is found on the line

B. Only tetrahedral voids are found on the line

C. Only octahedral voids are found on the line

D. Equal number of tetrahedral and octahedral voids are found on the line

Answer: B

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99. Given an alloy of Cu, Ag and Au in which Cu atoms constitute the ccp arrangement . If the hypothetical formula of the alloy is Cu_4Ag_3Au , the probable locations of Ag and Au atoms are

A. Ag- all tetrahedral voids , Au - all octahedral voids

B. Ag- (3th)/8 tetrahedral voicks , Au - (1th)/4 octahedral voids

C. Ag- 1/2 octahedral voicks , Au - 1/2 tetrahedral voids

D. Ag- all octahedral voicks , Au - all tetrahedral voids

Answer: B

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100. Which of the following statement is false ?

A. Two tetrahedral voids are formed on each of the four body diagonals of the cube

B. When body centre of the cube is surrounded by six atoms of face centres , an octahedral voids is formed .

C. Tetrahedral void is present at the centre of each of the 12 edges

D. The shortest distance between two octahedral a voids is $\frac{a}{\sqrt{2}}$ (a is the edge length of the unit cell).

Answer: C

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101. In fcc , a tetrahedral void is formed by atoms at

A. 3 corners and 1 face centre

B. 3 face centres and 1 corner

C. 2 face centres and 2 corners

D. 2 face centres , 1 corner and 1 body centre

Answer: B

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102. The relation between atomic radius (r) and edge length (a) a face - centred cubic cell is

A. $r = \frac{a}{2}$

B. $r = \frac{a}{2\sqrt{2}}$

C. $r = \frac{a\sqrt{3}}{4}$

D. $\frac{\sqrt{2}a}{2}$

Answer: B

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103. The fraction of the total volume occupied by atoms in a simple cube is

A. $\frac{\pi}{2}$

B. $\frac{\sqrt{3}\pi}{8}$

C. $\left(\sqrt{2}\pi\right)6$

D. $\frac{\pi}{6}$

Answer: D

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104. In a close packed structure of mixed oxides , the lattice is composed of oxide ions , one eighth of the tetrahedrai voids are occupied by divalent cations (A) while half of the octahedral voids

are occupied by trivalent cations (B) . What is the formula of the oxide ?

A. A_2B_3O

B. $A_4B_2O_3$

C. AB_2O_4

D. $A_3B_2O_2$

Answer: C

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105. An ionic solid AB crystallizes as a bcc structure . The distance between cation and anion in the lattice is 338 pm . Calculate the edge length of the unit cell .

A. 195.15 pm

B. 97.58 pm

C. 390.3 pm

D. 780.6 pm

Answer: C

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106. In a metal M having bcc arrangement edge length of the unit cell is 400 pm . The atomic radius of the metal is

A. 173 pm

B. 100 pm

C. 141 pm

D. 200 pm

Answer: A

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107. A compound XY crystallizes in BCC lattice with unit cell - edge length of 480 pm , if the radius of Y = is 225 pm , then the radius of X is

A. 95.34 pm

B. 225 pm

C. 127.5 pm

D. 190.7 pm

Answer: D

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108. What are the number of atoms per unit cell and the number of nearest neighbours in a bcc structure ?

A. $2, 12$

B. $4, 12$

C. $2, 8$

D. $2, 6$

Answer: C

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109. An element crystallizes in a fcc lattice and the edge length of the unit cell is 0.559 nm . The density of crystal is 3.19 g / cm^3 . Find atomic weight of the element .

A. 100.6

B. 75.9

C. 95.8

D. 83.9

Answer: D

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110. An element X (molar mass = 80 g / mol) having fcc structure , calculate number of unit cells in 8 g of X.

A. $0.4 \cdot N_A$

B. $0.1 \cdot N_A$

C. $4 \cdot N_A$

D. $0.025 \cdot N_A$

Answer: D

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111. Molybdenum (molar mass 96 $gcrystallizesasbcrystal.\ Ifdensityofcrystalis10.3\frac{g}{}$cm^3 , $thenradiusofMoa \rightarrow mis$(N_A = 6 X 10^23)$(Take$root(3)(31) = 3.2)`

A. 111 pm

B. 314 pm

C. 138.56 pm

D. 314 pm

Answer: C

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112. The coordination number of a metal crystallising a hcp structure is

A. 12

B. 8

C. 6

D. 4

Answer: A

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113. The unit cell present in ABCABC closed packing of atoms is

A. Hexagonal

B. Tetragonal

C. Face centred cube

D. Simple cube

Answer: C

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114. The atomic radius of strontium (Sr) is 215 pm and it crystallizes in FCC . Edge length of the cube is

A. 430 pm

B. 608.2 pm

C. 496.53 pm

D. 304.1 pm

Answer: B

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115. If the density of crystalline CsCI is 3.988 gcm^{-3} , calculate the volume effectively occupied by a single CsCl ion pair in the crystal (CsCl = 168.4)`

A. $7.01 \cdot 10^{-23} cm^3$

B. $6.02 \cdot 10^{-24} cm^3$

C. $1 cm^3$

D. $3.5 \cdot 10^{-23} cm^3$

Answer: A

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116. A binary solid (AB) has a rock salt structure . If the edge length is 500 pm , and radius of cation is 80 pm , find the radius of anion

A. 100 pm

B. 120 pm

C. 250 pm

D. 170 pm

Answer: D

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117. The two ions A^+ ' and $'B^-$ have radii 85 and 200 pm respectively. In the closed packed crystal of compound AB, the coordination number of A^+ ion is

A. 3

B. 4

C. 6

D. 8

Answer: C

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118. Cesium and chloride ions are in contact along the body diagonal in a body-centred cubic lattice. The edge lenth of the unit cell is 350

pm and Cs^+ has a radius of 133pm. Hence, the radius of Cl^- ion is approximately

A. 170

B. 133

C. 180

D. 150

Answer: A

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119. Which of the following given statement(s) is/are correct for both fluorite and antifluorite structures? (i) coordination number of cation is 8 (ii) Number of formula unit is one unit cell is 4 (iii) 100% tetrahedral voids are occupied (iv) Radius ratio of cation and anion is 0.20

A. (i) and (ii)

B. (i), (ii) & (iii)

C. (ii) and (iii)

D. (i), (ii), (iii) & (iV)

Answer: C

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120. A solid AB has ZnS-type structure. The edge lenth of unit cell is 400 pm abd the radius of B^- ion is 0.130 nm. Then the radius of A^+ ion is

A. 35.8 pm

B. 43.2 pm

C. 60.5 pm

D. 53.2 pm

Answer: B

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121. Which of the following is correct?

A. AgBr shows both Schottky and Frankel defect

B. Frenkel defect is shown by ionic solids where there is large difference in size of anion and cation

C. In Frankel defect, dielectric constant of crystal increases

D. All are correct

Answer: D

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122. Antiferromagnetic substance possess:

A. Low magnetic moment

B. Large magnetic moment

C. Zero magnetic moment

D. Non-zero value of magnetic moment

Answer: C

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123. $MgFe_2O_4$ has spinel structure , then the percentge of tetrahedral voids and the octahedral voids occupied are respectively

A. 25% & 37.5%

B. 12.5% & 50%

C. 25% & 25%

D. 37.5% & 25%

Answer: B

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124. If an ionic solid XY (X & Y are monovalent ions) is doped with 10^{-2} moles % of another ionic solid AY_3 , then the concentration of the cation vacancies created is

A. $6.023 \times 10^{19} mol^{-1}$

B. $60.23 \times 10^{18} mol^{-1}$

C. $12.05 \times 10^{21} mol^{-1}$

D. $1.205 \times 10^{21} mol^{-1}$

Answer: D

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125. Which of the following given statesment is incorrect?

A. F-centres generation is responsible factor for imparting colour to the crystal

B. Frenkel defect is usually shown by ionic compound having low coordination number

C. Stoichiometry of crystal remains uneffected due to schottky defect

D. Density of crystal always increses due to susbtitutional impurity defect

Answer: D

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126. Which of the following given statement for semiconductor is correct?

A. p-type semiconductor is formed by doping Si with B

B. p-type semiconductor is formed by doping Si with P

C. n-type semiconductor is formed by doping Si with Al

D. n-type semiconductor is formed by doping Ge with B

Answer: A

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127. Which of the following given moleculues in a pair are paramagnetic and ferrimagnetic substance respectively?

A. $Fe_3O_4 '\& ' H_2O$

B. $MnO\& ' CrO_2$

C. $Cu^2 + \ \& \ ZnFe_2O_4$

D. $C_6H_6 ' \& ' O_2$

Answer: C

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128. In 'Na_2 O' structure

A. $O^2 -$ ions constitute CCP and 'Na^+' ions occupy all the octahedral holes

B. O^2-' ions constitute CCP and 'Na^+' ions occupy all the tetrahedral holes

C. O^2-' ions constitute CCP and 'Na^+' ions occupy 50% of tetrahedral holes and 100% octahedral holes

D. `Na^+' ions constitute CCP and 'O^2-' ions occupy half of octahedral holes

Answer: B

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129. When acrystal structure of NaCl type is pressurised

A. The coordination number is decreased to 8 and converted to CsCl type crystal structure

B. The coordination number is remains same

C. The coordination number is increased to 8 and converted to CsCl type crystal structure

D. The coodination number is increased to 4 and coverted to ZnS type crystal structure

Answer: C

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130. Ferromagnetism arises becases of the sponteneous alignment of the magnetic moments due to unpaired electrons as

A. uparrowuparrowuparrowuparrowuparrow

B. uparrowuparrowuparrowdownarrowdownarrow

C. uparrowdownarrowuparrowdownarrow

D. uparrowuparrowdownarrowuparrowuparrow

Answer: A

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131. The minimum distance between two tetrahedral voids in NaCl type crystal structure is (a is edge lenth)

A. $\frac{\sqrt{3}a}{4}$

B. $\frac{a}{2}$

C. $\frac{a}{2 \times \sqrt{2}}$

D. $\frac{\sqrt{2}a}{2}$

Answer: B

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132. 2 M of 100 mL Na_2SO_4 is mixed with 3 M of 100 mL NaCl solution and 1 M of 200 mL $CaCl_2$ solution . Then the ratio of the concentration of cation and anion is

A. $1:1$

B. $2:1$

C. $2:3$

D. $1:2$

Answer: A

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133. Among the following , select the pair that does not form an ideal solution

A. Carbon tetrachloride and Silicon tetrachloride

B. Chlorobenzene and Bromobenzene

C. Chloroform and Carbon tetrachloride

D. Benzene and toluene

Answer: C

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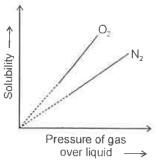
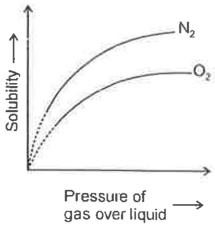
134. Which oth following graph is correct for solubility of O_2 and N_2 in water at 298

A. 

B. (##AAK_MCP_16_NEET_CHE_E16_018_Q02##)

C. (##AAK_MCP_16_NEET_CHE_E16_018_Q03##)

D. 

Answer: A

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135. Consider the data given below

`(AAK_MCP_16_NEET_CHE_E16_019_Q01.png" width="80%">

On the basis of the given data, arrange the gases in their increasing

A. AltBltCltD

B. BltDltAltC

C. CltDltAltB

D. CltAltDltB

Answer: B

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136. The volume of water added to 500 mL , 0.5 M NaOH so that its strenth becomes 10mg NaOH per mL is

A. 250 mL

B. 500 mL

C. 750 mL

D. 1000 mL

Answer: B

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137. Amount (in g) of sample containing 80% NaOH required to prepare 60 litre of 0.5 M solution is

A. 1000

B. 1200

C. 1500

D. 1600

Answer: C

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138. Henry's law is not valid when

A. Temperature is high

B. Pressure is low

C. The gas is not highly soluble

D. The gas neither reacts chemically with solvent nor dissociates or associates in the solvent

Answer: A

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139. Number of Faraday's required to generate one gram atom Cacl_2` is

A. 1

B. 2

C. 3

D. 4

Answer: B

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140. For the production of y L H_2 at STP at cathode, cost of electricity is x then cost of production of y LO_2 at STP at anode will be

A. x

B. $\frac{x}{2}$

C. 2x

D. 4x

Answer: C

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141. When one coulomb of electricity is passed through an electrolytic solution, the mass of the element deposited on the electrode is equal to

A. Molecular weight

B. equivalent weight

C. one gram

D. Electrochemical equivalent

Answer: D

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142. When a solution of $AgNO_3$ (0.5 M) is electrolyzed using platinum anode and cathode. Then the products obtained at two elctrodes are

A. Cu at anode ad Ag at cathode

B. o_2 at anode and Cu at cathode

C. o_2 at anode and Ag at cathode

D. NO_2 at anode and Ag at cathode

Answer: C

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143. Which of the following reaction is not involved in corrosion of iron?

A. $Fe(s) \rightarrow Fe^{2+}(aq) + 2e^-$

B. $4OH^-(aq) \rightarrow O_2(g) + 2H_2O(l) + 4e^-$

C. $4Fe^{2+}(aq) + O_2(g) + 4H_2o(l) \rightarrow 2Fe_2O_3(s) + 8H^+(aq)$

D. $2Fe(s) + o_2(g) + 4H^+(aq) \rightarrow 2Fe^{2+}(aq) + 2H_2O(l)$

Answer: B

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144. During electrolysis of H_2SO_4(aq) with high charge density, $H_2S_2O_8$ is fromed as by product In such electrolysis 44.8 L $H_2(g)$ and 15L $O_2(g)$ liberated at STP Hence, the moles of $H_2S_2O_8$ formed is approximately equal to

A. 0.25

B. 0.66

C. 2

D. 2.68

Answer: B

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145. When a lead storage battery is discharged

Sulphuric acid is consumed

Water is formed

Lead sulphate is produced at both electrodes

SO_2 is evolved

The correct statement is/are

A. only 1

B. only 1 & 2

C. 1 , 2 , & 3

D. Only 4

Answer: C

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146. Three moles of electrons are passed through three solutions in succession containing $AgNO_3$, $CuSO_4$ and $AuCl_3$ respectively the molar ratio of amounts of cations reduced at cathode will be

A. $1:2:3$

B. $3:2:1$

C. $2:1:3$

D. $6:3:2$

Answer: D

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147. The Zn acts as sacrificial or cathodic protection to prevent rusting of iron because

A. E_(op) of Zn = E_(op) of Fe`

B. $E_{op}ofZn > E_{op}ofFe$

C. $E_{op}ofZn < E_{op}ofFe$

D. Zn dose mot react with water

Answer: B

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148. An aqueous solution of NaCL on electrolysis gives H_2(g),CL_2(g) and NaOH according to the equation `2Cl^(-)(aq)+2H_2O

A. 48.71 hr,1041M

B. 2880 min, 1041M

C. 17.54 hr, 2M

D. 170.54 min, 2M

Answer: A

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149. When an electric current is passed through a cell having an electrolyte, then the cations and anions move to their respective electrodes if the cathode is pulled out of the solution then

A. Both cations and anions will move towards anode

B. cations will start moving towards anode while anions will stop moving

C. Anions will continue to move towards anode while cations will stop moving

D. Both cations and anions will starts moving randomly

Answer: D

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150. Which of the following given batteries are rechargeable?

Dry-cell battery

Nickel-cadmium battery

Lithium battery

Fuel cell

Lead storage battery

A. 1,2 & 4

B. 2, 3 & 5

C. 1, 2, 4 & 5

D. 2, 4 & 5

Answer: B

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151. Electrolysis of 50 L aqueous solution of CH_3COONa was done by passing 2F of electricity the pH of the solution and the gaseous products obtained at anode and cathode are respectively

A. pH=12.6,$C_2\ H_6$(g)+CO_2(g) &H_2(g)

B. pH=2, $C_2\ H_6$(g)+CO_2(g) &H_2(g)

C. pH=6.0, CH_4(g)+CO_2(g) &H_2(g)

D. pH=13.5, CH_4(g)+CO_2(g) & O_2(g)

Answer: A

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152. When an acidified solution of Na_2MoO_n (atomic mass of Moi=36) is electrolyzed, O_2 gas is liberated corresponding to a volume of 0.112 L at STP and mass of Mo deposited is 0.32 g. Then the formula of the salt and oxidation state of Mo is

A. Na_2MoO, 0

B. Na_2MoO_4,+6

C. Na_2MoO_2,+2

D. Na_2MoO_3,+4

Answer: B

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Exercise

1. For an equilibrium reaction, if the value of standard Gibb's free energy, AG° is zero, then the value of equilibrium constant, K will be equal to

A. Zero

B. 2

C. 1

D. 10

Answer: C

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2. The equlibrium constant k_p for the reactin. `2NOCL(g)

A. 4.912 kcal

B. 14.74 kcal

C. 7.3 kcal

D.

Answer: D

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3. The yeild of production of `A_2(g) + 2B(g)

A. High temperature and high pressure

B. High temperature and low pressure

C. Low temperature and high pressure

D. Low temperature and low pressure

Answer: C

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4. A chemical reaction is catalyzed by a catalyst' X'. Hence the catalyst 'X'

A. Changes the equilibrium constant of the reaction

B. Changes the enthalpy of reaction (AH)

C. Alters the concentration of both reactants and products in a state of equilibrium

D. Increases the speed of both the forward and backwand eactions to same extent in a reversible

Answer: D

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5. Which one of the equation is currect ?

A. $\delta G = \delta G^0 + nRT \log Q$

B. $\delta G = \delta G + nRT \log Q$

C. $\delta G = \delta G^0 + nRTInQ$

D. $\delta G = \delta G + nRTInQ$

Answer: C

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6. The yeild of production

A. 4.24

B. 2.12

C. 42.4

D. 8.48

Answer: A

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7. In which of the following reaction, the formation of product is favoured by increase in pressure?

A. $CO_2(g) < \Rightarrow 2CO(g) + O_2(g)$

B. $3O_2(g) < \Rightarrow 2O_3(g)$

C. $CO_2(g) + C(s) < \Rightarrow 2CO(g)$

D. $CH_4(g) + H_2O(g) < \Rightarrow CO(g) + 3H_2(g)$

Answer: B

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8. Consider the following reaction at equilibrium: `NH_4HS(s)

A. Equilibrium shifts in the backward direction

B. Equilibrium shifts in the forward direction

C. Equilibrium remains unaffected

D. The value of K is increased

Answer: C

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9. Ammonia is a weak base that reacts with water according to the equation:` NH_3(aq) +H_2O(l)

A. Addition of HCI

B. Addition of H_2O

C. Addition of NaOH

D. Addition of NH_4CI

Answer: C

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10. The equilibrium,` Baco_3(s)

A. Addition of BaO(s)

B. Removal of CO_2(g)

C. Removal of Bao(s)

D. Decreasing the volume of the vessel

Answer: D

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11. Le-Chatelier's principle is not applicable to which of the following reaction?

A. $N_2(g) + 3H_2(g) < \Rightarrow 2NH_3(g)$

B. $PCL_5(g) < \Rightarrow PCL_3(g) + CL_2(g)$

C. $Fe(s) + S(s) < \Rightarrow FeS(s)$

D. $CaCO_3(s) < \Rightarrow CaO(s) + CO_2$

Answer: C

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12. In which of the following reactions, increase in the pressure at constant temperature does not affect the moles at equilibrium?

A. $H_2(g) + \frac{1}{2}O_2(g) < \Rightarrow H_2O(g)$

B. $H_2(g) + I_2(g) < \Rightarrow 2HI(g)$

C. $C(g) + \frac{1}{2}O < \Rightarrow CO(g)$

D. $2NH_3(g) < \Rightarrow N_2(g) + 3H_2(g)$

Answer: B

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13. For the gas phase exothermic reaction,` A(g) + 2B(g)

A. Decreasing the temperature

B. Increasing the pressure

C. Adding inert yas at constant pressure

D. Removing C(g) at equilibrium

Answer: C

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14. For the reaaction,` CO(g) +H_2O(g)

A. Increasing the pressure

B. Adding an inert gas at constant pressure

C. Increasing the volume of the container

D. Increasing the amount of CO(g)

Answer: D

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15. Which among the following is a Lewis acid?

A. NH_3

B. BF_3

C. H_2O

D. NH_4

Answer: B

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16. The species which can act both as Bronsted acid and base is

A. CO_3^{2-}

B. NO_3^-

C. HSO_4^-

D. SO_4^{2-}

Answer: C

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17. An example of a strong electrolyte is

A. Glucose

B. Urea

C. Ammonium hydroxide

D. Sodium formate

Answer: D

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18. For a weak acid HA of concentration $C\left(moll^{-1}\right)$ and degree of dissociation (α), Ostwald's dilution law is represented by the

equation

A. $K_a = \frac{C^2\alpha}{1-\alpha}$

B. $K_a = \frac{\alpha^2 C}{1-\alpha}$

C. $K_a = C\alpha$

D. $K_a = \frac{C\alpha^2}{1-\alpha^2}$

Answer: B

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19. In the given irreversible reaction, $H_2O + HCl \rightarrow H_3O^+ + Cl^-$ the species that acts as Bronsted base is

A. H_2O

B. HCl

C. H_3O^+

D. Cl^-

Answer: A

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20. pH of a 0.001 M NaOH solution will be

A. 9

B. 3

C. 11

D. 12

Answer: C

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21. pH of a solution is 5. Thus. the concentration of hydroxyl ion in the solution is

A. $9molL^{-1}$

B. $5molL^{-1}$

C. $10^{-5}molL^{-1}$

D. $10^{-9}molL^{-1}$

Answer: D

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22. The dissociation constant of an acid, HA is $1x10^{-5}$ The pH of 0.1 M solution of the acid will be

A. 3

B. 5

C. 4

D. 2

Answer: A

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23. 100 mL of 0.01 M solution of NaOH is diluted to 1 litre. The pH of resultant solution will be

A. 3

B. 12

C. 11

D. 8

Answer: C

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24. At 85°C, distilled water has $\left[H_3O^+\right]$ concentration equal to $1x10^{-6}$ molelitre. The value of K_w at this temperature will be

A. $1 \cdot 10^{-8}$

B. $1 \cdot 10^{-14}$

C. $1 \cdot 10^{-12}$

D. $1 \cdot 10^{-7}$

Answer: C

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25. The pH of a solution obtained by mixing 50 mL of 2N HCI and 50 mL of 1 N NaOH is [log 5 = 0.7]

A. 1.7

B. 1.3

C. 0.7

D. 0.3

Answer: D

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26. If the pH of a solution is increased from 3 to 6, then H^+ ion concentration of the solution will be

A. Increased by 1000 times

B. Reduced to half

C. Reduced by 100 times

D. Reduced by 1000 times

Answer: D

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27. Ionic product of water increases, if

A. H^+ ions are added

B. OH ions are added

C. Temperature decreases

D. Temperature increases

Answer: D

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28. The hydrogen ion concentration of 0.1 M solution of acetic acid, which is 20% dissociated, is

A. 0.02 M

B. 2 M

C. 0.2 M

D. 0.002 M

Answer: A

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29. A monobasic weak acid solution which is 0.002 M has pH value equal to 5, The percentage ionization value of the acid in the solution will be

A. 0.5

B. 0.005

C. 5

D. 0.05

Answer: A

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30. The solubility of AgCl will be minimum in

A. $0.1MCaCl_2$

B. $0.01MAgNO_3$

C. Pure water

D. $0.1MNH_3$

Answer: A

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31. If the solubility of $Mg(OH)_2$ in water is $SmolL^{-1}$ then its K_sp will be

A. S^3

B. $4S^3$

C. $27S^3$

D. $8S^3$

Answer: B

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32. Aqueous solution of sodium acetate is

A. Alkaline

B. Neutral

C. Weakly acidic

D. Strongly acidic

Answer: A

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33. An acidic buffer solution can be prepared by mixing the solutions of

A. Sodium chloride and sodium hydroxide

B. Nitric acid and sodium nitrate

C. Ammonium chloride and ammonium hydroxide

D. Sodium acetate and acetic acid

Answer: D

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34. In hydrolysis of a salt of weak acid and strong base, the hydrolysis constant (K_a) is equal to

A. $\frac{K_w}{K_b}$

B. $\frac{K_w}{K_a \cdot K_b}$

C. $\frac{K_w}{K_a}$

D. $\frac{K_a \cdot K_b}{K_w}$

Answer: C

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35. The pH of a solution at $25^\circ C$ containing 0.20 M sodium acetate and 0.06 M acetic acid is $(pK_af \text{ or } CH_3COOH = 4.74 \text{ and } \log 3 = 0.477)$

A. 4.36

B. 5.26

C. 5.84

D. 6.32

Answer: B

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36. The pH of 0.2 M aqueous solution of NH_4CI will be $(pK_a of NH_3 = 4.74, \log 2 = 0.3)$

A. 4.98

B. 5.42

C. 4.76

D. 4.32

Answer: A

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37. On adding ammonium chloride to a solution ammonium hydroxide

A. Dissociation of NH_4OH increases

B. Concentration of OH increases

C. Concentration of OH decreases

D. Concentration of OH remains unchanged

Answer: C

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38. Aqueous solution of which salt will not be hydrolysed?

A. Potassium nitrate

B. Potassium cyanide

C. Potassium formate

D. Potassium acetate

Answer: A

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39. If K_sp of $HgSO_4$, $is 6.4x10^{-5}M^2$, then solubility of the $HgSO_4$, in water will be

A. $5.4 \cdot 10^{-5}M$

B. $8 \cdot 10^{-3}M$

C. $8 \cdot 10^{-4}M$

D. $6.4 \cdot 10^{-3}M$

Answer: B

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40. pH of 0.5 M aqueous NaCN solution is $(pK_aofHCN = 9.3, \log 5 = 0.7)$

A. 10.3

B. 9.5

C. 10.6

D. 11.5

Answer: D

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41. The pH of an aqueous solution of 1.0M ammonium formate will be

$(pk_aoff \text{ or } micacid = 3.8 \text{ and } pK_a, ofammoniumhydr \otimes ide = 4.8)$

A. 5.5

B. 7.5

C. 6.1

D. 6.5

Answer: D

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42. How many grams of calcium oxalate should be dissolved in water to make one litre of saturated solution? K_sp of CaC_2O_4 is $2.5x10^{-9}$ and its molecular weight is 128 u

A. $6.4 \cdot 10^{-3}g$

B. $8.0 \cdot 10^{-3}g$

C. $1.28 \cdot 10^{-3}g$

D. $6.4 \cdot 3.2^{-3}g$

Answer: A

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43. The pH at which M(OH), will begin to precipitate from a solution containing $0.10MM^2 +$ ions $\left[K_spofM(OH)_2 = 1x10^{-9}M^3\right]$ 1 is

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44. If a certain buffer solution contains equal concentration of X^- and HX. Then the pH of buffer will be $\left(K_b f \text{ or } X^{-i} s 10^{-10}\right)$

A. 10

B. 4

C. 5

D. 11

Answer: B

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45. When ClO_3^- , changes toCI^-

A. It gains six electrons

B. It gains four electrons

C. It loses six electrons

D. It gains three electrons

Answer: A

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46. A reducing agent is a substance which can

A. Accept electron

B. Donate electron

C. Reduce itself

D. Oxidises another species

Answer: B

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47. For the redox reaction: $Fe^{2+} + Cr_2O_7^{2-} + H^+ \rightarrow Fe^{3+} + Cr^{3+} + H_2O$ The correct coefficients of the reactants for the balanced reaction are

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48. Which among the following will not act as a reducing agent?

A. KNO_2

B. KI

C. $NaNO_3$

D. H_2S

Answer: C

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49. in which of the following reactions,H_2O_2 is acting as a reducing agent?

A. $PbS + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O$

B. $Cl_2 + H_2O, \rightarrow 2HCI + O_2$

C. $2Fe^2 + H_2O_2 \rightarrow 2Fe^{3+} + 2OH$

D. $H_2SO_4 + H_2O_2 \rightarrow H_2SO_4 + H_2O$

Answer: B

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50. In the given reaction: $P_4 + NaOH + H_2O \rightarrow PH_3 + NaH_2PO_2$

A. P is reduced only

B. P undergoes disproportionation reaction

C. P is oxidised only

D. O is reduced

Answer: B

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51. In the conversion of $I_2 \rightarrow IO_3^-$ the oxidation state of iodine changes from

A. 0 to +6

B. 0 to +5

C. 0 to -1

D. 0 to -3

Answer: B

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52. The oxidation state of Mn in MnO_4^{2-} is

A. $+8$

B. $+6$

C. $+7$

D. $+5$

Answer: B

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53. The oxidation state of phosphorous in various compounds vary between

A. (-3) to +5

B. (-1) to +3

C. (-3) to +3

D. (-5) to +5

Answer: A

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54. The average oxidation state of sulphur atom in $S_4O_6^{2-}$ ion is

A. $+2$

B. $+5$

C. 0

D. $+2.5$

Answer: D

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55. Which is not an example of disproportionation reaction?

A. $Cl_2(g) + 2OH_{aq} \rightarrow CIO^-(aq) + CI^-\_(aq) + H_2O(I)$

B. $4CIO_3^{-(aq)} \rightarrow 3CIO_4(aq) + 2CI^{-(aq)}$

C. $2F_2(g) + 2OH(aq) \rightarrow 2F^{-(aq)} + OF_2(g) + H_2O(I)$

D. $S_8(s) + 12O'H(aq) \rightarrow 4S^{2-}(aq) + 2S_2O_3^{2-}(aq) + 6H_2O(I)$

Answer: C

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56. For the redox reaction: $MnO_4 + C_2O_4^{2-} + H^+ \rightarrow Mn^{2+} + CO_2 + H_2O$ The number of mole of permanganate ion required per mole of oxalate ion for completion of the reaction is

A. $\frac{1}{5}$

B. $\frac{2}{5}$

C. $\frac{5}{2}$

D. $\frac{3}{5}$

Answer: B

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57. The equivalent weight of $MnCl_2$, is half of its molecular weight when it is converted to

A. MnO_4^-

B. Mn_2O_3

C. MnO_2

D. MnO_4^{2-}

Answer: C

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58. The value of n in the following half equation is

$MnO_4^- + 2H_2O + \neq \rightarrow MnO_2 + 4OH^-$

A. 3

B. 5

C. 4

D. 6

Answer: A

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59. The oxidation state of Cr in CrO_5 is:

A. $+4$

B. $+6$

C. $+8$

D. $+10$

Answer: B

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60. For the galvanic cell: $Zn(s)\left|Zn^{2+}(aq)(1.0M)\right|\left|Ni^{2+}(aq)(1.0M)\right|Ni(s)$, E_cell^o will be [Given $E^0_{\frac{Zn^{2+}}{Zn}} = -0.76V$, $\left[E^0_{\frac{Ni^{2+}}{Ni}} = -0.25V\right]$

A. $-0.51V$

B. $-1.01V$

C. $0.51V$

D. $1.01V$

Answer: C

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61. Which of the following metals will not react dilute hydrochloric acid?

A. Cu

B. Zn

C. Fe

D. Ca

Answer: A

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62. Syngas is a mixture of

A. $CO_2 + H_2$

B. $CO_2 + N_2$

C. $H_2 + O_2$

D. $CO + H_2$

Answer: D

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63. $Zn(s) + Cu^{2+}(aq) \rightarrow Zn^{2+}(aq) + Cu(s)$ The cell representation for the above redox reaction is

A. $Cu(s)\left|Cu^{2+}(aq)\right|\left|Zn^{2+}(aq)\right|Zn(s)$

B. $Zn(s)\left|Zn^{2+}(aq)\right|\left|Cu^{2+}(aq)\right|Cu(s)$

C. $Cu(s)\left|Cu^{2+}(aq)\right|\left|Zn(s)\right|Zn^{2+}(aq)$

D. $Zn(s)\left|Zn^{2+}(aq)\right|\left|Cu(s)\right|Cu^{2+}(aq)$

Answer: B

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64. In which of the compounds the oxidation state of hydrogen is -1?

A. H_2O

B. CaH_2

C. HBr

D. H_2S

Answer: B

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65. In iodometric titration which indicator is used to detect end point of titration reaction?

A. Diphenylamine

B. Starch

C. $MnO_4^{\ominus}$

D. Methyl orange

Answer: B

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66. If a small Cu rod is placed in an aqueous solution of ferrous salt, then which of the following will be observed? ($E^0_{\frac{Cu^{2-}}{Cu}} = -0.34V$, $E^0_{\frac{Fe^{2+}}{Fe}} = -0.44V$)

A. Copper will be oxidised

B. Fe^{2+} will be reduced

C. No reaction will take place

D. Fe^{2+} will be oxidised

Answer: C

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67. The standard reduction potential of zinc and silver at 298 K are ($\forall K_M CP_{14} \_ N \exists T_C HE_E 14_{023} \_ Q01$) Which of the following reactions actually takes place in a cell reaction?

A. $Zn^{2+}(aq) + 2Ag^{2+}(aq) \rightarrow Zn(s) + 2Ag(s)$

B. $Zn(s) + 2Ag^{+}(aq) \rightarrow zn^{2+}(aq) + 2Ag(s)$

C. $Zn^{2+}(aq) + 2Ag(s) \rightarrow 2Ag^{+}(aq) + Zn(s)$

D. $Zn(s) + 2Ag(s) \rightarrow Zn^{2+}(aq) + 2Ag^{+}$

Answer: B

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68. Four metals A, B, C and D are having standard reduction potential as -3.06, -1.66, -0.40 and 0.80 volt respectively. The most reactive metal is

A. D

B. A

C. C

D. B

Answer: B

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69. In faintly alkaline solution, 4 moles of permanganate anion quantitatively oxidize thiosulphate anions to produce X moles of sulphate anion. The value of X

A. 8

B. 6

C. 4

D. 3

Answer: D

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