CHEMISTRY

BOOKS - NARENDER AVASTHI CHEMISTRY (ENGLISH)

STOICHIOMETRY

Level-2

1. A mixture of NH_4NO_3 and $(NH_4)_2HPO_4$ contain 30.40% mass per cent of nitrogen. What is the mass ratio of the two components in the mixture ?

A. (a) $2:1$

B. (b) $1:2$

C. (c) $3:4$

D. (d) $4:1$

Answer: A

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2. What volume of 75% alcohol by weight $\left(d - 0.80g/cm^3\right)$ must be used to prepare 150 cm^3 of 30 % alcohal by mass $\left(d = 0.90g/cm^3\right)$?

A. (a) 67.5 mL

B. (b) 56.25 mL

C. (c) 44.44 mL

D. (d) None of these

Answer: A

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3. Calculate the number of millilitre of NH_3(aq) solution (d=0.986g/ml) contain 2.5% by mass NH_3, which will be required to precipitate iron as

$Fe(OH)_3$ in a 0.8 g sample that contains 50% Fe_2O_3.

A. 0.344 mL

B. 3.44 mL

C. 17.24 mL

D. 10.34 mL

Answer: D

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4. In the preparation of iron from haematite (Fe_2O_3) by the reduction with carbon

$Fe_2O_3 + C \rightarrow Fe + CO_2$

how much 80% pure iron may be produced from 120 kg of 90% pure Fe_2O_3?

A. 94.5 kg

B. 60.48 kg

C. 116.66 kg

D. 120 kg

Answer: A

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5. A mineral consists of an equimolar mixture of the carbonates of two bivalent metals. One metal is present to the extent of 12.5% by mass.2.8 g of the mineral on heating loat 1.32 of CO_2. What is the % by mass of the other metal ?

A. 87.5

B. 35.71

C. 65.11

D. 23.21

Answer: D

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6. 6.2 g of a sample containing $NaHCO_3$, $NaHCO_3$ and non -volatiale inert impurity on gentle heating loses 5% of its mass due to reaction $2NaHCO_3 \rightarrow Na_2CO_3 + H_2O + CO_2$. Residue is dissolved in water and formed 100 mL solution and its 10 mL portion requires 7.5 mL of 0.2 M aqueous solution of $BaCl_2$ for complete precipitation of carbonates. Determine mass (in gram) of Na_2CO_3 in the original sample .

A. 1.59

B. 1.06

C. 0.53

D. None of these

Answer: B

7. Nitric acid canbe produced from NH_3in three steps process given below

(I)$4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(g)$

(II)$2NO(g) + O_2(g) \rightarrow 2NO_3(g)$

$3NO_2(g) + H_2O(l) \rightarrow 2HNO_3(aq) + NO(g)$

percent yield of 1^{st} ,2^{nd} and 3^{rd} steps are respectively 50%,60% and 80% respectivley then what volume of NH_3(g) at 1 atm and 0°required to produced1575 g of HNO_3 .

A. 156.25

B. 350 L

C. 3500 L

D. None of these

Answer: C

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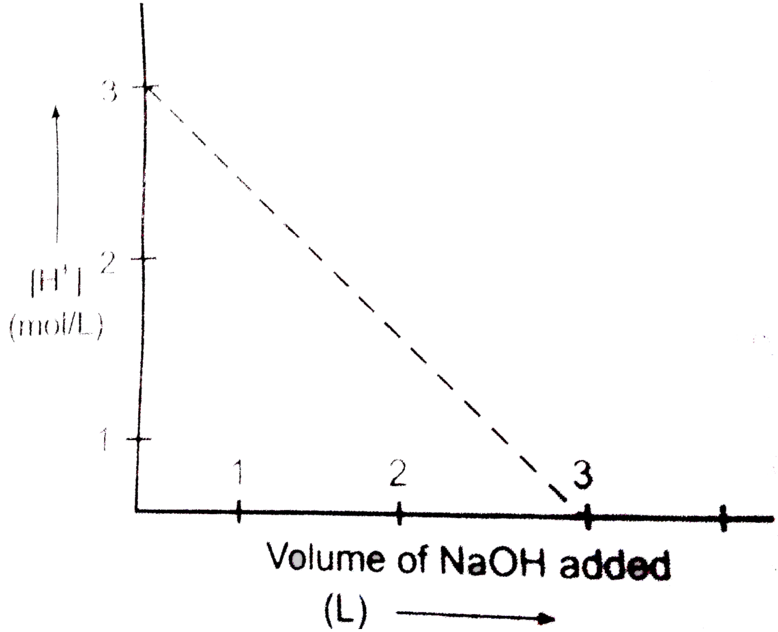
8. 1 M NaOH solution was slowly added in to 1000 mL of 183.75 g impure H_2SO_4 solution and the following plot was obtained. The percentage purity of H_2SO_4 sample and slope of the curve respectively are:



A. 75%, $-\frac{1}{3}$

B. 80%, $-\frac{1}{2}$

C. 80%, -1

D. None of these

Answer: C

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9. MnO_2 on ignition converts into Mn_3O_4. A sample of pyrolusite having 75% MnO_2, 20% inert impurities and rest water is ignited in air to constant mass. What is the percentage of Mn in the ignited sample ?

A. (a) 0.246

B. (b) 0.37

C. (c) 0.5524

D. (d) 0.7405

Answer: C

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10. A 1.0g sample of a pure organic compound cotaining chlorine is fused with Na_2O_2 to convert chlorine to NaCl. The sample is then dissolved in water, and the chloride precipitated with $AgNO_3$, giving 1.96 g of AgCl. If the molecular mass of organic compound is 147, how many chlorine does each molecule contain ?

A. 1

B. 2

C. 3

D. 4

Answer: B

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11. A 0.6gm sample consisting of only CaC_2O_4 and MgC_2O_4 is heated at $500^\circ C$gets converted into $CaCO_3$ and $MgCO_3$. The sample then weighed 0.465gm. If the sample had been heated to $900^\circ C$ where the products are CaO and MgO, then what would the mixture of oxides weigh?

A. 0.12 g

B. 0.21 g

C. 0.252 g

D. 0.3 g

Answer: C

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12. A metal M forms the sulphate $M_2(SO_4)_3$. A 0.596 gram sample of the sulphate reacts with excess $BaCl_2$ to give 1.220 g $BaSO_4$. What is the atomic mass of M ?

A. 26.9

B. 69.7

C. 55.8

D. 23

Answer: A

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13. Urea(H_2NCONH_2) is manufactured by passing CO_2(g) through ammonia solution followed by crystallization. For the above reaction is prepared by combustion of hydrocarbons. If combustion of 236 kg of a saturated hydrocarbon (C_nH_{2n+2}) produces as much CO_2 as required for production of 999.6 kg urea then molecular formula of hydrocarbon is:

A. $C_{10}H_{22}$

B. $C_{12}H_{26}$

C. $C_{13}H_{28}$

D. C_8H_{18}

Answer: B

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14. 11.6 g of an organic compound having formula (C_nH_{2n+2}) is burnt in excess of $O_2(g)$ initially taken in a 22.41 litre steel vessel. Reaction the gaseous mixture was at 273 K with pressure reading 2 atm. After complete complete combustion and loss of considerable amount of heat, the mixture of product and excess of O_2 had a temperature of 546 K and 4.6 atm pressure. The formula of organic compound is :

A. C_6H_6

B. C_3H_8

C. C_5H_{12}

D. C_4H_{10}

Answer: D

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15. $H_2O_2 + 2KI \xrightarrow{40\,\%\,\text{yield}} I_2 + 2KOH$

$H_2O_2 + 2KMnO_4 + 3H_2SO_4 \xrightarrow{50\,\%\,\text{yield}} K_2SO_4 + 2MnSO_4 + 3O_2 + 4H_2O$

150mL of H_2O_2 sample was divided into two parts. First part was treated with KI and formed KOH required 200 mL of $M/2H_2SO_4$ for neutralisation. Other part was treated with $KMnO_4$ yielding 6.74 litre of O_2 at 1 atm. and 273 K. Using % yield indicated find volume strength of H_2O_2 sample used.

A. 5.04

B. 10.08

C. 3.36

D. 33.6

Answer: D

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16. SO_2Cl_2 (sulphuryl chloride) reacts with water to given a mixture of H_2SO_4 and HCL. What volume of 0.2 M $Ba(OH)_2$ is needed to completely neutralize 25 mL of 0.2 MSO_2Cl_2 solution:

A. 25 mL

B. 50 mL

C. 100 mL

D. 200 mL

Answer: B

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17. 5 g sample contain only Na_2CO_3 and Na_2SO_4 . This sample is dissolved and the volume made up to 250 mL. 25 mL of this solution neutralizes 20 mL of 0.1 M H_2SO_4.

Calcalute the % of Na_2SO_4 in the sample .

A. 42.4

B. 57.6

C. 36.2

D. None of these

Answer: B

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18. 20 mL of 0.2 M NaOH(aq) solution is mixed with 35 mL of this 0.1 ML NaOH (aq) solution and the resultant solution is diluted to 100 mL. 40 mL of this diluted solution reacted with 10% impure sample of oxalic acid $(H_2C_2O_4)$ The mass of impure is:

A. 0.15 gram

B. 0.135 gram

C. 0.59 gram

D. None of these

Answer: A

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19. A silver coin weighing 11.34 g was dissolved in nitric acid When sodium chloride was added to the solution all the silver (present as $AgNO_3$) precipitated as silver chloride. The mass of the precipitated silver chloride was 14.35 g. Calculate the percentage of silver in the coin.

A. 48%

B. 95.2%

C. 90%

D. 80%

Answer: B

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20. Two elements A and B combine chemically to from compounds combining with a fixed mass of A in I, II and III is $1:3:5$, if 32 parts by mass of A combine with 84 parts by mass of B in II, then III, 16 parts of A will combine with................ by mass of B.

(a) 14 parts by mass of Y

(b) 42 parts by mass of Y

(c) 70 parts by mass of Y

(d) 84 parts by mass of Y

A. 14 parts by mass of Y

B. 42 parts by mass of Y

C. 70 parts by mass of Y

D. 84 parts by mass of Y

Answer: C

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21. The conversion of oxygen to ozone occurs to the extent of 15% only. The mass of ozone that can be prepared from 67.2 L of oxygen at 1 atm and 273 K will be :

A. 14.4 g

B. 96 g

C. 640 g

D. 64 g

Answer: A

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22. RH_2 (ion exchange resin) can replace Ca^{2+} ions in hard water as $RH_2 + Ca^{2+} \rightarrow RCa + 2H^+$. If L of hard water after passing through RH_2 has pH=3 then hardness in parts per million of Ca^{2+} is :

A. 20

B. 10

C. 40

D. 100

Answer: A

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23. $100cm^3$ of a solution of an acid (Molar mass =98) containing 29.4 g of the acid per litre were completely neutrazed by $90.0cm^3$ of aq. NaOH cotaining 20 g of NaOH per$500cm^3$. The basicity of the acid is

A. 3

B. 2

C. 1

D. data insufficient

Answer: A

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24. 20 mL of 0.1 M solution of compound $NaCO_3. NaHCO_3.2H_2O$ is titrated against 0.05 M HCL. X mL of HCL is used when phenolphthalein is used as an indicator and y mL of HCL is used when methly orange is the indicator in two separate titrations. Hence (y-x) is:

A. 40 mL

B. 80 mL

C. 120 mL

D. None of these

Answer: B

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25. A sample containing $HAsO_2$ (mol. Mass=108) and weighing 3.78 g is dissolved and diluted to 250 mL in a volumetric flask. A 50 mL sample (aliquot) is withdrawn with a pipet and titrated with 25 mL of 0.05 M solution of I_2. Calculate the percentage $HAsO_2$ in the sample :

A. 0.25

B. 0.2

C. 0.1

D. None of these

Answer: A

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26. A mixture of FeO and Fe_2O_3 is completely reacted with 100 mL of 0.25 M acidified $KMnO_4$ solution. The resultant solution was then treated with Zn dust which converted Fe^{3+} of the solution to Fe^{2+}.The Fe^{2+} required 1000 mL of 0.10 $MK_2Cr_2O_7$ solution. Find out the weight % Fe_2O_3 in the mixture.

A. 80.85

B. 19.15

C. 50

D. 89.41

Answer: A

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27. To a 10mL, 1M aqueous solution of Br_2, excess of NaOH is added so that all Br_2 is disproportionated to Br^- and BrO_3^-. The resulting solution is free from Br^-, by extraction and excess of OH^- neutralised by acidifying the solution. The resulting solution is suffcient to react with 2 g of impure CaC_2O_4(M= 128g/mol) sample. The % purity of oxalate sample is :

A. 0.853

B. 0.125

C. 0.9

D. 0.64

Answer: B

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28. 0.10 g of a sample containing $CuCO_3$ and some inert impurity was dissolved in dilute sulphuric acid and volume made up to 520 mL. This solution was added into 50mL of 0.04 M KI solution where copper precipitates as CuI and I^- is oxidized into I_3^-. A 10 mL portion of this solution is taken for analysis, filtered and made up free I_3^- and then treated with excess of acidic permanganate solution. Liberated iodine required 20 mL of 2.5 mM sodium thiosulphate solution to reach the end point.

Determine mass percentage of $CuCO_3$ in the original sample.

A. 7.41

B. 74.1

C. 61.75

D. None of these

Answer: B

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29. 1 mole of equimolar mixture of ferric oxalate and ferrous oxalate requres x mole of $KMnO_4$ in acidic medium for complete oxidation. X is:

A. 0.5 mole

B. 0.9 mole

C. 1.2 mole

D. 4.5 mole

Answer: B

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30. An impure sample of sodium oxalate $(Na_2C_2O_4$ weighing 0.20 g is dissolved in aqueous solution of $H_2SO_4)$ and solution is titrated at $70^\circ C$,requiring 45 mL of 0.02 M $KMnO_4$ solution. The end point is overrun, and back titration in carried out with 10 mL of 0.1 M oxalic acid solution. Find the purity of $Na_2C_2O_4$ in sample:

(a)75

(b)83.75

(c)90.25

(d)None of these

A. 75

B. 83.75

C. 90.25

D. None of these

Answer: B

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31. 0.5 gmixture of $K_2Cr_2O_7$ and $KMnO_4$ was treated with excess of KI in acidic medium. Iodine liberated required $150cm^3$ of 0.10 N solution of thiosulphate solution for titration.

Find trhe percentage of $K_2Cr_2O_7$ in the mixture :

A. 14.64

B. 34.2

C. 65.69

D. 50

Answer: A

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32. A 150 mL of solution of I_2 is divided into two unequal parts. I part reacts with hypo solution solution in acidic medium. $15mLof0.4Mhypo$ was consumed. II part was added with $100mLof0.3MNaOH$ solution. Residual base required $10mL0.3MH_2SO_4$ solution for complete neutralization. What was the initial concentration of I_2 ?

A. 0.08 M

B. 0.1 M

C. 0.2 M

D. None of these

Answer: B

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33. A mixture of H_2SO_4 and $H_2C_2O_4$ (oxalic acid) and some inert impurity weighing 3.185 g was dessolved in water and the solution made up to 1litre. 10 mL of this solution required 3 mL of 0.1 N NaOH for complete neutralization. In another experiment 100 mL of the same solution in hot condition required 4 mL of 0.02 M $KMnO_4$ solution for complete reaction. The mass % of H_2SO_4 in the mixture was:

A. 40

B. 50

C. 60

D. 80

Answer: A

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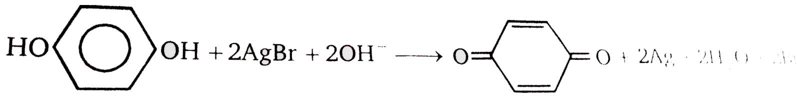
34. During developing of an exposed camera film, one step involves in the following reaction :



(Quinol)

Which of the following best describes the role of quinol?

(a)It acts as an acid

(b)It acts as reducing agent

(c)It act as oxidant

(d)It acts as a base

A. It acts as an acid

B. It acts as reducing agent

C. It acts as oxidant

D. It acts as a base

Answer: B

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35. The concentration of an oxalic acid solution is x mol $litre^{-1}$. 40mL of this solution reacts with 16 mL of 0.05 M acidified $KMnO_4$. What is the pH x M oxalic acid solution ? (Assume that oxalic acid dissociates completely.)

A. (a) 1.3

B. (b) 1.699

C. (c) 1

D. (d) 2

Answer: C

Watch Video Solution

passage-1

1. Oleum is considered as a solution of SO_3 in H_2SO_4, which is obtained by passing SO_3 in solution of H_2SO_4 When 100 g sample of oleum is diluted with desired mass of H_2O then the total mass of H_2SO_4 obtained after dilution is known is known as % labelling in oleum.

For example, a oleum bottle labelled as 109% H_2SO_4 means the 109 g total mass of pure H_2SO_4 will be formed when 100 g of oleum is diluted by 9 g of H_2O which combines with all the free SO_3 present in oleum to form H_2SO_4 as $SO_3 + H_2O \rightarrow H_2SO_4$

What is the % of free SO_3 in an oleum that is labelled as 104.5% H_2SO_4 ?

A. 10

B. 20

C. 40

D. None of these

Answer: B

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2. Oleum is considered as a solution of SO_3 in H_2SO_4, which is obtained by passing SO_3 in solution of H_2SO_4 When 100 g sample of oleum is diluted with desired mass of H_2O then the total mass of H_2SO_4 obtained after dilution is known is known as $\%$ labelling in oleum.

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9.0 g water is added into oleum sample lablled as "112%" H_2SO_4 then the amount of free SO_3remaining in the solution is : (STP=1 atm and 273 K)

A. 14.93 Lat STP

B. 7.46 L at STP

C. 3.73 L at STP

D. 11.2 L at STP

Answer: C

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3. Oleum is considered as a solution of SO_3 in H_2SO_4, which is obtained by passing SO_3 in solution of H_2SO_4 When 100 g sample of oleum is diluted with desired mass of H_2O then the total mass of H_2SO_4 obtained after dilution is known is known as % labelling in oleum.

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If excess water is added into a bottle sample labelled as "112$\%H_2SO_4$" and is reacted with 5.3 g $NaCO_3$ then find the volume of CO_2 evolved at 1 atm pressure and 300 K temperature after the completion of the reaction :

A. 2.46 L

B. 24.6 L

C. 1.23 L

D. 12.3 L

Answer: C

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4. Oleum is considered as a solution of SO_3 in H_2SO_4, which is obtained by passing SO_3 in solution of H_2SO_4 When 100 g sample of oleum is diluted with desired mass of H_2O then the total mass of H_2SO_4 obtained after dilution is known is known as % labelling in oleum.

For example, a oleum bottle labelled as '$019\ \%\ H_2SO_4$' means the 109 g total mass of pure H_2SO_4 will be formed when 100 g of oleum is diluted by 9 g of H_2O which combines with all the free SO_3 present in oleum to form H_2SO_4 as $SO_3 + H_2O \rightarrow H_2SO_4$

1 g of oleum sample is diluted with water. The solution required 54 mL of 0.4 N NaOH for complete neutralization. The % free SO_3 in the sample is :

(a)74

(b)26

(c)20

(d)None of these

A. 74

B. 26

C. 20

D. None of these

Answer: B

Watch Video Solution

passage-2

1. The strength of H_2O_2 is expressed in several ways like molarity, normality,% (w/V), volume strength, etc. The strength of "10 V" means 1 volume of H_2O_2 on decomposition gives 10 volumes of oxygen at 1 atm and 273 K or 1 litre of H_2O_2gives 10 litre of O_2 at 1 atm and 273 K The decomposition of H_2O_2 is shown as under :

$$H_2O_2(aq) \rightarrow H_2O(l) + \frac{1}{2}O_2(g)$$

H_2O_2 can acts as oxidising as well as reducing agent. As oxidizing agent

H_2O_2 is converted into H_2O and as reducing agent H_2O_2 is converted into O_2. For both cases its n-factor is 2. $\therefore \text{Normality} \ \text{of} H_2O_2$ " solution " $= 2 \times \ \text{molarity of} H_2O_2$ solution

What is the molarity of "11.2 V" H_2O_2 ?

A. 1 M

B. 2 M

C. 5.6 M

D. 11.2 M

Answer: A

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What is thepercentage strength (%w/V) of "11.2 V" H_2O_2

A. 1.7

B. 3.4

C. 34

D. None of these

Answer: B

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20mL of H_2O_2 solution is reacted with 80 mL of 0.05 $MKMnO_4$ "in acidic medium then what is the volume strength of" H_2O_2 ?

A. 2.8

B. 5.6

C. 11.2

D. None of these

Answer: B

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40 g $Ba(MnO_4)_2$ (mol.mass=375) sample containing some inert impurities in acidic medium completely reacts with 125 mL of "33.6 V" of H_2O_2. What is the percentage purity of the sample ?

A. 0.2812

B. 0.7031

C. 0.85

D. None of these

Answer: B

Watch Video Solution

passage-3

1. A water is said to be soft water if it produces sufficient foam with the soap and water that does not produce foam with soap is known as hard water. Hardness has been classified into two types (i)Temporary hardness (ii) Permanent hardness.

Temporary hardness is due to presence of calcium and magnesium bicarbonate. It is simply removed by boiling as

$$Ca(HCO_3)_2 \xrightarrow{\Delta} CaCO_3 \downarrow + CO_2 \uparrow + H_2O$$

$$Mg(HCO_3)_2 \xrightarrow{\Delta} MgCO_3 \downarrow + CO_2 \uparrow + H_2O$$

temporary hardness can also be removed by addition of slaked lime, $Ca(OH)_2$

$$Ca(HCO_3)_2 + Ca(OH)_2 \rightarrow 2CaCO_3 \downarrow + 2H_2O$$

permanent hardsness is due to presencce of sulphates and chlorides of

Ca,Mg,etc. It is removed by washing soda as

$CaCl_2 + Na_2CO_3 \rightarrow CaCO_3 \downarrow + 2NaCl$

$CaSO(4) + Na_2CO_3 \rightarrow CaCO_3 \downarrow + Na_2SO_4$

Permanent hardness also removed by ion exchange resin process as

$2RH + Ca^{2+} \rightarrow R_2Ca + 2H^+$

$2ROH + SO_4^{2-} \rightarrow R_2SO_4 + 2OH^-$

The degree of hardness of water is measured in terms of PPm of $CaCO_3$

100 PPm means 100 g of $CaCO_3$ is present in 10^6 g of H_2O. If any other water sample which contain 120 PPm of $MgSO_4$, hardness in terms of $CaCO_3$ is equal to =100 PPm.

One litre of a sample of hard water (d=1 g/mL) cotains 136 mg of $CaSO_4$ and 190 mg of $MgCl_2$. What is the total hardness of water in terms of $CaCO_3$?

A. 100 ppm

B. 200 ppm

C. 300 ppm

D. None of these

Answer: C

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The degree of hardness of water is measured in terms of PPm of $CaCO_3$

100 PPm means 100 g of $CaCO_3$ is present in 10^6 g of H_2O. If any other water sample which contain 120 PPm of $MgSO_4$, hardness in terms of $CaCO_3$ is equal to =100 PPm.

What is the mass of $Ca(OH)_2$ required for 10 litre of water remove temporary hardness of 100 PPm due to $Ca(HCO_3)_2$?

A. 1.62 g

B. 0.74 g

C. 7.4 g

D. None of these

Answer: B

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3. A water is said to be soft water if it produces sufficient foam with the soap and waterthat does not produce foam with soap is known as hard water. Hardness has been classified into two types (i)Temporary hardness (ii) Permanent hardness.

Temporary hardness is due to presence of calcium and magnesium bicarbonate. It is simply removed by boiling as

$$Ca(HCO_3)_2 \xrightarrow{\Delta} CaCO_3 \downarrow + CO_2 \uparrow + H_2O$$

$$Mg(HCO_3)_2 \xrightarrow{\Delta} MgCO_3 \downarrow + CO_2 \uparrow + H_2O$$

temporary hardness can also be removed by addition of slaked lime, $Ca(OH)_2$

$$Ca(HCO_3)_2 + Ca(OH)_2 \rightarrow 2CaCO_3 \downarrow + 2H_2O$$

permanent hardsness is due to presencce of sulphates and chlorides of Ca,Mg,etc. It is removed by washing soda as

$$CaCl_2 + Na_2CO_3 \rightarrow CaCO_3 \downarrow + 2NaCl$$

$$CaSO(4) + Na_2CO_3 \rightarrow CaCO_3 \downarrow + Na_2SO_4$$

Permanent hardness also removed by ion exchange resin process as

$$2RH + Ca^{2+} \rightarrow R_2Ca + 2H^+$$

$$2ROH + SO_4^{2-} \rightarrow R_2SO_4 + 2OH^-$$

The degree of hardness of water is measured in terms of PPm of $CaCO_3$ 100 PPm means 100 g of CaCO_(3) is present in 10^6 g of H_2O. If any other water sample which contain 120 PPm of $MgSO_4$, hardness in terms of $CaCO_3$ is equal to =100 PPm.

A 200 g sample of hard water is passed through the column of cation exchange resin, in which H^+ is exchanged by Ca^{2+}.The outlet water of column required 50mL of 0.1 M NaOH for complete neutralization.What is the hardness of Ca^{2+} ion in PPm?

A. 250 ppm

B. 500 ppm

C. 750 ppm

D. 1000 ppm

Answer: B

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Passage-4

1. "Equivalent mass" =("Molecular mass/Atomic mass")/("n-factor")

n-factor is very important in redox as well as non-redox reactions. With the help of n-factor we can predict the molar ratio of the reactant species taking part in reactions. The reciprocal of n-factor's ratio of the reactions is the molar ratio of the reactants.

In general n-factor of acid/base is number of moles of H^+/OH^- furnished per mole of acid/base n-factor of a reactant is number of moles electrons lost or gained per mole of reactant.

Example 1:

(1)In acidic medium : $KMnO_4(n=5) \rightarrow Mn^{2+}$

(2) In neutral medium : $KMnO_4(n=3) \rightarrow Mn^{2+}$

(3) In basic medium : $KMnO_4(n=1) \rightarrow Mn^{6+}$

Example 2 : $FeC_2O_4 \rightarrow Fe^{3+} + 2CO_2$

Total number of moles e^- lost by 1 mole of FeC_2O_4

$= 1 + 1 \times 2 \Rightarrow 3$

n-factor of $Ba(MNO_4)_2$ in acidic medium is :

A. 2

B. 6

C. 10

D. None of these

Answer: C

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2. "Equivalent mass" =("Molecular mass/Atomic mass")/("n-factor")

n-factor is very important in redox as well as non-redox reactions.With the help of n-factor we can predict the molar ratio of the reactant species specis taking part in reactions. The reciprocal of n-factor's ratio of the reactions is the molar ratio of the reactants.

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Example 2 : $FeC_2O_4 \rightarrow Fe^{3+} + 2CO_2$

Total number of moles e^- lost by 1 mole of FeC_2O_4

$= 1 + 1 \times 2 \Rightarrow 3$

Consider the following reaction.

$H_3PO_2 + NaOH \rightarrow NaH_2PO_2 + H_2O$

What is the equivalent mass of H_3PO_2 ?(mol.Wt.is M)

A. M

B. `M/2

C. M/3

D. None of these

Answer: A

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3. "Equivalent mass" =("Molecular mass/Atomic mass")/("n-factor")

n-factor is very important in redox as well as non-redox reactions.With

the help of n-factor we can predict the molar ratio of the reactant species specis taking part in reactions. The reciprocal of n-factor's ratio of the reactions is the molar ratio of the reactants.

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Example 2 : $FeC_2O_4 \rightarrow Fe^{3+} + 2CO_2$

Total number of moles e^- lost by 1 mole of FeC_2O_4

$= 1 + 1 \times 2 \Rightarrow 3$

For the reaction, $O(\text{molar mass=M}) \rightarrow Fe_2O_3$ what is the eq. mass of $fe_{0.95}$O ?

A. $\frac{M}{0.85}$

B. $\frac{M}{0.95}$

C. $\frac{M}{0.8075}$

D. None of these

Answer: A

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4. "Equivalent mass" =("Molecular mass/Atomic mass")/("n-factor")

n-factor is very important in redox as well as non-redox reactions.With the help of n-factor we can predict the molar ratio of the reactant species specis taking part in reactions. The reciprocal of n-factor's ratio of the reactions is the molar ratio of the reactants.

In general n-factor of acid/base is number of moles of H^{+}/OH^{-} furnished per mole of acid/base n-factor of a reactant is number of moles electrons lost or gained per mole of reactant.

Example 1:

(1)In acidic medium : $KMnO_4(n=5) \rightarrow Mn^{2+}$

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(3) In basic medium : $KMnO_4(n=1) \rightarrow Mn^{6+}$

Example 2 : $FeC_2O_4 \rightarrow Fe^{3+} + 2CO_2$

Total number of moles e^{-} lost by 1 mole of FeC_2O_4

$= 1 + 1 \times 2 \Rightarrow 3$

In the reaction, $xVO + yFe_2O_3 \rightarrow FeO + V_2O_5$ what is the value of x and y respectively?

A. 1,1

B. 2,3

C. 3,2

D. None of these

Answer: B

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Passage-5

1. Consider the following series of reactions :

$Cl_2 + 2NaOH \rightarrow NaCl + NaClO + H_2O$

$3NaClO \rightarrow 2NaCl + NaClO_3$

$4NaClO_3 \rightarrow 3NaClO_4 + NaCl$

How much Cl_2 is reqired to prepare 122.5 g of $NaClO_4$ by above sequencial reactions ?

A. 284 g

B. 213 g

C. 142 g

D. 71 g

Answer: A

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2. Consider the following series of reactions :

$$Cl_2 + 2NaOH \rightarrow NaCl + NaClO + H_2O$$

$$3NaClO \rightarrow 2NaCl + NaClO_3$$

$$4NaClO_3 \rightarrow 3NaClO_4 + NaCl$$

How many moles of NaCl will be formed by using 1 mole Cl_2 and other reagents in excess ?

A. $\frac{1}{12}$ mole

B. 1.67 mole

C. 1.75 mole

D. 0.75 mole

Answer: C

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3. Consider the following series of reactions :

$Cl_2 + 2NaOH \rightarrow NaCl + NaClO + H_2O$

$3NaClO \rightarrow 2NaCl + NaClO_3$

$4NaClO_3 \rightarrow 3NaClO_4 + NaCl$

many moles $NaClO_3$ obtained after the complection of reaction by taking 1 mole Cl_2 and other reagents in excess ?

A. $\frac{1}{3}$ mole

B. Zero

C. $\frac{1}{4}$ mole

D. 1 mole

Answer: B

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One oir More Answer is Correct

1. 14 g of nitrogen represents :

A. $6.02 \times 10^{23} N_2$ molecules

B. 22.4 litre of N_2 at 1 atm and 273 K

C. 11.2 litre of N_2 at 1 atm and 273 K

D. 14 g of nitrogen

Answer: C::D

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2. 182 g of V_2O_5 contains :

A. 5 mole of oxygen atom

B. 2 mole of V atom

C. 1 mole of oxygen atom

D. 2.5 mole of oxygen atom

Answer: A::B

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3. Select the dimensionless quantity (ies) :

A. vapour density

B. molality

C. specific gravity

D. mass fraction

Answer: A::C::D

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4. Which of the following concentration terms is/are affected by a change in temperature ?

A. Molarity

B. Molality

C. Normality

D. Specific gravity

Answer: A::C::D

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5. Which of the following statements regarding the compound A_xB_y is /are correct?

A. 1 mole of A_xB_y contains 1 mole of A and 1 mole B

B. 1 equivalent of A_xB_y contains 1 equivalent of A and 1 equivalent of B

C. 1 mole of A_xB_y contains x moles of A and y moles of B

D. equivalent mass of A_xB_y=equivalent mass of A +equivalent mass of B

Answer: B::C::D

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6. 1 mole of $Ba(OH)_2$ will exactly neutralize :

A. 0.5 mole HCL

B. 1 mole of H_2SO_4

C. 1 mole of H_3PO_3

D. 2 mole of H_3PO_2

Answer: B::C::D

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7. The pair of species having different percentage (mass) of carbon is :

A. CH_3COOH and $C_6H_{12}O_6$

B. CH_3COOH and C_2H_5OH

C. $HCOOCH_3$ and $HCOOH$

D. C_2H_5OH and CH_3OCH_3

Answer: B::D

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8. $30mL$ of $CH_3OH(d = 0.8g/cm^3)$ is mixed with $60mL$ of $C_2H_5OH(d = 0.92g/cm^2)$ at $25^\circ C$ to form a solution of density $0.88g/cm^3$. Select the correct option(s) :

A. Molarity and molality of resulting solution are 6.33 and 13.59 respectively

B. The mole fraction of solute and molality are 0.385 and 13.59 respectively

C. Molarity and % change in volume are 0.615 and zero respectively

D. Mole fraction of solvent and molality are 0.615 and 13.59 respectively

Answer: B::C

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9. Which of the following is/are incorrect for 17 g/L of H_2O_2 solution ?

A. Volume strengths is 5.6 at 273 K and 1 atm

B. Molarity of solution is 0.5 M

C. 1 mL of thios solution gives 2.8 mL O_2 at 273 K and 2 atm

D. The normality of solution is 2 N

Answer: A::B::C

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10. Solutions containing 23 g HCOOH is/are :

A. $46g \text{ of } 70\% \left(\frac{w}{V}\right) HCOOH(d_{\text{solution}} = 1.40g/mL)$

B. $50g \text{ of } 10 \text{ M } HCOOH(d_{\text{solution}} = 1g/mL)$

C. $50g \text{ of } 25\% \left(\frac{w}{w}\right) HCOOH$

D. 46 g " of 5 M " HCOOH$(d_{solution} = 1g/mL)$

Answer: A::B

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11. A sample of H_2O_2 solution labelled as "28 volume" has density of 265 g/L. Mark the correct option(s) representing concentration of same solution in other units :

(a)$M_{H_2O_2} = 2.5$

(b) $\% \frac{w}{V} = 17$

(c)Mole fraction of H_2O_2 = 0.2

(d)$m_{H_2O_2} = 13.88$

A. $M_{H_2O_2} = 2.5$

B. $\% \frac{w}{V} = 17$

C. Mole fraction of H_2O_2 = 0.2

D. $m_{H_2O_2} = 13.88$

Answer: A::C::D

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12. A mixture of $100ml$ of CO, CO_2 and O_2 was sparked. When the resulting gaseous mixture was passed through KOH solution, contraction in volume was found to be $80ml$, the composition of initial mixture may be (in the same order)

A. 30 mL,60mL,10mL

B. 30 mL,50mL, 20mL

C. 50 mL,30mL,20mL

D. 20 mL,70 mL, 10 mL

Answer: A::B

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13. If 1 mole of H_3PO_4 reacts with 1 mole of $X(OH)_2$ as shown below :

$H_3PO_4 + X(OH)_2 \rightarrow XHPO_4 + 2H_2O$ then

A. the equivalent mass of base is $\dfrac{mol.\,mass}{2}$

B. the eq. mass of H_3PO_4 is $\frac{98}{3}$

C. the resulting solution requires 1 mole NaOH for complete neutralization

D. minimum 1 mole of X$(OH)_2$ is required for complete neutralization of $XHPO_4$

Answer: A::C

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14. In acidic medium dichromate oin osxidizes stannous ion as :

$xSn^{2+} + yCr_2O_7^{2-} + zH^{+} \rightarrow aSn^{4+} + bCr^{3+} cH_2O$

A. "the value of x:y is " 1:3

B. the value of x+y+z is 18

C. a:b " is " 3:2

D. the value of z-c is 7

Answer: B::C::D

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15. When a equimolar mixture of Cu_2S and CuS is tirated with $Ba(MnO_4)_2$ in acidic medium, the final products cintain Cu^{2+}, So_2 and Mn^{2+}. If the mol. Mass of Cu_2S, CuS and $Ba(MnO_4)_2$are M_1, M_2 and M_3 respectively then :

A. eq. mass of Cu_2S is $\frac{M_1}{8}$

B. eq. mass of CuS is $\frac{M_2}{6}$

C. eq. mass of $Ba(MnO_4)_2$ is $\frac{M_3}{5}$

D. Cu_2 and CuS both have same equivalents in mixture

Answer: A::B

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16. Which is/are INCORRECT statement ?

A. Equivalent mass of $H_2PO_3^-$ is 40.5.

B. Eq. mass of $H_2PO_4^-$ may be equal to molar mass or less than molar mass because it depends on the reaction.

C. $KMnO_4$ has maximum eq. mass in acidic medium.

D. Oxidation state of H in MgH_2 is greater than in H_2O_2.

Answer: A::C::D

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Assertion-Reason type Questtions

1. STATEMENTS-1 : Specific gravity is dimensionless.

STATEMENTS-2 : Specific gravity is density of a substance measured w.r.t. density of water at $4^\circ C$.

A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT-1

B. If both the statement are TRUE but STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT- is 1 TRUE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FALSE and STATEMENT-2 is TRUE

Answer: A

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2. STATEMENT-1: Molarity of pure water is 55.55 M at 298K.

STATEMENT-2 : Molarity is temperature dependent.

A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT-1

B. If both the statement are TRUE but STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT- is 1 TRUE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FALSE and STATEMENT-2 is TRUE

Answer: B

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3. STATEMENT-1: Gram molecular mass of O_2 is 32.

STATEMENT-2: Relative atomic mass of oxygen is 32 a.m.u.

A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT-1

B. If both the statement are TRUE but STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT- is 1 TRUE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FALSE and STATEMENT-2 is TRUE

Answer: C

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4. STATEMENT-1: The oxidation state of S in $H_2S_2O_8$ is 6.

STATEMENT-2: Maximum oxidation state of S is 6 because the maximum oxidation state of an element is equal to number of its valence electrons in it.

A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT-1

B. If both the statement are TRUE but STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT- is 1 TRUE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FALSE and STATEMENT-2 is TRUE

Answer: A

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5. STATEMENT-1: $0.1MH_3PO_3$(aq) solution has normality equal to 0.3 N when completely reacted with NaOH.

STATEMENT-2 : H_3PO_3 is a dibasic acid.

A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT-1

B. If both the statement are TRUE but STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT- is 1 TRUE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FALSE and STATEMENT-2 is TRUE

Answer: D

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6. STATEMENT-1 : MnO_2 can act as an oxidizing agent as well as reducing agent.

STATEMENT-2 : Oxidation state of MnO_2 lies between highest and lowest oxidation state.

A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT-1

B. If both the statement are TRUE but STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT- is 1 TRUE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FALSE and STATEMENT-2 is TRUE

Answer: A

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7. STATEMENT-1 : Equivalent volume of H_2 is 11.2 L at 1 atm and 273 K.

STATEMENT-2 : $1/2$mole H_2 has produced when 1 mole of H^+ (aq) accepted 1 mole of e^-.

A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT-1

B. If both the statement are TRUE but STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT- is 1 TRUE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FALSE and STATEMENT-2 is TRUE

Answer: A

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8. STATEMENT-1 : For the reaction in titration $Na_2CO_3 + HCL \rightarrow NaCl + NaHCO_3$, the suitable indicator is phennophthalein.

STATEMENT-2 : Phenolphthalein provide its colour in acidic medium.

A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT-1

B. If both the statement are TRUE but STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT- is 1 TRUE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FALSE and STATEMENT-2 is TRUE

Answer: C

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9. STATEMENT-1 : $\left[Fe(CN)_6\right]^{4-} \rightarrow Fe^{3+} + CO_2 + NO_3^-$, the equivalent mass of reactant is 3.74.

STATEMENT-2 : "Equivalent mass of reactant" = ("Mol.mass")/(61)`.

A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT-1

B. If both the statement are TRUE but STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT- is 1 TRUE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FALSE and STATEMENT-2 is TRUE

Answer: D

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10. STATEMENT-1 : In the balanced redox reaction,

$xAs_2S_3 + yNO_3^- + 4H_2O \rightarrow aAsO_4^{3-} + bNO + cSO_4^{2-} + 8H^+$ the n-factor of As_2S_3 and NO_3^- is 28 and 3 respectively.

Statement-2 : Molar ratio is reciprocal of n-factor's ratio so $x : t$ is $3 : 28$.

A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT-1

B. If both the statement are TRUE but STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT- is 1 TRUE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FALSE and STATEMENT-2 is TRUE

Answer: A

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11. STATEMENT-1 : In the given reaction, $NaOH + H_3PO_4 \rightarrow NaH_2PO_4 + H_2O$ equivalent mass of H_3PO_4 is $M/3$

STATEMENT-2 : H_3PO_4 is tribasic acid.

A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT-1

B. If both the statement are TRUE but STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT- is 1 TRUE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FALSE and STATEMENT-2 is TRUE

Answer: D

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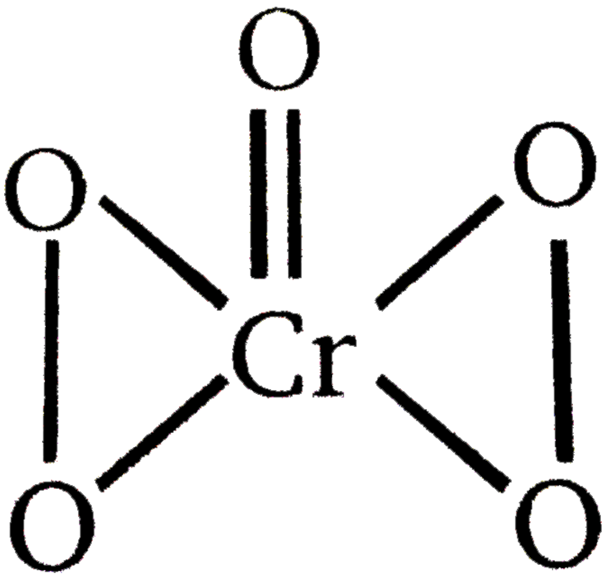
12. STATEMENT-1: In CrO_5 oxidation number of Cr is +6.

STATEMENT-2 : CrO_5 has butterfly structure in which peroxide peroxide bonds are present.



A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT-1

B. If both the statement are TRUE but STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT- is 1 TRUE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FALSE and STATEMENT-2 is TRUE

Answer: A

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13. STATEMENT-1 : $I_2 \rightarrow IO_3^- + I^-$, is example of a disproportionation reaction.

STATEMENT-2 : Oxidation number of I can vary from -1 to $+7$.

A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT-1

B. If both the statement are TRUE but STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT- is 1 TRUE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FALSE and STATEMENT-2 is TRUE

Answer: B

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14. Assertion: Fluorine exists only in -1 oxidation state.

Reason: Fluorine has $2s^2 2p^5$ configuration.

A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT-1

B. If both the statement are TRUE but STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT- is 1 TRUE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FALSE and STATEMENT-2 is TRUE

Answer: B

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15. STATEMENT-1 : H_2SO_4 can not act as reducing agent.

STATEMENT-2 : Sulphur can not increase its oxidation number beyond $+6$.

A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT-1

B. If both the statement are TRUE but STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT- is 1 TRUE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FALSE and STATEMENT-2 is TRUE

Answer: A

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Subjective Problems

1. What volume of a liquid (in L) will contain 10 mole ? If molar mass of liquid is 280 and its density is 1.4 g/mL.

A. 2 L

B. 4 L

C. 7 L

D. 9 L

Answer: 2

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2. 16 g of SO_x gas occupies 5.6 L at 1 atm and 273 K.What will be the value of x ?

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3. 200 mL of 1 HCl, is mixed with 300 mL of 6 M and the final solution is diluted to 1000 mL.calculate molar concentration of $\left[H^{+}\right]$ ion .

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4. N_2(g) reacts with H_2(g) in either of the following ways depending upon supply of H_2(g) :

$N_2(g) + H_2(g) \rightarrow N_2H_2(l)$

$N_2(g) + 2H_2(g) \rightarrow N_2H_4$(g)

If 5 L N_2(g) and 3 L H_2(g) are taken initially (at same temperature and pressure), calculate the contraction in valume after the reaction (in L).

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5. One commercial system removes SO_2 emission from smoke at $95(\circ)C$ by the following set of reaction :

$SO_2(g) + Cl_2(g) \rightarrow SO_2Cl_2$(g)

$SO_2Cl_2(g) + H_2O(l) \rightarrow H_2SO_4 + HCl$

$H_2SO_4 + Ca(OH)_2 \rightarrow CaSO_4 + H_2O$

How many grams of $CaSO_4$ may be produced from 3.78 g of SO_2 ?

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6. W is the mass of iron (in g) which will be converted into Fe_3O_4 by the action of 18 g of steam on it . What is the value of W/7 ?

$Fe + H_2O \rightarrow Fe_3O_4 + H_2$

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7. Calculate the total moles of atoms of each element present in 122.5 g of $KCLO_3$

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8. On dissolving 2.0 g of metal in sulphuric acid ,4.51 g of the metal sulphate was formed . The specific heat of the metal is 0.057 cal $g^{-1}.^{\circ} C^{-1}$. What is the valency of metal ?

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9. One gram of a metallic chloride was found to contain 0.835 g of chlorine. Its vapour density is 85.5.If its moleculars formula is M_xCl_y,then what is value of (x+y) ?

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10. 0.7875 g of crystalline barium hydroxide is dissolved in water .For the neutralization of this solution 20 mL of N/4 HNO_3 is required. How many moles of water of crystallization are present in one mole of this base ? (Given : Atomic mass Ba=137,O=16, N=14, H=1)

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11. 2.0 g of polybasic organic acid (Molecular mass =600) required 100 mL of a $\frac{M}{6}$ NaOH solution for complete neutralisation. Find the basicity of acid .

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12. A mixture contains 1.0 mole each of NaOH,Na_2CO_3 and $NaHCO_3$. When half of mixture is titrated with HCl ,it required x mole of HCl in presence of phenolphthalein. In another experiment ,half of mixture required y mole of same HCl in presence of methyl orange. Find the value of (x+y).

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13. When BrO_3^- ion reacts with Br^- ion in acidic medium, Br_2 is liberated. Calculate the ratio of molecular mass and equivalent mass of $KBrO_3$

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14. A volume of 12.5 mL of 0.05 M SeO_2 reacts with 25 mL of 0.1 M $CrSO_4$ which is oxidised to Cr^{3+}. To what oxidation state was the selenium converted by the reaction ?

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15. A 0.276 g impure sample of copper ore is dissolved and Cu^{2+} is titrated with KI solution. I_2 liberated required 40 mL of 0.1 M $Na_2 S_2 O_3$ solution for titration. What is the % of impurities in the ore ?

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16. A sample of 28 mL of $H_2 O_2$ (aq) solution required 10 mL of 0.1 M $KMnO_4$ (aq) solution for complete reaction in acidic medium. What is the valume strength of H_2O_2 ?

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17. For the redox reaction given, what is the value of $\frac{x}{z}$?

$xNO_3^- + yAs_2S_3 + zH_2O \rightarrow AsO_4^{3-} + NO + SO_4^{2-} + H^+$.

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18. On heating 0.220 g of a metallic oxide in presence of hydrogen,0.045 g of water is formed. If the equivalent mass of the metal is E,then what is the value of E/9

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19. 10 g mixture of $K_2Cr(2)O_7$ and $KMnO_4$ was treated with excess of KI in acidic medium. Iodine liberated $100cm^3$ of 2.2 N sodium thiosulphate solution for titration. If the mass percent of $KMnO_4$in the mixture Z, then what is the value of 2Z/5 ?

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20. In an ore, the only oxidizable material is Sn^{2+}. This ore is titrated with a dichromate solution containing $2.5g$ of $K_2Cr_2O_7$ in 0.5litre. A $0.40g$ sample of the ore required $10.0cm^3$ of titrant to reach equivalence point. Calculate the percentage of tin in ore.

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Level-1

1. Calculate number of neutrons present in $12X10^{25}$ atoms of oxygen $(8O^{17})$: (Given : $N_A = 6X10^{23}$)

A. 1800

B. 1600

C. $1800N_A$

D. $3200N_A$

Answer: C

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2. If mass of one atom is $3.32 \times 10^{-23} g$, then calculate number of nucleons (neutrons and protons) present in 2 atoms of the element:

A. 40

B. 20

C. 10

D. $40N_4$

Answer: A

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3. Calculate number of electron present in 9.5 g of PO_4^{3-}?

A. 6

B. $5N_A$

C. $0.1N_A$

D. $4.7N_A$

Answer: B

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4. What is the number of moles of O-atoms in 126 amu of HNO_3 ?

A. 2

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

C. $0.1N_A$

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

Answer: D

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5. What is the charge of 96 amu of s^{2-} ?

(a) 2C

(b) 3.2 x 10^{-19} C

(c) 9.6 x 10^{-19} C

(d) 6C

A. 2C

B. $3.2 \times 10^{-19} C$

C. $9.6 \times 10^{-19} C$

D. 6 C

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6. A sample of sodium has a mass of $46g$. What is the mass of the same number of calcium atoms as sodium atoms present in given sample ?

A. 46 g

B. 20 g

C. 40 g

D. 80 g

Answer: D

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7. The total number of neutrons present in $54 mL H_2O(l)$ are :

A. $3N_A$

B. $30N_A$

C. $24N_A$

D. None of these

Answer: C

Watch Video Solution

8. Total number of electrons present in $48gMg^{2+}$ are :

A. $24N_A$

B. $2N_A$

C. $20N_A$

D. None of these

Answer: C

Watch Video Solution

9. The number of neutrons in 5g of D_2O (D is ${}_1^2H$)

A. $0.25N_A$

B. $2.5N_A$

C. $1.1N_A$

D. None of these

Answer: B

Watch Video Solution

10. Cisplatin, an anticancer drug, has the molecular formula $Pt(NH_3)_2Cl_2$. What is the mass (in gram) of one molecule ? (Atomic masses : $Pt = 195, H = 14, Cl = 35.5$)

A. 4.98×10^{23}

B. 1.08×10^{-22}

C. 6.55×10^{-21}

D. 3.85×10^{-22}

Answer: A

Watch Video Solution

11. Aspirin has the formula $C_9H_8O_4$. How many atoms of oxygen are there in a tablet weighing $360mg$?

A. 1.204×10^{23}

B. 1.08×10^{22}

C. 1.204×10^{24}

D. 4.81×10^{24}

Answer: D

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12. $20g$ of ideal gas contains only atoms of S and O occupies $5.6L$ at 1 atm and $273K$. what is the molecular mass of gas ?

A. 64

B. 80

C. 96

D. None of these

Answer: B

Watch Video Solution

13. A sample of ammonium phosphate ,$(NH_4)_3PO_4$, contains 6 moles of hydrogen atom , The no. of moles of oxygen atom are:

A. 1

B. 2

C. 4

D. 6

Answer: B

Watch Video Solution

14. Total number of moles of oxygen atoms in 3 litre $O_3(g)$ at $27^\circ C$ and 8.21 atm are :

A. 3

B. 1

C. 1

D. None of these

Answer: A

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15. 3.011×10^{22} atoms of an element weighs $1.15gm$. The atomic mass of the element is :

A. $10a\mu$

B. $2.3a\mu$

C. $35.5a\mu$

D. $23a\mu$

Answer: D

Watch Video Solution

16. One atom of an element x weight $6.643 \times 10^{-232}g$. Number of moles of atom in 20 kg is :

A. 4

B. 40

C. 100

D. 500

Answer: D

Watch Video Solution

17. Mass of one atom of the element A is $3.9854 \times 10^{-23} g$. How many atoms are contained in 1g of the element A ?

A. 2.509×120^{23}

B. 6.022×10^{23}

C. 12.044×10^{23}

D. None of these

Answer: D

Watch Video Solution

18. Which of the following contains the largest mass of hydrogen atoms?

A. $5.0 \quad \text{moles} C_2H_2O_4$

B. $1.1 \quad \text{moles} C_3H_8O_3$

C. $1.5 \quad \text{moles} C_6H_8O_6$

D. $4.0 \quad \text{moles} C_2H_4O_2$

Answer: D

Watch Video Solution

19. Which has minnimum number of oxygen atom ?

A. 10 mL $H_2O(l)$

B. 0.1 mole $V_2O_5(s)$

C. 12 gm $O_3(g)$

D. 12.044×10^{22} molecules of CO_2

Answer: C

Watch Video Solution

20. Rearrange the following $(I$ to $IV)$ in the order of increasing masses :

(I) 0.5 mole of O_3 $(II) 0.5 gm$ atom of oxygen

(III) 3.011×10^{23} molecules of O_2 $(IV) 5.6$ litre of CO_2 at STP

A. $II < IV < III < I$

B. $II < I < IV < III$

C. $IV < II < III < I$

D. $I < II < III < IV$

Answer: A

Watch Video Solution

21. If the volume of a drop of water is $0.0018 mL$ then the number of water molecules present in two drop of water at room temperature is :

A. 12.046×10^{19}

B. 1.084×10^{18}

C. 4.48×10^{17}

D. 6.023×10^{23}

Answer: A

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22. It is known that atom contain protons. Neutrons and electrons. If the mass of neutron is assumed to half of its orginal value where as that of proton is assumed to be twice of its original value then the atomic mass of $._{6}^{14}C$ will be :-

A. same

B. 14.28% less

C. 14.28% more

D. 28.56% less

Answer: C

Watch Video Solution

23. Common salt obtained from sea-water contains $8.775\%\ NaCl$ by mass. The number of formula units of $NaCl$ present in $25g$ of this salt is :

A. 3.367×10^{23} formula units

B. 2.258×10^{22} formula units

C. 3.176×10^{23} formula units

D. 4.73×10^{25} formula units

Answer: B

Watch Video Solution

24. Calculate the number of hydrogen atoms present in $25.6g$ of sucrose $(C_{12}H_{22}O_{11})$ which has a molar mass of $342.3g$?

A. 22×10^{23}

B. 9.91×10^{23}

C. 11×10^{23}

D. 44×10^{23}

Answer: B

Watch Video Solution

25. Caffeine has a molecular mass of 194. If it contains $28.9\,\%$ by mass of nitrogen, Calculate number of atoms of nitrogen in one molecule of caffeine ?

A. 4

B. 6

C. 2

D. 3

Answer: A

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26. The density of water is 1g/mL. Water is the volume occupied by 1 molecule of water ?

A. $1.44 \times 10^{-23} mL$

B. $1 mL$

C. $18 mL$

D. $2.88 \times 10^{-23} mL$

Answer: D

Watch Video Solution

27. A $25.0 mm \times 40.0 mm$ piece of gold foil is $0.25 mm$ thick. The density of gold is $19.32 \frac{g}{c} m^3$. How many gold atoms are in the sheet ? (Atomic weight : $Au = 197.0$)

A. 7.7×10^{23}

B. 1.5×10^{23}

C. 4.3×10^{21}

D. 1.47×10^{22}

Answer: D

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28. If average molecular mass of air is 29, then assuming N_2 and O_2 gases are there, which option are correct regarding composition of are?

(i)

$75\ \%$ by mass ofN_2 $(ii) 75\ \%$ by moles N_2 $($

A. only (i) is are correct

B. Only (ii) is correct

C. both (ii) and (iii) are correct

D. both (i) and (ii) are correct

Answer: C

Watch Video Solution

29. Density of dry air containing ony N_2 and O_2 is $1.15\frac{g}{L}$ at $740mm$ of Hg and $300K$. What is % composition of N_2 by mass in the air ?

A. 78%

B. 85.5%

C. 70.02%

D. 62.75%

Answer: C

Watch Video Solution

30. A gaseous mixture of H_2 and CO_2 gas contains 66 mass $\%$ of CO_2 . What is the vapour density of the mixture ?

A. 6.1

B. 5.4

C. 2.7

D. 10.8

Answer: C

Watch Video Solution

31. A mixture contains N_2O_4 and NO_2 in the ratio 2:1 by volume. Calculate the vapour density of the mixture?

A. 0.1

B. 0.2

C. 0.5

D. 38.33

Answer: D

Watch Video Solution

32. Density of ideal gas at 2 atm and 600K is 2g/L. Calculate relative density of this with respect to Ne(g) under similar conditions : (given : $R = \frac{1}{12}atm\frac{L}{m}ol.\ K)$

A. 2.5

B. 2

C. 3

D. 5

Answer: A

Watch Video Solution

33. Average atomic mass of magnesium is 24.31 amu. This magnesium is composed of 79 mole $\%$ of $.^{24}Mg$ and remaining 21 mol $\%$ of $.^{25}Mg$ and $.^{26}Mg$. Calculate mole $\%$ of $.^{26}Mg$.

A. 10

B. 11

C. 15

D. 16

Answer: A

Watch Video Solution

34. Indium (atomic mass $= 114.82$) has two naturally occurring isotopes, the predominant one from has isotopic mass 114.9041 and abundance of 95.72%. Which of the following isotopic mass is the most likely for the other isotope ?

A. 112.94

B. 115.9

C. 113.9

D. 114.9

Answer: A

Watch Video Solution

35. Calculate density of a gaseous mixture which consist of 3.01×10^{24} molecules of N_2 and $32g$ of O_2 gas at 3 atm pressure and $860K$ temperature (Given : $R = \frac{1}{12}$ atm $L^{-1}. K^{-1}$

A. $0.6g / L$

B. $1.2g / L$

C. $0.3g / L$

D. $12g / L$

Answer: B

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36. A mixture of O_2 and gas Y $(mol.\ wt.\ 80)$ in the mole ratio $a : b$ has a mean molecular weight 40. What would be mean molecular weight, if the gases are mixed in the ratio $b : a$ under identical conditions ? (gases are)

A. 40

B. 48

C. 62

D. 72

Answer: D

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37. If water sample are taken from sea, rivers or lake, they will be found to contain hydrogen and oxygen in the approximate ratio of $1 : 8$. This indicates the law of :

A. law of conseravtion of mass

B. Definite proporation

C. Reciprocal propoertions

D. None of these

Answer: B

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38. Hydrogen and oxygen combine to from H_2O_2 and H_2O containing 5.93% and 11.2% hydrogen respectively . The data illustrates :

A. law of conseravtion of mass

B. law of constant proportion

C. law of reciparocal proporation

D. law of multiple proporetion

Answer: 4

Watch Video Solution

39. Which one the following combinations illustrate law of reciprocal proportions ?

A. N_2O_3, N_2O_4, N_2O_5

B. $NaCl, NaBr, NaI$

C. CS_2, CO_2, SO_2

D. PH_3, P_2O_3, P_2O_5

Answer: 3

Watch Video Solution

40. Carbon and oxygen combine to form two oxides, carbon monoxide and carbon dioxide in which the ratio of the weight of carbon and oxygen is respectively $12:16$ and $12:32$. These figures illustrate the :

(a)law of multiple proportions

(b)law of reciprocal proportions

(c)law of conservation of mass

(d)law of constant proportions

A. law of multiple proportions

B. law of reciprocal proportions

C. law of conservation of mass

D. law of constant proportains

Answer: A

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41. A sample of calcuium carbonate $(CaCO_3)$ has the following percentage composition: $Ca = 40\%, C = 12\%, O = 48\%$ If the law of constant proportions is true. Then the weight of calcium in $4g$ of a sample of calcium carbonate obtained from another source will be

A. $0.016g$

B. $0.16g$

C. $1.6g$

D. $16g$

Answer: C

Watch Video Solution

42. The law of multiple proportion is illustrated by the two compounds :

A. Sodium chlordie and sodium bromide

B. Ordinary water and heavy water

C. Caustic soda caustic potash

D. Sulphur dioxide and sulphur trixoide

Answer: 4

Watch Video Solution

43. All the substance listed below are fertilizers that contribute nitrogen to the soil. Which of these is the richest source of nitrogen on a mass percentage basis ?

A. Urea ,$(NH_2)_2CO$

B. Ammonium nitrate ,NH_4NO_3

C. Nitric oxide , NO

D. Ammonia , NH_3

Answer: D

Watch Video Solution

44. One mole of element X has 0.444 times the mass of one mole of element Y. One atom of element X has $2.96 \times$ the mass of one atom of $.^{12}C$. What is the atomic mass of Y ?

A. 80

B. 15.77

C. 46.67

D. 40

Answer: A

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45. A given sample of pure compound contains $9.81g$ of Zn, 1.8×10^{23} atoms of chromium, and 0.60 mol of oxygen atoms. What is the simplest formula?

A. $ZnCr_2O_7$

B. $ZnCr_2O_4$

C. $ZnCrO_4$

D. $ZnCrO_6$

Answer: B

Watch Video Solution

46. The formula of an acid is HXO_2. The mass of 0.0242 g of the acid is $1.657g$. What is the atomic mass of X ?

A. 35.5

B. 28.1

C. 128

D. 19

Answer: A

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47. What is the emprical formula of vanadium oxide , if $2.74g$ of the metal oxide contains $1.53g$ of metal ?

A. V_2O_3

B. VO

C. V_2O_5

D. V_2O_7

Answer: C

Watch Video Solution

48. Determine the empirical fromula of kelvar, used in making bullet proof vests, is $70.6\% C, 4.2\% H, 11.8\% N$ and $13.4\% O$:

A. $C_7H_5NO_2$

B. $C_7H_5N_2O$

C. C_7H_9NO

D. C_7H_5NO

Answer: D

Watch Video Solution

49. The hydrated salt $Na_2CO_3 . xH_2O$ undergoes 63% loss in mass on heating and becomes anhydrous . The value x is :

A. 10

B. 12

C. 8

D. 18

Answer: A

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50. A $6.85g$ sample of the hydrated $Sr(OH)_2 . xH_2O$ is dried in an oven to given $3.13g$ of anhydrous $sr(OH)_2$. What is the value of x? (Atomic masses : $Sr = 87.60. O = 16.0, H = 1.0$)

A. 8

B. 12

C. 10

D. 6

Answer: A

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51. What percentage of oxygen is present in the compound $CACO_{3.3}Ca_3(PO_4)_2$?

A. 23.3%

B. 45.36%

C. 41.94%

D. 17.08%

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52. Deildrin, an insecticide, contains C, H, Cl and O. Combustion of $29.72mg$ of dieldrin gave $41.21mgCO_2$ and $5.63mg$ of H_2O . In a separate analysis $25.31mg$ of dieldein was converted into $57.13mg$ Ag Cl. What is the empirical formula of diedrin ?

A. $C_6H_4Cl_3O$

B. C_8H_8ClO

C. $C_{12}H_8Cl_6O$

D. $C_6H_4Cl_3O_2$

Answer: C

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53. A gaseous compound is composed of 85.7% by mass carbon and 14.3% by mass hydrogen. Its density is 2.28 g/litre at $300K$ and 1.0 atm pressure. Determine the molecular formula of the compound.

A. C_2H_2

B. C_2H_4

C. C_4H_8

D. C_4H_{10}

Answer: C

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54. Complete combustion of 0.858 g of compound X gives 2.63 g of CO_2 and 1.28 g of H_2O. The lowest molecular mass X can have

A. 43 g

B. 86 g

C. 129 g

D. 172 g

Answer: A

Watch Video Solution

55. The sulphate of a metal M contains 9.87% of M, This sulphate is isomorphous with $ZnSO_4.7H_2O$. What is the atomic weight of M ?

A. 40.3

B. 36.3

C. 24.3

D. 11.3

Answer: C

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56. In an organic compound of molar mass $108 gm mol^{-1} C, H$ and N atoms are presents in $9:1:3.5$ by mass. Molecular can be

A. $C_6H_8N_2$

B. $C_7H_{10}N$

C. $C_5H_6N_3$

D. $C_4H_{18}N_3$

Answer: A

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57. On analysis, a certain compound was found to contain 254g of iodine (at.mass 127) and 80g oxygen (at.mass 16). What is the formula of the compound ?

A. IO

B. I_2O

C. I_5O_3

D. I_2O_5

Answer: D

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58. An element A is teravalent and another element B is divalent. The formula of the compound formed from these elements will be :

A. A_2B

B. AB

C. AB_2

D. A_2B_3

Answer: C

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59. A compound used in making nylon, contains 43.8% oxygen. There are four oxygen atoms per molecule. What is the molecular mass of compound ?

A. 36

B. 116

C. 292

D. 146

Answer: D

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60. Suppose two elements X and Y combine to form two compounds XY_2 and X_2Y_3 when 0.05 mole of XY_2 weight $5g$ while 3.011×10^{23} molecules of X_2Y_3 weight $85g$. The atomic masses of X and Y are respectively.

A. 23,30

B. 30,40

C. 40,30

D. 80,60

Answer: C

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61. $44g$ of a sample C,H & O on complete combustion given $88gCO_2$ and $36g$ of H_2O. The molecular formula of the compound may be :

A. C_4H_9

B. C_2H_6O

C. C_2H_4O

D. C_3H_6O

Answer: C

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62. 40 miligram diatomic volatile substance (X_2) is converted to vapour that displaced $4.92 mL$ of air at 1atm and 300k. Atomic mass of element X is nearly :

A. 400

B. 240

C. 200

D. 100

Answer: D

Watch Video Solution

63. Two elemets $X($ atomic weight $= 75)$ and $Y($ atomic weight $= 16)$ combine to give a compound having 75.8% X.` The formula of the compound is

A. XY

B. X_2Y

C. X_2Y_2

D. X_2Y_3

Answer: D

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64. A sample of phosphorus that weighs $12.4g$ exerts a pressure 8 atm in a 0.821 litre closed vesel at $527^\circ C$. The molecular formula of the phosphorus vapour is :

A. P_2

B. P_4

C. P_6

D. P_8

Answer: B

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65. Manganese forms non-stoichiometric oxides having the gereral formula formula MnO_x. The value of x for the compound that analyzed 64% by mass mn :

A. 1.16

B. 1.83

C. 2

D. 1.93

Answer: D

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66. 1.44 gram if titanium (Ti) reacted with excess of O_2 and produce x gram of non $-$ stoichiometric compound $Ti_{1.44}O$. The value of x is :

A. 2

B. 1.77

C. 1.44

D. None of these

Answer: C

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67. Which statement is false for the balanced equation givem below ?

$CS_2 + 3O_2 \rightarrow 2SO_2 + CO_2$

A. One mole of CS_2 will produce one mole of CO_2

B. The reaction of 16 g of oxygen produces $7.33g\text{of} \ \ CO_2$

C. The raction of one mole of O_2 will produce $2/3$ "mole of" SO_2

D. Six molecules of oxygen requires theree molecular of CS_2

Answer: D

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68. Which of the following setups is correct to calculate the mass (in g) of $KCIO_3$ produced from the reacting of 0.150 moles of CI_2 ?

A. $0.150 \quad \text{moles} \quad Cl_2 \times 1\text{mole} \quad KClO_3 / 3\text{moles}Cl_2 \times 122.5g / 1$

B. $0.150 \quad \text{moles} \quad Cl_2 \times 1\text{mole} \quad KClO_3 / 3\text{moles}Cl_2 \times 1\text{mole}$

C. $0.150 \ \ \text{moles} \quad Cl_2 \times 3\text{moles} \quad Cl_2 / 1 \ \ \text{mole} \ \ KCLO_3 \times 122.5g / 1\text{m}$

D. $0.150 \ \ \text{moles} \quad Cl_2 \times 3\text{moles} \quad Cl_2 / 1 \ \ \text{mole} \ \ KCLO_3 \times 1\text{mole} \quad K$

Answer: A

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69. 2.0 g of a sample contains mixture of SiO_2 and Fe_2O_3. On very strong heating , it leaves a residue weighing $1.96g$. The reaction responsible for loss of mass is given below .

$Fe_2O_3(s) \rightarrow Fe_3O_4(s) + O_2(g)$, (unbalance equation) . What is the percentage by mass of SiO_2 in original sample ?

A. $10\ \%$

B. $20\ \%$

C. $40\ \%$

D. $60\ \%$

Answer: C

Watch Video Solution

70. What volume of air at 1 atm and $273K$ containing $21\ \%$ of oxygen by volume is required to completely burn sulphur (S_8) present in $200g$ of sample , which contains 20% inert material which does not burn. Sulphur burns according to the reaction $\frac{1}{8}S_8(s) + O_2(g) \rightarrow SO_2(g)$

A. 23.52 litre

B. 320 litre

C. 112 litre

D. 533.33 litre

Answer: D

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71. For the reaction, $2Fe(NO_3) + 3Na_2CO \rightarrow Fe_2(CO_3)_3 + 6NaNO_3$ initially 2.5 mole of $Fe(NO_3)_3$ and 3.6 mole of Na_2CO_3 are taken. If 6.3 mole of $NaNO_3$ is obtained then % yield of given reaction is :

A. 50

B. 84

C. 87.5

D. 100

Answer: C

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72. How many of P_4can be producedby reaction of 0.10 moles $Ca_5(PO_4)_3F, 0.36$ moles SiO_2 and 0.90 moles C according to the following reaction ?

$4Ca_5(PO_4)_3F + 18SiO_2 + 30C \rightarrow 3P_4 + 2CaF_2 + 18CaSiO_3 + 30CO$

A. 0.060

B. 0.030

C. 0.045

D. 0.075

Answer: A

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73. Some older emergency oxygen masks contains potassium superoxide KO_2 which reacts with CO_2 and water present in exhaled air to produce oxygen according to the given equation. If a person exhales $0.667g$ of CO_2 per minute, how many gram of KO_2 are consumed in 5.0 minutes ?

A. 10.7

B. 0.0757

C. 1.07

D. 5.38

Answer: D

Watch Video Solution

74. The mass of N_2F_4 produced by the reaction of $2.0g$ of NH_3 and $8.0g$ of F_2 is $3.56g$. What is the per cent yield ?

A. 79

B. 71.2

C. 84.6

D. None of these

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75. Calculate the weight of lime (CaO) obtained by heating 200 kg of 95% pure lime stone $(CaCO_3)$.

A. $104.4kg$

B. $105.4kg$

C. $212.8kg$

D. $106.4kg$

Answer: D

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76. Phospheric acid (H_3PO_4) perpared in two step process .

(1) $P_4 + 5O_2 \rightarrow P_4O_{10}$ $(2) P_4O_{10} + 6H_2O \rightarrow 4H_3PO_4$

Well allow 62 g of phosphrous to react with exces oxygen which from P_4O_{10} in 85% yield . In the sep (2) reaction 90% yield of H_3PO_4 is obtained . Mass of H_3PO_4 produced is :

A. $37.485g$

B. $149.949g$

C. $125.47g$

D. $564.48g$

Answer: B

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77. 9 moles of "D" and 14 moles of E are allowed to react in a closed vessel according to given reactions. Calculate number of moles of B formed in the end of reaction, if 4 moles of G are present in reaction vessel.

(percentage yield of reaction is mentioned in the reaction) Step -1 $3D + 4E80\% \rightarrow 5C + A$ Step-2 $3C + 5G50\% \rightarrow 6B + F$

A. 2.4

B. 30

C. 4.8

D. 1

Answer: A

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78. The chief are of Zn is the sulphide , ZnS. The Ore is concentrated by froth floation process and then heated in air to convert Zns to Zno.

$$2ZnS + 30_2 \xrightarrow{80\%} 2ZnO + 2SO_2$$

$$ZnO + H_2SO_4 \xrightarrow{100\%} ZnSO_4 + H_2$$

$$2ZnSO_4 + 2H_2O \xrightarrow{80\%} 2Zn + 2H_2SO_4 + O_2$$

The number of moles of ZnS required for producing 2 moles of Zn will be:

A. 3.125

B. 2

C. 2.125

D. 4

Answer: A

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79. 0.8 moles of a mixture of CO and CO_2 requieds exactly 40 gram of $NaOH$ in solution for complete conversion of all the CO_2 into Na_2CO_3. How many more of $NaOH$ would for require for conversion into Na_2CO_3 if the mixture (0.8 mole) is completely oxidised to CO_2 ?

A. 0.2

B. 0.6

C. 1

D. 1.5

Answer: B

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80. Silver oxide (Ag_2O) decomposes at temperature $300^\circ C$ yielding matellic silver and oxygen gas. A $1.60g$ sample of impure silver oxide yields $0.104g$ of oxygen gas. What is the per cent by mass of the silver oxide in the sample ?

A. 5.9

B. 47.125

C. 94.25

D. 88.2

Answer: C

Watch Video Solution

81. 342 g of 20% by mass of ba$(OH)_2$ solution (sq.gr.0.57) is reacted with $1200 mL$ of $2 M HNO_3$. If the final density of solution is same as pure water then molarity of the ion in resulting solution which decides the nature of the above solution is :

A. 0.25

B. $0.5M$

C. $0.888M$

D. None of these

Answer: C

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82. $100 mL$ of H_2SO_4 solution having molarity $1M$ and density $1.5 g/mL$ is mixed with $400 mL$ of water. Calculate final molarity of H_2SO_4 solution, if final density is $1.25 g/mL$?

A. $4.4M$

B. $0.145M$

C. $0.52M$

D. $0.227M$

Answer: D

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83. What volume of HCI solution of density $1.2\frac{g}{c}m^3$ and containing 36.5% by mass HCI, must be allowed to react wtih zinc (Zn) in order to liberate $4.0g$ of hydrogen ?

A. $333.33mL$

B. $500mL$

C. $614.66mL$

D. None of these

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84. An ideal gaseous mixture of ethane (C_2H_6) and ethene (C_2H_4) occupies 28 litre at $1atm$ $0^\circ C$. The mixture reacts completely with $128gmO_2$ to produce CO_2 and H_2O. Mole of fraction at C_2H_6 in the mixtture is-

A. 0.6

B. 0.4

C. 0.5

D. 0.8

Answer: B

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85. Wood's metal contains 50.0% bismuth, 25.0% lead, 12.5% tin and 12.5% cadmium by mass. What is the mole fraction of tin ?(\ (Atomic mass : $Bi = 209, Pb = 207, Sn = 119, Cd = 112)$

A. 0.202

B. 0.158

C. 0.176

D. 0.221

Answer: C

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86. The density of a 56.0% by mass aqueous solution of 1-propanol $(CH_3CH_2CH_2OH)$ is $0.8975\frac{g}{c}m^3$. What is the mole fraction of the 1-propanol ?

A. 0.292

B. 0227

C. 0.241

D. 0.276

Answer: D

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87. What is the molartiy of SO_4^{2-} ion in aqueous solution that contain $34.2p\pm$ of $AI_2(SO_4)_3$? (Assume complete dissociation and density of solution $1\frac{g}{m}L$)

A. $3\times10^{-4}M$

B. 2×10^{-4}

C. $10^{-4}M$

D. None of these

Answer: A

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88. The relation between molarity (M) and molality (m) is given by : (p=density of solution (g/mL), M_1= molecular mass of solute)

A. $m = \frac{1000M}{1000\rho - M_1}$

B. $m = \frac{1000\rho M}{1000\rho - MM_1}$

C. $m = \frac{1000MM}{1000\rho - MM_1}$

D. $m = \frac{1000M}{1000\rho - MM_1}$

Answer: D

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89. Molarity and molality of a solution of an liquid (mol.mass $= 50$) in aqueous solution is 9 and 10 respectively. what is the density of solution ?

A. $1g/\text{cc}$

B. $0.95g/\text{cc}$

C. $1.05g/\text{cc}$

D. $1.35g / \text{cc}$

Answer: D

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90. An aqueous solution of ethanol has density $1.025g / mL$ and it is 2 M.

What is the molality of this solution ?

A. 1.79

B. 2.143

C. 1.951

D. None of these

Answer: B

Watch Video Solution

91. 0.2 mole of HCI and 0.2 mole of barium chloride were dissolved in water to produce a $500mL$ solution. The molarity of the CI^{-} ions is :

A. $0.06M$

B. $0.09M$

C. $1.2M$

D. $0.80M$

Answer: C

Watch Video Solution

92. Calculate the mass of anhydrous HCI in $10mL$ of concentrated HCI (density $= 1.2\frac{g}{m}L$) solution having 37% HCI by mass.

A. $4.44g$

B. $4.44mg$

C. 4.44×10^{-3}

D. $0.444 \mu g$

Answer: A

Watch Video Solution

93. Calculate the molality of 1L solution of $80\% \ H_2SO_4\left(\frac{w}{V}\right)$ given that the density of the solution is $1.80 gmL^{-1}$.

A. 8.16

B. 8.6

C. 1.02

D. 10.8

Watch Video Solution

94. Fluoxymesterone , $C_{20}H_{29}FO_3$, is an anabolic steroid . A 500 ml solution is prepared by dissolving 10.0 mg of the steroid in water. 10.0 mL portion of this solution is diluted to final volume of 1.00 L. What is the resulting molarity ?

A. 1.19×10^{-10}

B. 1.19×10^{-7}

C. 5.95×10^{-8}

D. 2.38×10^{-11}

Answer: C

Watch Video Solution

95. The 25 mL of a 0.15 M solution of lead nitrate, $Pb(NO_3)_2$ react with all of the aluminium sulphate , $Al_2(SO_4)_3$, present in 20 mL of a solution . What is the molar concentration of the $Al_2(SO_4)_3$?

A. $6.25 \times 10^{-2} M$

B. $2.421 \times 10^{-2} M$

C. $0.1875 M$

D. None of these

Answer: A

Watch Video Solution

96. Concentrated HNO_3 is 63% HNO_3 by mass and has a density of $1.4 g / mL$. How many millilitres of this solution are required to prepare $250 mL$ of a $1.20 M HNO_3$ solution ?

A. 18.0

B. 21.42

C. 20.0

D. 14.21

Watch Video Solution

97. $50mLof$20.8% (w/V) Ba CI_2 and (aq) and 100mLof9.8%mL(w/V) H_2SO_4(aq)$solutionsaremixed. Molarityof$CI^- iron in the resulting solution is : (At mass of $Ba = 137$)

A. 0.333M

B. 0.666M

C. 0.1M

D. 1.33M

Answer: B

Watch Video Solution

98. What volume of 0.10 M H_2SO_4 must be added to 50 mL of a 0.10 NaOH solution to make a solution in which molarity of the H_2SO_4 is 0.050M?

A. 400mL

B. 200mL

C. 100mL

D. none of these

Answer: C

Watch Video Solution

99. $1MHCl$ and $2MHCl$ are mixed in volume ratio 4:1. What is the final molarity of HCl solution?

A. 1.5

B. 1

C. 1.2

D. 1.8

Answer: C

Watch Video Solution

100. Three solutions X,Y,Z of HCl are mixed to produce 100mL of 0.1M solution . The molarities of X,Y and Z are 0.07M, 0.12M and 0.15M respectively. What respective volumes of X,Y and Z should be mixed?

A. $50mL, 25mL, 25mL$

B. $20mL, 60mL, 20mL$

C. $40mL, 30mL, 30mL$

D. $55mL, 20mL, 25mL$

Answer: D

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101. A bottle of an aqueous H_2O_2 solution is labelled as '28V' H_2O_2 and the density of the solution $(\text{in} g / mL)$ is 1.25. Choose the correct option.

A. Molarity of H_2O_2 solution is 2

B. Molarity of H_2O_2 solution is 5

C. Molarity of H_2O_2 solution is 2.15

D. none of these

Answer: C

Watch Video Solution

102. The impure 6g of NaCl is dissolved in water and then treated with excess of silver nitrate solution. The mass of precipitate of silver chloride is found to be 14g. The % purity of NaCl solution would be:

A. 0.95

B. 0.85

C. 0.75

D. 0.65

Answer: A

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103. $Al(SO)_4)_3$ solution of 1 molal concentration is present in 1 litre solution of density 2.684 g/cc. How many moles $BaSO_4$ would be precipated on adding excess $BaCl_2$ in it?

A. 2 moles

B. 3 moles

C. 6 moles

D. 12 moles

Answer: C

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104. A certain public water supply contains 0.10ppb (part per billion) of chloroform $(CHCl_3)$. How many molecules of $CHCl_3$ would be obtained in 0.478mL drop of this water? (Assuming d=1g//Ml)

A. $4 \times 10^{-13} \times N_A$

B. $10^{-3} \times N_A$

C. $4 \times 10^{-10} \times N_A$

D. none of these

Answer: A

Watch Video Solution

105. Decreasing order (first having highest and then other following it) of mass of pure NaOH in each of the aqueous solution

(P) 50 gm of $40\% \,(w/w)$ NaOH

(Q) 50 gm of $50\% \,(w/v)$ NaOH $[d_{\text{soln.}} = 1.2 gm/ml]$

(R) 50 gm of 20 M NaOH $[d_{\text{soln}}. = 1 gm/ml]$

A. I,ii,iii

B. iii,ii,i

C. ii,iii,i

D. ii,I,iii

Answer: B

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106. What is the molar mass if diacidic organic Lewis base (B), if 12g of its chloroplatinate salt (BH_2PtCl_6) on ignition produced 5g residue of Pt?

A. 52

B. 58

C. 88

D. none of these

Answer: B

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107. On strong heating, one gram of the silver salt of an organic dibasic acid yields 0.5934g of silver. If the mass percentage of carbon in it 8 times the mass percentage of hydrogen and one-half the mass percentage of oxygen, determine the molecular formula of the acid.

A. $C_4H_6O_4$

B. $C_4H_6O_6$

C. $C_4H_6O_2$

D. $C_5H_{10}O_5$

Answer: B

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108. $0.607g$ of silver salt of tribasic organic acid was quantitatively reduced to $0.37g$ of pure Ag. What is the mol. Wt. of the acid ?

A. 207

B. 210

C. 531

D. 324

Answer: B

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109. A sample of peanut oil weighing 2g is added to $25mL$ of $0.40MKOH$. After saponification is complete, $8.5mL$ of $0.28MH_2SO_4$ is needed to nuetralize excess of KOH. The saponification number of peanut oil is : (saponification number is defined as the milligrams of KOH consumed by 1g of oil)

A. 146.72

B. 223.44

C. 98.44

D. 98.9

Answer: A

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110. $20mL$ of a mixture of CO and H_2 were mixed excess of O_2 and exploded & cooled. There was a volume contraction of 23mL. All volume measurements corresponds to room temperature $(27^{\circ} C)$ and one atmospheric pressure. Determine the volume ratio $(V_1 : V_2 \text{of} Co$ anf H_2 in the original mixture .

A. $6.5 : 13.5$

B. $5 : 15$

C. $2 : 3$

D. $7 : 13$

Answer: B

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111. In the reaction $2Al(s)+6HCl(aq)\rightarrow 2Al^{3+}+6Cl^{-}(aq)+3H_2$

A. $6LHCl(aq)$ is consumed for every $3LH_2(g)$ produced

B. 33.6L $H_2(g)$ is produced regardless of temperature and pressure for every mole Al that reacts

C.

$67.2LH_2at1atm$ and $273K$is produced for every mole Al that reacts

D. 11.2L $H_2(g)$ at 1 atm and 273K is produced for every mole HCl(aq) consumed

Answer: D

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112. A gaseous mixture of propane and butane of volume 3 litre on complete combustion produces

11.0 litre CO_2 under standard conditions of temperature and pressure.

The ration of volume of butane to propane is:

A. $1:2$

B. $2:1$

C. $3:2$

D. $3:1$

Answer: B

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113. Phosphorous has the oxidation state of +1 in:

A. (a)Orthophosphoric acid

B. (b)Phosphorous acid

C. (C)Hypophosphoric acid

D. (d)Metaphosphoric acid

Answer: C

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114. Oxidation numbers of two Cl atoms in belaching powder, $CaOCl_2$, are

A. $+1 only$

B. $-1 only$

C. $+1 \text{ and } -1$

D. none of these

Answer: C

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115. The oxidation number of sulphur in $S_8, S_2F_2, H_2S \text{ and } H_2SO_4$ respectively are:

A. $0, \ +1, \ -2 \ \text{and} \ 6$

B. $+2, 0, \ +2 \ \text{and} \ 6$

C. $0, \ +1, \ +2 \ \text{and} \ 6$

D. $-2, 0, \ +2 \ \text{and} \ 6$

Answer: A

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116. Fe show on oxidation state of +1 in:

A. $Fe(CO)_5$

B. $[Fe(H_2O)_5NO]SO_4$

C. $Fe_4[Fe(CN)_6]_3$

D. $Fe_4Cl_4^-$

Answer: B

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117. When SO_2 is passed inoto an acidified potassium dichromate soltion, the oxidation number of sulphur and chromium in the final products respectively are:

A. $+6, \ +6$

B. $+6, \ +3$

C. $+0, \ +3$

D. $+2, \ +3$

Answer: B

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118. The oxidation number of nitrogen atoms in NH_4NO_3 are:

A. $+3, \ +3$

B. $+3, \ -3$

C. $-3, \ -5$

D. $-5, \ +3$

Answer: C

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119. The oxidation state of S-atoms in Caro's and Marshall's acids are:

A. $+6, \ +6$

B. $+6, \ +4$

C. $+6, \ -6$

D. $+4, \ +6$

Answer: A

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120. In which fo the following has the oxidation number of oxygen been arragned in increasing order ?

A. $OF_2 < KO_2 < BaO_2 < O_3$

B. $BaO_2 < KO_2 < O_3 < OF_2$

C. $BaO_2 < KO_2 < OF_2 < KO_2$

D. $KO_2 < OF_2 < O_3 < BaO_2$

Answer: B

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121. The oxidation number of oxygen in KO_3, Na_2O_2 respectively are:

A. 3,2

B. 1,0

C. 0,1

D. $-0.33, \ -1$

Answer: D

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122. Oxidation number of P in $Ba(H_2PO_2)_2$ is

A. -1

B. $+1$

C. $+2$

D. $+3$

Answer: B

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123. If it is known that in $Fe_{0.96}O$, Fe is present in +2 and +3 oxidation state, what is the mole fraction of Fe^{2+} in the compound?

A. $\frac{12}{25}$

B. $\frac{25}{12}$

C. $\frac{1}{12}$

D. $\frac{11}{12}$

Answer: D

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124. Which ordering of compounds is according to the decreasing order of the oxidation state of nitrogen ?

A. HNO_3, NO, NH_4Cl, N_2

B. HNO_3, NO, N_2, NH_4Cl

C. HNO_3, NH_4Cl, NO, N_2

D. NO, HNO_3, NH_4Cl, N_2

Answer: B

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125. 2 mole of N_2H_4 loses 16 mole of electron is being converted to a new compound X. Assuming that all of the N appears in the new compound. What is the oxidation state of $'N'$ in X ?

A. -1

B. -2

C. $+2$

D. $+4$

Answer: C

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126. When $K_2Cr_2O_7$ is converted to K_2CrO_4, the change in the oxidation state of chromium is

A. 0

B. 6

C. 4

D. 3

Answer: A

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127. When a mananous salt is fused with a mixture of KNO_3 and and solid NaOH, the oxidation number of Mn change from +2 to:

A. $+4$

B. $+3$

C. $+6$

D. $+7$

Answer: C

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128. In Fe(II) -MnO_4^- tirtration HNO_3 is not used beacause:

A. it oxidises Mn^{2+}

B. it reduces MnO_4^-

C. it oxidise Fe^{2+}

D. it reduces Fe^{3+} formed

Answer: C

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129. Which species are oxidised and reduced in the reaction?

$$FeC_2O_4 + KMnO_4 \rightarrow Fe^{3+} + CO_2 + Mn^{2+}$$

A. Oxidised:Fe,C,Reduced:Mn

B. Oxidised:Fe,Reduced:Mn

C. Reduced:Fe,Mn,Oxidised:C

D. Reduced:C,Oxidised:Mn,Fe

Answer: A

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130. In which of the following reactions, H_2O_2 is acting as a reducing agent?

A. $SO_2 + H_2O_2 \rightarrow H_2SO_4$

B. $2KI + H_2O_2 \rightarrow 2KOH + I_2$

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

D. $Ag_2O + H_2O_2 \rightarrow 2Ag + H_2O + O_2$

Answer: D

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131. Following reaction describes the rusting of iron

$$4Fe + 3O_2 \rightarrow 4Fe^{3+} + 6O^{2-}$$

Which one of the following statements is incorrect?

A. This is an example of a redox reaction

B. Metallic iron is reduced to Fe^{2+}

C. Fe^{3+} is an oxidising agent

D. Metallic iron is a reducing agent

Answer: B

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132. Which reaction does not represent auto redox or disproptionation?

A. $Cl_2 + OH^- \rightarrow Cl^- + ClO_3^- + H_2O$

B. $2H_2O_2 \rightarrow H_2O_2$

C. $2Cu^+ \rightarrow Cu^{2+} + Cu$

D. $(NH_4)_2Cr_2O_7 \rightarrow N_2 + Cr_2O_3 + 4H_2O$

Answer: D

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133. Which of the following is redox reaction ?

A. H_2SO_4 reach with NaOH

B. In atmoshere, O_3 is formed from O_2 by lightning

C. Evaporation of H_2O

D. Oxides of nitrogen are formed form nitrogen & oxygen by lightning

Answer: D

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134. Which of the following is redox reaction?

A. $2Na[Ag(CN)_2] + Zn \rightarrow Na_2[Zn(CN)_4] + 2Ag$

B. $BaO_2 + H_2SO_4 \rightarrow BaSO_4 + H_2O_2$

C. $N_2O_5 + H_2O \rightarrow 2HNO_3$

D. $AgNO_3 + KI \rightarrow AgI + KNO_3$

Answer: A

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135. For the redox reation

$MnO_4^- + C_2O_4^{2-} + H^+ \rightarrow Mn^{2+} CO_2 + H_2O$

The correct stoichiometric coefficients of $Mno_4^-, C_2O_4^{2-}$ and H^+ respectively:

A. 2,5,16

B. 16,3,12

C. 15,16,12

D. 2,16,5

Answer: A

Watch Video Solution

136. In the chemical reaction,

$$K_2Cr_2O_7 + xH_2SO_4 + ySO_2 \rightarrow K_2SO_4 + Cr_2(SO_4)_3 + zH_2O$$

$x, y, \text{ and } z$ are

A. x=1,y=3,z-=1

B. x=4,y=1,z=4

C. x=3.y=2.z=1

D. x=2.y=2,z=1

Answer: A

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137. Balance the following equation and choose the quantity which is the sum of the coefficients of and products:

$\ldots . \, CS_2 + \ldots . \, Cl_2 \rightarrow \ldots\ldots CCl_4 + \ldots . \, S_2Cl_2$

A. 5

B. 3

C. 6

D. 2

Answer: D

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138. Balance the followings equations and choose the quantity which is the sum of the coefficients of reactants and products :

$\ldots\ldots . \, PtCI_4 + \ldots . \, XeF_2 - > PtF_6 + \ldots\ldots CIF + \ldots . \, Xe$

A. (a) 16

B. (b) 13

C. (c) 18

D. (d) 12

Answer: A

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139. If 0.1 mole H_3PO_x is completely neutralised by 5.6g KOH then select the true statement.

A. (a) x=3 and given acid is diabasic

B. (b) x=4 and given acid has no P=H linkage

C. (c) x=2 and given acid does not form acid salt

D. (d) all of these

Answer: C

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140. When potassium permanganate is titrated against ferrous ammonium sulphate, the equivalent weight of potassium permanganent is

A. (a) $\frac{\text{molecular mass}}{3}$

B. (b) $\frac{\text{molecular mass}}{5}$

C. (c) $\frac{\text{molecular mass}}{2}$

D. (d) $\frac{\text{molecular mass}}{10}$

Answer: B

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141. Equivalent weight of FeS_2 in the half reaction

$FeS_2 \rightarrow Fe_2O_3 + SO_2$ is :

A. (a) $\frac{M}{10}$

B. (b) $\frac{M}{11}$

C. (c) $\frac{M}{6}$

D. (d) $\frac{M}{1}$

Answer: B

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142. The equivalent mass of HCl in the given reaction is:

A. 16.25

B. 36.5

C. 73

D. 85.1

Answer: D

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143. Equivalent weight of H_3PO_2 when it disproportionates into PH_3 and H_3PO_3 is (mol.wt. of $H_3PO_2 = M$)

A. M

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

C. $\frac{M}{4}$

D. $\frac{3M}{4}$

Answer: D

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144. In the following reaction (unbalanced), equivalent weight of As_2S_3 is related to molecular weight M by

$$As_2S_3 + H + NO_3^- \rightarrow NO + H_2O + AsO_4^{3-} + SO_4^{2-}$$

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

B. $\frac{M}{4}$

C. $\frac{M}{24}$

D. $\frac{M}{28}$

Answer: D

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145. Sulphur forms the chlorides S_2Cl_2 and SCl_2. The equivalent mass of sulphur in SCl_2 is

A. 8g/mol

B. 16g/mol

C. 64.8g/mol

D. 3g/mol

Answer: B

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146. The equivalent weight of an element is 4. Its chloride has a vapour density 59.25. Find the valency of element.

A. 4

B. 3

C. 2

D. 1

Answer: B

Watch Video Solution

147. 6×10^{-3} mole $K_2Cr_2C_7$ reacts completely with 9×10^{-3} mole X^{n+} to give XO_3^- and Cr^{3+}. The value of n is :

A. 1

B. 2

C. 3

D. none of these

Answer: A

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148. What mass of $H_2C_2O_4.\ 2H_2O(mol.\ mass = 126)$ should be dissoved in water to prepare 250mL of centinormal solution which act as a reducing agent?

A. 0.63g

B. 0.1575g

C. 0.126g

D. 0.875g

Answer: B

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149. The equivalent weight of salt

$KHC_2O_4.\ H_2C_2O_4.4H_2O$ when used as reducing agent : $-$

A. $\frac{\text{Mol.mass}}{1}$

B. $\frac{\text{Mol.mass}}{2}$

C. $\frac{\text{Mol.mass}}{3}$

D. $\frac{\text{Mol.mass}}{4}$

Answer: D

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150. The equivalent mass of dilvalent metal is W. The molecular mass of its chloride is:

A. W+35.6

B. W+72

C. 2W+72

D. 2W+35.6

Answer: C

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151. When

BrO_3^- ions reacts with Br- $Br_2$is liberated. The equivalent mass ofBr_2in

: .

A. $\frac{5M}{8}$

B. $\frac{5M}{3}$

C. $\frac{3M}{5}$

D. $\frac{4M}{6}$

Answer: C

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152. If m_A gram of a metal A displaces m_B gram of another metal B from its salt solution and if the equilvalent mass are E_A and E_B respectively then equivalent mass of A can be expressed as:

A. $E_A = \frac{m_A}{m_B} \times E_B$

B. $E_A = \frac{m_A \times m_B}{E_B}$

C. $E_A = \frac{m_B}{E_A} \times E_B$

D. $E_A = \sqrt{\frac{m_A}{m_B} \times E_B}$

Answer: A

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153. Hydrazine reacts with KIO_3 in presence of HCl as :

$N_2H_4 + IO_3^- + 2H^+ + Cl^- \rightarrow ICI + N_2 + 3H_2O$

The equivalent masses of N_2H_4 and KIO_3 respectively are :

A. 8 and 53.5

B. 16 and 53.5

C. 8 and 35.6

D. 8 and 87

Answer: A

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154. What will be the normally of a solution obtained by mixiing 0.45N and 0.60N NaOH in the ratio 2:1 by volume?

A. 0.4N

B. 0.5N

C. 1.05N

D. 0.15N

Answer: B

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155. A solution containg $2.7 \times 10^{-3} mol of A^{2+}$ ion required $1.6 \times 10^{-3} mol of MnO_4^-$ for the oxidation of $A^{2+} to AO_3^-$ the medium is:

A. neutral

B. acidic

C. strong basic

D. none of these

Answer: B

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156. H_2O_2 is used as bleaching reagent because on dissociation it gives oxygen

$$\left(H_2O_2 \to H_2O + \frac{1}{2}O_2\right)$$

"Chachi420" used H_2O_2 solution to bleach her hair and she required

$2.24 L O_2$ gas at 1atm and 273K. She has a H_2O_2 solution labelled '5.6V' then what volume of such solution must she required to bleach her hair?

A. 200mL

B. 300mL

C. 400mL

D. 500mL

Answer: C

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157. 1.25g of a solid dibasic acid is completely neutralised by 25mL of 0.25 molar $Ba(OH_2)$ solution. Molecular mass of the acid is:

A. 100

B. 150

C. 120

D. 200

Answer: D

Watch Video Solution

158. 10mL of N-HCl, 20mL of $N/2H_2SO_4$ and $30mLN/3HNO_3$ are mixed togeher and volume made to one litre. The normally of H^+ in the resulting solution is:

A. 3N/100

B. N/10

C. N/20

D. N/40

Answer: A

Watch Video Solution

159. $0.45g$ of acid (mol. Wt. $= 90$) was exactly neutralized by $20ml$ of $0.5(M) NaOH$.

The basicity of the given acid is

A. 1

B. 2

C. 3

D. 4

Answer: B

Watch Video Solution

160. A $3.4g$ sample of H_2O_2 solution containing $x\% H_2O$ by mass requires xmL of a $KMnO_4$ solution for complete oxidation under acidic conditions. The molarity of $KMnO_4$ solution is :

A. 1

B. 0.5

C. 0.4

D. 0.2

Answer: C

Watch Video Solution

161. What volume of O_2 measured at standard condition will be formed by the action of $100mL$ of $0.5NKMnO_4$ on hydrogen peroxide in an acid solution?

The skeleton equation for the reaction is,

$KMnO_4 + H_2SO_4 + H_2O_2 \rightarrow K_2SO_4 + MnSO_4 + H_2O + O_2$

A. 0.12litre

B. 0.028 litre

C. 0.56 litre

D. 1.12 litre

Answer: C

Watch Video Solution

162. A sample of 1.0g of solid $Fe_2O_3 of 80\%$ purity is dissolved in a moderately concentrated HCl solution which is reduced by zinc dust. The resulting solution required 16.7mL of a 0.1M solution of the oxidant. Calculate the number of electrons taken up by the oxidant.

A. (a) 2

B. (b) 4

C. (c) 6

D. (d) 5

Answer: C

Watch Video Solution

163. $KMnO_4$ reacts with oxalic acid according to the equation

$$2MnO_4^- + 5C_2O_4^{2-} + 16H^+ \rightarrow 2Mn^{2+} + 10CO_2 + 8H_2O$$

Here, 20mL of 1.0M $KMnO_4$ is equivalent to:

A. $120mLof0.25MH_2C_2O_4$

B. $150mLof0.10MH_2C_2O_4$

C. $25mLof0.20MH_2C_2O_4$

D. $50mLof0.20MH_2C_2O_4$

Answer: C

Watch Video Solution

164. Ratio of moles of Fe (II) oxidised by equal volumes of equimolar $KMnO_4$ and $K_2Cr_2O_7$ solutions in acidic medium will be:

A. $5:3$

B. $1:1$

C. $1:2$

D. $5:6$

Answer: D

Watch Video Solution

165. The mass of a mixtutre contining HCl and H_2SO_4 is 0.1g. On treatment withan excess of an $AgNO_3$ solution, reacted with this acid mixture gives 0.1435g of AgCl. Mass $\%$ of the H_2SO_3 mixture is:

A. 36.5

B. 63.5

C. 50

D. none of these

Answer: B

Watch Video Solution

166. A solution of $Na_2S_2O_3$ is standardized iodometrically against 0.167g of $KBrO_3$. The process requires 50mL of the $Na_2S_2O_4$ solution. What is the normality of the $Na_2S_3O_3$?

A. 0.2N

B. 0.12N

C. 0.72N

D. 0.02N

Answer: B

Watch Video Solution

167. 0.80g of impure $(NH_4)_2SO_4$ was boiled with 100mL of a 0.2N NaOH solution till all the NH_3 (g) evolved. the remaining solution was diluted to $250mL$. $25mL$of this solution was neutralized using $5mL$ of a $0.2NH_2SO_4$ solution. The percentage purity of the $(NH_4)_2SO_4$ sample is:

A. 82.5

B. 72.5

C. 62.5

D. 17.5

Answer: A

Watch Video Solution

168. 0.303 g of an organic compound was analysed for nitrogen by Kjeldahl's method. The ammonia evolved was absorbed in 50 ml of 0.1 N H_2SO_4. The excess acid required 25 ml of 0.1 N NaOH for neutralisation. Calculate the percentage of nitrogen in the compound.

A. 8

B. 16

C. 20

D. 25

Answer: A::C

Watch Video Solution

169. Find out $\%$ of oxalate ion ina given sample of an alkali metal oxalate salt, 0.30g of it is dissolve in 100mL water and its required 90mL OF Centimolar $KMnO_4$ solution in aicdic medium:

A. 66%

B. 55%

C. 44%

D. 6.6%

Answer: A

Watch Video Solution

170. 320 mg of a sample of magnessium having a coasting of its oxide required 20mL of 0.1M hydrochloric acid for the complete neutralisation of the latter. The composition of the sample is:

A. 87% Mg and 12.5%MgO

B. 12.5% Mg and 87.5 %MgO

C. 80% Mg and 20%MgO

D. 20% Mg and 80%MgO

Answer: C

Watch Video Solution

171. The concentration of bivalent lead ions in a sample of polluted of polluted water that aslo contains nitrate ions is determined by adding solid sodium sulphate (M=142) to exactly 500mL water. Calculate the molarity of lead ions if 0.355g is sodium sulphate was nedded for complete precipitation of lead ions as sulphate.

Watch Video Solution

172. What volume of HNO_3(sp. gravity$1.05mL^{-1}$containing $12.6(w/W)ofHNO_3$) that reduce into NO is required to oxidise iron 1g $1g. FeSO_4.7H_2O$ in acid medium is:

A. 70mL

B. 0.57mL

C. 80mL

D. 0.65mL

Answer: C

Watch Video Solution

173. The total volume of $0.1MKMnO_4$ solution that are needed to oxidize 100mg each of ferrius oxalate and ferrous sulphate in a mixture in acidic medium is:

A. 1.096mL

B. 1.32mL

C. 5.48mL

D. none of these

Answer: A

Watch Video Solution

174. When 2.5g of a sample of Mohr's salt reacts completely with 50mL of $\frac{N}{10}KMnO_4$ solution. The $\%$ purity of the sample of Mohr's salt is:

A. (a) 78.4

B. (b) 70

C. (c) 37

D. (d) 40

Answer: A

Watch Video Solution

175. 4 mole of a mixture of Mohr's salt and $Fe_2(SO_4)_3$ requires 500mL of $1 M K_2Cr_2O_7$ for complete oxidation in acidic medium. The mole % of the Mohr's salt in the mixture is:

A. 25

B. 50

C. 60

D. 75

Answer: D

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176. The equivalent mass of a metal is twice to that of oxygen. How many times the weight of it's oxide is greater than the weight of metal?

A. 1.5

B. 2

C. 3

D. 4

Answer: A

Watch Video Solution

177. A metal oxide has the formular M_2O_3. It can be reduced by hydrogen to give free metal and water 0.1596g of the metal oxide required 6 mg hydrogen for complete reduction. The atomic weight of the metal is:

A. 15.58

B. 155.8

C. 5.58

D. 55.8

Answer: D

Watch Video Solution

178. Calculate the mass of oxalic acid $(H_2C_2O_4)$ which can be oxidised to CO_2 by $100.0mL$ of MnO_4^- solution, $10mL$ of which is capable of oxidising $50.0mL$ of $1.0NI^-$ to I_2?

A. 45g

B. 22.5g

C. 30g

D. 12.25g

Answer: B

Watch Video Solution

179. A mixture of $NaHC_2O_4$ and $KHC_2O_4 . H_2C_2O_4$ required equal volumess of $0.2NKMnO_4$ and $0.12NNaOH$ separtely. What is the molar ration $NaHC_2O_4$ and $KHC_2O_4 . H_2O_4$ in the mixture?

A. $6:1$

B. $1:6$

C. $1:3$

D. $3:1$

Answer: D

Watch Video Solution

180. Stannous sulphate $(SnSO_4)$ and potassium permanganate are used as oxidising agents in acidic medium for oxidation of ferrrous ammnium sulphate to ferric sulphate. The ration of number of moles of stannous sulphate required per mole of ferrous ammonium sulphate to the number of moles of $KMnO_4$ required per mole of ferrous ammonium sulphate, is:

A. 2.5

B. 0.2

C. 0.4

D. 2

Answer: A

Watch Video Solution

181. If a g is the mass of $NaHC_2O_4$ required to neutralize 100mL of 0.2M NaOH and b g that required to reduce 100mL of 0.02mL $KMnO_4$ in acidic medium then:

A. a=b

B. 2a=b

C. a=2b

D. none of these

Answer: D

Watch Video Solution

182. 2 mole , equimolar mixture of $Na_2C_2O_4$ and $H_2C_2O_4$ required $V_1 L of 0.1 M KMnO_4$ in acidic medium for complete oxidation. The same amount of the mixture required $V_2 L of 0.2 M NaOH$ for neutralisaation. The raation of V_1 and V_2 is:

A. $1:2$

B. $2:1$

C. $4:5$

D. $5:4$

Answer: C

Watch Video Solution

183. A mixture contaning 0.05 moleof $K_2Cr_2O_7$ and $0.02\text{mole of} KMnO_4$ was treated eoith excess of KI in acidic medium. The liberated iodine required $1.0L\text{of}Na_2S_2O_3$ solution for titration. Concentration of $Na_2S_2O_3$ solution was:

A. $0.4molL^{-1}$

B. $0.20molL^{-1}$

C. $0.25molL^{-1}$

D. $0.30molL^{-1}$

Answer: A

Watch Video Solution

184. 25mL of $2NHCl, 50mL\text{of}4NHNO_3$ and $xmL2$ MH_2SO_4 are mixed together and the total volume is made up to 1L after dilution. 50mL if this acid ixture completely reacteed with 25mL of a $1NNa_2CO_3$ solution. The value of x is:

A. 250mL

B. 62.5mL

C. 100mL

D. none of these

Answer: B

Watch Video Solution

185. In a iodomeric estimation, the following reactions occur

$$2Cu^{2+} + 4i^{-} \rightarrow Cu_2I_2 + I_2, I_2 + 2Na_2S_2O_3 \rightarrow 2NaI + Na_2S_4O_6$$

0.12 mole of $CuSO_4$ was adde to excess of KI solution and the liberated iodine required 120mL of hypo. The molarity of hypo soulution was:

A. 2

B. 0.2

C. 0.1

D. 1

Answer: D

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186. 1g mixture of equal number of mole of Li_2CO_3 and other metal carbonate (M_2CO_3) required 21.6mL of 0.5 N HCl for complete neutralisation reaction. What is the apoproximate atomic mass of the other metal?

A. 25

B. 23

C. 51

D. 118

Answer: D

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187. 32g of a sample of $FeSO_4.7H_2O$ were dissolved in dilute sulphuric aid and water and its volue was made up to 1litre. 25mL of this solution required 20mL of $0.02 M KMnO_4$ solution for complete oxidation. Calculate the mass% of $FeSO_4.7H_2O$ in the sample.

A. 34.75

B. 69.5

C. 89.5

D. none of these

Answer: A

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188. In the mixture of $(NaHCO_3 + Na_2CO_3)$, volume of HCI required is x mL with phenolphthalein indicator and y mL with methly orange indicator in the same titration. Hence, volume of HCI for complete reaction of Na_2CO_3 is :

(a) 2x

(b) y

(c) x/2

(d) (y-x)

A. 2x

B. y

C. x/2

D. (y-x)

Answer: D

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189. 0.1g of a solution containing Na_2CO_3 and $NaHCO_3$ requires 10mL of 0.01 N HCl for neutralization using phenolphthalein as an indicator, mass% of Na_2CO_3 in solution is:

A. 25

B. 32

C. 50

D. none of these

Answer: C

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190. A mixture $NaOH + Na_2CO_3$ required 25mL of 0.1 M HCl using phenolpth.thalein as the indicator. However, the same amount of the mixture required 30mL of 0.1M HCl when methyl orange was used as the indicator. The molar ration of $NaOH$ and Na_2CO_3 in the mixture was:

A. $2:1$

B. $1:2$

C. $4:1$

D. $1:4$

Answer: A

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191. When 100mL solution of $NaOH$ and $NaCO_3$ was first titrated with N/10 HCl in presence of HPh, 17.5mL were usedtill end point is obtained. After this end point MeOH was added and 2.5mL of same HCl were required to attain new end point. The amount NaOH in mixture is:

A. 0.06g per 100mL

B. 0.06g per 200mL

C. 0.05 g per 100mL

D. 0.012 g per 200mL

Answer: A

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192. 1gram of a sample of $CaCO_3$ was strongly heated and the CO_2 liberated was absorbed iun 100mL of 0.5 M NaOH solution. Assuming 90% purity for the sample, how many mL of 0.5M HCl would be required to react with the resulting solution to reach the end point inpresence of phenolphthaein?

A. 73mL

B. 41mL

C. 82mL

D. 100mL

Answer: C

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193. A sample of pure sodium carbonate 0.318g is dissolved in water and titrated with HCl solution. A volume of 60mL is required to reach the methyl orange end point. Calculate the molarity of the acid.

A. 0.1M

B. 0.2M

C. 0.4M

D. none of these

Answer: A

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194. 10L of hard water required 5.6g of lime for removing hardness. Hence temperorary hardness in ppm of $CaCO_3$ is:

A. 1000

B. 2000

C. 100

D. 1

Answer: A

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195. 1L of pond water contains $20mgofCa^{2+}$ and $12mg\text{of}Mg^{2+}ions.$ What is the volume of a $2NNa_2CO_3$ solution required to soften 5000L of pond water?

A. 500L

B. 50L

C. 5L

D. none of these

Answer: C

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196. One litre of a sample of hard water contain $4.44mgCaCl_2$ and $1.9mg\text{of}MgCl_2$. What is the total hardness in terms of ppm of $CaCO_3$?

A. 2ppm

B. 3ppm

C. 4ppm

D. 6ppm

Answer: D

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197. If hardness of water sample is 200ppm, then select the incorrect statement:

A. Mass ratio of $CaCO_3$ to H_2O $is \frac{0.02}{100}$

B. Mole ratio of $CaCO_3$ to H_2O $is 3.6 \times 10^{-5}$

C. Mass of $CaCO_3$ present in hard water $is 0.2 g/L$

D. 1 miliequivalent of $CaCO_3$ present in 1kg of hard water

Answer: D

Match the Colum-II

1.

Column-I

(A) 0.5 mole of $SO_2(g)$

(B) 1 g of $H_2(g)$

(C) 0.5 mole of $O_3(g)$

(D) 1 g molecule of $O_2(g)$

Column-II

(P) Occupy 11.2 L at 1 atm and 273 K

(Q) Weighs 24 g

(R) Total no. of atoms 1.5 × N_A

(S) Weighs 32 g

2. Match the following Column - I and Column - II

Column-I

(A) 44 g CO_2 gas

(B) 35.2 g of CH_4

(C) 48 g of O_3 gas

(D) 44 g of N_2O gas

Column-II

(P) 1g molecule

(Q) N_A molecule

(R) 22 N_A electrons

(S) 49.28 L at 1 atm and 273 K

(T) N_A atoms of oxygen

3. Match the following columns

Column-I [Atomic masses (M)]				Column-II (% composition of heavier isotope
	Isotope-II	Isotope-II	Average	
(A)	$(z-1)$	$(z+3)$	z	(P) 25% by moles
(B)	$(z+1)$	$(z+3)$	$(z+2)$	(Q) 50% by moles
(C)	z	$3z$	$2z$	(R) % by mass dependent on z
(D)	$(z-1)$	$(z+1)$	z	(S) 75% by mass

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4. Match the following Columns

Column-I	Column-II
(A) When Bi_2S_3 converted into Bi^{5+} and S	(P) 18
(B) When $Al_2(Cr_2O_7)_3$ reduced into Cr^{3+} in acidic medium	(Q) 11
(C) When FeS_2 converted into Fe_2O_3 and SO_2	(R) 2
(D) When $Mn(NO_3)_2$ converted into MnO_4^{2-} and NO	(S) 10

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Column-I	Column-II
(A) $P_2H_4 \longrightarrow PH_3 + P_4H_2$	(P) $E = \frac{3M}{4}$
(B) $I_2 \longrightarrow I^- + IO_3^-$	(Q) $E = \frac{3M}{5}$
(C) $MnO_4^- + Mn^{2+} + H_2O \longrightarrow Mn_3O_4 + H^+$	(R) $E = \frac{15M}{26}$
(D) $H_3PO_2 \longrightarrow PH_3 + H_3PO_3$	(S) $E = \frac{5M}{6}$

5.

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6. A sample of raw material contain $NaNO_3$. It contains some $NaIO_3$ also. The $NaIO_3$ can be used as a source of iodine, produced in the following reactions:

$IO_3^- + HSO_3^- \rightarrow I^- + SO_4^-$ ....(1)

$I^- + IO_3^- \rightarrow I_2 + H_2O$ ....(2)

One litre of sample solution containing 396 g $NaIO_3$ is treated with stoichiometric quantity of $NaHSO_3$. Now a substantial amount of solution is added to reaction mixture to bring about the reaction (2).

Column-I	Column-II
(A) n-factor of IO_3^- in reaction (2)	(P) 6
(B) Number of moles of HSO_3^- used in reaction (1)	(Q) 1.2
(C) Moles of I_2 produced	(R) 2
(D) Equivalents of IO_3^- used in reaction (2)	(S) 5

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Others

1. Calculate number of neutrons present in 12×10^{25} atoms of oxygen $(8O^{17})$: (Given : $N_A = 6 \times 10^{23}$)

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2. If mass of one atom is $3.32 \times 10^{-23} g$, then calculate number of nucleons (neutrons and protons) present in 2 atoms of the element:

(a) 40

(b) 20

(c) 10

(d) 40 NA

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3. Calculate number of electron present in $9.5 \text{ g of} PO_4^{3-}$:

(a) 6

(b) $5N_A$

(c) $0.1N_A$

(d) $4.7N_A$

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4. What is the number of moles of O-atoms in 126 amu of HNO_3 ?

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5. What is the charge of 96 amu of s^{2-} ?

(a) 2C

(b) 3.2 x 10^{-19} C

(c) 9.6 x 10^{-19} C

(d) 6C

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6. A sample of sodium has a mass of $46g$. What is the mass of the same number of calcium atoms as sodium atoms present in given sample

(a) 46 g

(b) 20 g

(c) 40 g

(d) 80 g

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7. The total number of neutrons present in $54mLH_2O(l)$ are :

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8. Total number of electrons present in $48 g Mg^{2+}$ are :

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9. The number of neutrons in $5g$ of D_2O(D is $2_1 H$) are:

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10. Cisplatin, an anticancer drug, has the molecular formula $Pt(NH_3)_2Cl_2$. What is the mass (in gram) of one molecule ? (Atomic masses : $Pt = 195$, $N = 14$, $H = 1$, $Cl = 35.5$)

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11. Aspirin has the fromula $C_9H_8O_4$. How many atoms of oxygen are there in a tablet weighing $360mg$?

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12. $20g$ of ideal gas contains only atoms of S and O occupies $5.6L$ at 1 atm and $273K$. what is the molecular mass of gas ?

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13. A sample of ammonium phosphate, $(NH_4)_3PO_4$ contains 18 moles of hydrogen atoms. The number of moles of oxygen atoms in the sample is

Watch Video Solution

14. Total number of moles of oxygen atoms in 3 litre $O_3(g)$ at $27^\circ C$ and 8.21 atm are :

(a) 3

(b) 1

(c) 1

(d) None of these

Watch Video Solution

15. 3.011×10^{22} atoms of an element weighs $1.15gm$. The atomic mass of the element is :

(a) 10amu

(b) 2.3amu

(c) 35.5amu

(d) 23amu

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16. One atom of an element x weighs $6.643 \times 10^{-23}g$. Number of moles of atoms in its $20kg$ is :

A. 4

B. 40

C. 100

D. 500

Answer: D

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17. Mass of one atom of the element A is $3.9854 \times 10^{-23} g$. How many atoms are contained in 1g of the element A ?

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18. Which of the following contains the largest mass of hydrogen atoms

(a) 5.0 moles of $C_2H_2O_4$

(b) 1.1 moles of $C_3H_8O_3$

(c) 1.5 moles of $C_6H_8O_6$

(d) 4.0 moles of $C_2H_4O_2$

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19. If the volume of a drop of water is $0.0018 mL$ then the number of water molecules present in two drop of water at room temperature is :

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20. It is known that atom contain protons, neutrons and electrons. If the mass of neutron is assumed to half of its original value whereas that of proton is assumed to be twice of its original value then the atomic mass of C_6^{14} will be :

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21. Common salt obtained from sea-water contains $8.775\%\ NaCl$ by mass. The number of formula units of $NaCl$ present in $25g$ of this salt is :

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22. The number of hydrogen atoms present in $25.6g$ of sucrose $(C_{12}H_{22}O_{11})$ which has a molar mass of $342.3g$ is :

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23. Caffiene has a molecular mass of 194. If it contains 28.9% by mass of nitrogen, number of atoms of nitrogen in one molecule of caffeine is :

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24. The density of water is 1g/mL. What is the volume occupied by 1 molecule of water ?

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25. A $25.0mm \times 40.0mm$ piece of gold foil is $0.25mm$ thick. The density of gold is $19.32g$ per cm^3. How many gold atoms are in the sheet ? (Atomic weight : $Au = 197.0$)

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26. If average molecular mass of air is 29, then assuming N_2 and O_2 gases are there, which option are correct regarding composition of are?

$(i) 75 \%$ by mass of N_2(ii)75% "by moles of N_2 $(iii) 72.41 \% bymassof$ N_(2)`

A. only i) is correct

B. only ii) is correct

C. both ii) and iii) are correct

D. both i) and ii) are correct

Answer: C

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27. Density of dry air containing only N_2 and O_2 is $1.15\frac{g}{L}$ at $740mm$ of Hg and $300K$. What is % composition of N_2 by mass in the air ?

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28. A gaseous mixture of H_2 and CO_2 gases contains 66 mass % of CO_2. The vapour density of the mixture is :

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29. The vapour density of a mixture containing NO_2 and N_2O_4 is 27.6. The mole fraction of N_2O_4 in the mixture is :

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30. Density of ideal gas at 2 atm and 600K is 2g/L. Calculate relative density of this with respect to Ne(g) under similar conditions : (given : $R = \frac{1}{12} atm \frac{L}{m} ol. K$)

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31. Average atomic mass of magnesium is 24.31amu. This magnesium is composed of 79 mole % of 24 Mg and remaining 21 mole % of 25Mg and 26 Mg. Calculate mole % of 26 Mg.

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32. Indium (atomic mass $= 114.82$) has two naturally occurring isotopes, the predominant one from has isotopic mass 114.9041 and abundance of 95.72%. Which of the following isotopic mass is the most likely for the other isotope ?

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33. Calculate density of a gaseous mixture which consist of 3.01×10^{24} molecules of N_2 and $32g$ of O_2 gas at 3 atm pressure and $860K$ temperature (Given : $R = \frac{1}{12}\, atm\, L\, mol^{-1}\, K^{-1}$)

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34. A mixture of O_2 and gas Y $(mol.\, wt.\, 80)$ in the mole ratio $a : b$ has a mean molecular weight 40. What would be mean molecular weight, if the gases are mixed in the ratio $b : a$ under identical conditions ? (gases are ideal)

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35. If water sample are taken from sea, rivers or lake, they will be found to contain hydrogen and oxygen in the approximate ratio of $1 : 8$. This indicates the law of :

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36. Hydrogen and oxygen combine to form H_2O_2 and H_2O containing 5.93% and 11.2% hydrogen respectively. The data illustrates :

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37. Which one the following combinations illustrate law of reciprocal proportions ?

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38. Carbon and oxygen combine to from two oxides, carbon is respectively $12:16$ and $12:32$. These figures illustrate the :

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39. A sample of calcuium carbonate $(CaCO_3)$ has the following percentage composition: $Ca = 40\%$, $C = 12\%$, $O = 48\%$ If the law of constant proportions is true. Then the weight of calcium in $4g$ of a sample of calcium carbonate obtained from another source will be

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40. The law of multiple proportion is illustrated by the two compounds :

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41. All the substance listed below are fertilizers that contribute nitrogen to the soil. Which of these is the richest source of nitrogen on a mass percentage basis ?

(a) Urea

(b) Ammonium Nitrate

(c)Nitric oxide

(d) Ammonia

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42. One mole of element X has 0.444 times the mass of one mole of element Y. One atom of element X has 2.96 times the mass of one atom of C^{12}. What is the atomic mass of Y ?`

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43. A given sample of pure compound contains $9.81g$ of Zn, 1.8×10^{23} atoms of chromium, and 0.60 mol of oxygen atoms. What is the simplest formula?

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44. The formula of an acid is HXO_2. The mass of 0.0242 moles of the acid is $1.657g$. What is the atomic mass of X ?

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45. What is the emprical formula of vanadium oxide , if $2.74g$ of the metal oxide contains $1.53g$ of metal ?

Watch Video Solution

46. Determine the empirical formula of kelvar, used in making bullet proof vests, containing $70.6\,\%\,C,\,4.2\,\%\,H,\,11.8\,\%\,N\,$ and $\,13.4\,\%\,O$:

A. $C_7H_5NO_2$

B. $C_7H_5N_2O$

C. C_7H_9NO

D. C_7H_5NO

Answer: D

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47. The hydrate salt $Na_2CO_3 . xH_2O$ undergoes 63% loss in mass on heating and becomes anhydrous. The value of x is :

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48. A $6.85g$ sample of the hydrated $Sr(OH)_2 . xH_2O$ is dried in an oven to give $3.13g$ of anhydrous $Sr(OH)_2$. What is the value of x? (Atomic masses : $Sr = 87.60. O = 16.0, H = 1.0$)

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49. What percentage of oxygen is present in the compound $CaCO_3.3Ca_3(PO_4)_2$?

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50. Deildrin, an insecticide, contains C, H, Cl and O. Combustion of $29.72mg$ of dieldrin gave $41.21mgCO_2$ and $5.63mg$ of H_2O . In a separate analysis $25.31mg$ of dieldrin was converted into $57.13mg$ Ag Cl. What is the empirical formula of dieldrin ?

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51. A gaseous compound is composed of 85.7% by mass carbon and 14.3% by mass hydrogen. Its density is 2.28 g/litre at $300K$ and 1.0 atm pressure. Determine the molecular formula of the compound.

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52. Complete combustion of $0.858g$ of compound X given $2.64g$ of CO_2 and 1.26g of H_2O The lowest molecular mass X can have ;

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53. The sulphate of a metal M contains 9.87% of M, This sulphate is isomorphous with $ZnSO_4.7H_2O$. The atomic weight of M is

Watch Video Solution

54. In an organic compound of molar mass $108gmmol^{-1}C, H$ and N atoms are presents in $9:1:3.5$ by mass. Molecular formula can be

A. $C_6H_8N_2$

B. $C_7H_{10}N$

C. $C_5H_6N_3$

D. $C_4H_{18}N_3$

Answer: A

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55. On analysis, a certain compound was found to contain 254g of iodine (at.mass 127) and 80g oxygen (at.mass 16). What is the formula of the compound ?

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56. An element A is teravalent and another element B is divalent. The formula of the compound formed from these elements will be :

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57. A compound used in making nylon, contains 43.8% oxygen. There are four oxygen atoms per molecule. What is the molecular mass of compound ?

A. 36

B. 116

C. 292

D. 146

Answer: D

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58. Suppose two elements X and Y combine to form two compound XY_2 and X_2Y_3weighs $85g$. The atomic masses of X and Y are respectively :

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59. $44g$ of a sample on complete combustion given $88gCO_2$ and $36g$ of H_2O. The molecular formula of the compound may be :

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60. 40 miligram diatomic volatile substance (X_2) is converted to vapour that displaced $4.92mL$ of air at 1atm and 300k. Atomic mass of element X is nearly :

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61. Two element X (at . Mass = 75) and Y(at .mass =16) combine to given a compound having 75.8% of X. The formula of the compound is :

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62. A sample of phosphorus that weighs $12.4g$ exerts a pressure 8 atm in a 0.821 litre closed vesel at $527^{\circ}C$. The molecular formula of the phosphorus vapour is :

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63. Manganese forms non-stoichiometric oxides having the general formula MnO_x. The value of x for the compound that analyzed 64% by mass Mn :

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64. 1.44 gram if titanium (Ti) reacted with excess of O_2 and produce x gram of non $-$ stoichiometric compound $Ti_{1.44}O$. The value of x is :

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65. Which of the following setups is correct to calualate the mass (in g) of $KClO_3$ produced from the reaction of 0.150 moles of Cl_2 ?

$3Cl_2 + 6KOH \rightarrow 5KClO_3 + 3H_2O$

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66. $2.0g$ of a sample contains mixture of SiO_2 and Fe_2O_3. On very strong heating, it leaves a residue weighing $1.96g$. The reaction responsible for loss of mass is given below. Fe_2O_3(s)rarrFe_3o_4(s)+O_2(s)

, $(unbalanceequation). W\hat{i}sthepercentbymassof$SiO_2` in original sample ?

Watch Video Solution

67. What volume of air at 1 atm and $273K$ containing 21% of oxygen by volume is required to completely burn sulphur (S_8) present in $200g$ of sample , which contains 20% inert material which does not burn. Sulphur burns according to the reaction $\frac{1}{8}S_8(s) + O_2(g) \rightarrow SO_2(g)$

Watch Video Solution

68. For the reaction, $2Fe(NO_3)_3 + 3Na_2CO_3 \rightarrow Fe_2(CO_3)_3 + 6NaNO_3$ initially 2.5 mole of $Fe(NO_3)_3$ and 3.6 mole of Na_2CO_3 are taken. If 6.3 mole of $NaNO_3$ is obtained then % yield of given reaction is :

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69. How many of P_4 can be produced by reaction of 0.10 moles $Ca_5(PO_4)_3F$, 0.36 moles SiO_2 and 0.90 moles C according to the following reaction ?

$$4Ca_5(PO_4)_3F + 18SiO_2 + 30C \rightarrow 3P_4 + 2CaF_2 + 18CaSiO_3 + 30CO$$

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70. Some older emergency oxygen masks contains potassium superoxide KO_2 which reacts with CO_2 and water present in exhaled air to produce oxygen according to the given equation. If a person exhales $0.667g$ of CO_2 per minute, how many gram of KO_2 are consumed in 5.0 minutes ?

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71. The mass of N_2F_4 produced by the reaction of $2.0g$ of NH_3 and $8.0g$ of F_2 is $3.56g$. What is the per cent yield ?

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72. Calculate the mass of lime (CaO) obtained by heating $200kg$ of 95% pure lime stone $(CaCo_3)$:

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73. Phosphoric acid (H_3PO_4) prepared in a two step process. (1) $P_4 + 5O_2 \rightarrow P_4O_{10}$ (2) $P_4O_{10} + 6H_2O \rightarrow 4H_3PO_4$ We allow $62g$ of phosphorus to react with excess oxygen which form P_4O_{10} in 85% yield. In the step (2) reaction 90% yield of H_3PO_4$isobta \in ed. massof$ H_3PO_4` produced is :

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74. 9 moles of "D" and 14 moles of E are allowed to react in a closed vessel according to given reactions. Calculate number of moles of B formed in the end of reaction, if 4 moles of G are present in reaction vessel. (percentage yield of reaction is mentioned in the reaction) Step -1 $3D + 4E80\% \rightarrow 5C + A$ Step-2 $3C + 5G50\% \rightarrow 6B + F$

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75. The chief ore of Zn is the sulphide ZnS. The ore is concentrated by froth floatation process and then heated in air to convert ZnS to ZnO $2ZnS + 3O_3 \rightarrow 2ZnO + 2SO$ (80% conversion) $ZnO + H_2SO_4 \rightarrow ZnSO_4 + H_2O$ (100% conversion) and $2ZnSO_4 + 2H_2O \rightarrow 2Zn + 2H_2SO_4 + O_2$ (80% conversion).The number of moles of ZnS required for producing 2 moles of Zn will be :

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76. 0.8 moles of a mixture of CO and CO_2 requires exactly 40 gram of $NaOH$ in solution for complete conversion of all the CO_2 into Na_2CO_3. How many more of $NaOH$ would for require for conversion into Na_2CO_3 if the mixture (0.8 mole) is completely oxidised to CO_2 ?

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77. Silver oxide (Ag_2O) decomposes at temperature $300^\circ C$ yielding mettallic silver and oxygen gas. A $1.60g$ sample of impure silver oxide yields $0.104g$ of oxygen gas. What is the per cent by mass of the silver oxide in the sample ?

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78. Comprehension # 5

$342g$ of 20% by mass of $Ba(OH)_2$ solution $(sp.\ gr.0.57)$ is reacted with $200mL$ of $2MHNO_3$ according to given balanced reaction :

$$Ba(OH)_2 + 2HNO_3 \rightarrow Ba(NO_3)_2 + 2H_2O$$

Find the molarity of the ion in resulting solution by which nature of the above solution is identified, is

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79. $100mL$ of H_2SO_4 solution having molarity $1M$ and density $1.5g/mL$ is mixed with $400mL$ of water. Calculate final m plarity of H_2SO_4 solution, if final density is $1.25g/mL$?

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80. What volume of HCI solution of density $1.2\frac{g}{c}m^3$ and containing 36.5% by mass HCI, must be allowed to react wtih zinc (Zn) in order to liberate $4.0g$ of hydrogen ?

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81. An ideal gaseous mixture of ethane (C_2H_6) and ethene (C_2H_4) occupies 28 litre at $1atm\ 0^\circ C$. The mixture reacts completely with $128gmO_2$ to produce CO_2 and H_2O. Mole of fraction at C_2H_6 in the mixture is-

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82. Wood's metal contains 50.0% bismuth, 25.0% lead, 12.5% tin and 12.5% cadmium by mass. What is the mole fraction of tin ?(\ (Atomic mass : $Bi = 209, Pb = 207, Sn = 119, Cd = 112)$

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83. The density of a 56.0% by mass aqueous solution of 1-propanol $(CH_3CH_2CH_2OH)$ is $0.8975\frac{g}{c}m^3$. What is the mole fraction of the 1-propanol ?

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84. What is the molartiy of SO_4^{2-} ion in aqueous solution that contain $34.2p \pm$ of $AI_2(SO_4)_3$? (Assume complete dissociation and density of solution $1\frac{g}{m}L$)

A. 3x10^{-4}

B. 2x10^{-4}

C. 10^{-4}

D. None

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85. The relation between molarity (M) and molality (m) is given by : (p=density of solution (g/mL), M_1= molecular mass of solute)

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86. Molarity and molality of a solution of an liquid (mol. Mass =50) in aqueous solution is 9 and 10 respectively . What is the density of solution ?

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87. An aqueous solution of ethanol has density 1.025 g/mL and it is 2 M. What is the molality of this solution ?

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88. 0.2 mole of HCI and 0.2 mole of barium chloride were dissolved in water to produce a $500mL$ solution. The molarity of the CI^{-} ions is :

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89. Calculate the mass of anhyrous HCl in $10mL$ of concentrated HCl (density =1.2 g per ml) solution having $37\% HCl$ by mass is :

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90. Calculate the molality of 1L solution of $80\% H_2SO_4\left(\frac{w}{V}\right)$ given that the density of the solution is $1.80gmL^{-1}$.

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91. Fluoxymesterone, $C_{10}H_{29}FO_3$, is an anabolic steroid. A 500 mL solution is prepared by dissolving $10.0mg$ of the steoid in water. $10.0mL$ portion of this solution is diluted to a final volume of $1.00L$. what is the resulting molarity ?

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92. The $25mL$ of a 0.15M solution of lead nitrate, $Pb(NO_3)_2$ reacts with all of the aluminium sulphate, $Al_2(SO_4)_3$, present in $20mL$ of a solution. What is the molar concentration of the $AI_2(SO_4)_3$?

$3Pb(NO_3)_2(aq) + AI_2(SO_4)_3(aq) \rightarrow 3PbSO_4(s) + 2AI(NO_3)_3(aq)$

Watch Video Solution

93. Concentrated HNO_3 is 63% HNO_3 by mass and has a density of $1.4g/mL$. How many millilitres of this solution are required to prepare $250mL$ of a $1.20 M HNO_3$ solution ?

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94. $50mLof$20.8% (w/V) Ba CI_2 and (aq) and 100mLof9.8% (w/V) H_2SO_4(aq)$solutions are mixed. Molarity of$CI^- in the resulting solution is : (At mass of $Ba = 137$)

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95. $100mL$ of $10\%\ NaOH\left(\frac{w}{V}\right)$ is added to $100mL$ of $10\%\ HCI\left(\frac{w}{V}\right)$.

The nature of resultant solution is :

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96. How many millilitres of $0.1MH_2SO_4$ must be added to $50mL$ of $0.1MNaOH$ to give a solution that has a concentration of $0.05M$ in H_2SO_4 ?

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97. $1MHCl$ and $2MHCl$ are mixed in volume ratio 4:1. What is the final molarity of HCl solution?

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98. Three solutions X,Y,Z of HCl are mixed to produce 100mL of 0.1M solution . The molarities of X,Y and Z are 0.7M, 0.12M and 0.15M respectively. What respective volumes of X,Y and Z should be mixed?

a. 50mL,25mL,25mL

b. 20mL,60mL,20mL

c. 40mL, 30mL, 30mL

d. 55mL, 20mL, 25mL

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99. A bottle of an aqueous H_2O_2 solution is labelled as '28V' H_2O_2 and the density of the solution $(\text{in} g/mL)$ is 1.25. Choose the correct option.

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100. The impure 6g of NaCl is dissolved in water and then treated with excess of silver nitrate solution. The mass of p[recipitate of silver chloride is found to be 14g. The % purity of NaCl solution would be:

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101. $AI_2(SO_4)_3$ solution of 1 molal concentration is present in 1 litre solution of density $2.684\frac{g}{m}L$. How many moles of $BaSO_4$ would be precipitated on adding excess of $BaCI_2$ in it ?

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102. A certain public water supply contains $0.10ppb$ (part per billion) of chloroform $(CHCI_3)$. How many molecules of $CHCI_3$ would be obtained in $0.478mL$ drop of this water ?(assumed $d = 1\frac{g}{m}L$)

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103. Decreasing order (first having highest and then other following it) of mass of pure NaOH in each of the aqueous solution

(P) 50 gm of 40% (w/w) NaOH

(Q) 50 gm of $50\%\ (w/w)$ NaOH $[d_{\text{soln.}} = 1.2 gm/ml]$

(R) 50 gm of 20 M NaOH $[d_{\text{soln}}. = 1 gm/ml]$

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104. What is the molar mass of diacidic organic Lewis base (B), if $12g$ of its chloroplatinate salt (BH_2PtCI_6) on ignition produced $5g$ residue of Pt ?

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105. On strong heating, One gram of the silver salt of an organic dibasic acid yields $0.5934g$ of silver. If the mass percentage of carbon in it 8 times the mass percentage of hydrogen and one - half the mass percentage of oxygen, determine the molecular formula of the acid.

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106. $0.607g$ of silver salt of tribasic organic acid was quantitatively reduced to $0.37g$ of pure Ag. What is the mol. Wt. of the acid ?

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107. A sample of peanut oil weighing 2g is added to $25mL$ of $0.40MKOH$. After saponification is complete, $8.5mL$ of $0.28MH_2SO_4$ is needed to nuetralize excess of KOH. The saponification number of peanut oil is : (saponification number is defined as the milligrams of KOH consumed by 1g of oil)

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108. $20mL$ of a mixture of CO and H_2 were mixed excess of O_2 and exploded & cooled. There was a volume contraction of $23mL$. All volume measurements corresponds to room temperature $(27^\circ C)$ and one atmospheric pressure. Determine the volume ratio $(V_1 : V_2)$ of CO and H_2 in the original mixture .

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109. In the reaction:

$$2Al(s) + 6HCl(aq) \rightarrow 2Al^{3+}(aq) + 6Cl^{-}(aq) + 3H_2(g)$$

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110. A gaseous mixture of propane and butane of volume 3 litre on complete combustion produces 11.0 litre CO_2 under standard conditions of temperature and pressure. The ratio of volume of butane to propane is :

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111. Phosphorous has the oxidation state of $+1$ in :

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112. Oxidation state(s) of chlorine in $CaOCl_2$ (bleaching powder)

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113. The oxidation number of sulphur in S_8, S_2F_2, H_2S and H_2SO_4 respectively are :

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114. Fe shows an oxidation state of $+1$ in : a) FeCl3 b) [Fe (H2O)6] 2+ c) Fe(CO)5 d) [Fe (H2O)5NO +] SO4

A. FeCl3

B. [Fe (H2O)6] 2+

C. Fe(CO)5

D. [Fe (H2O)5NO +] SO4

Answer: D

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115. When SO_2 is passed into an acidified potassium dichromate solution, the oxidation numbers of sulphur and chromium in the final products respectively are :

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116. The oxidation state of S-atoms in Caro's and Marshall's acids are :

Watch Video Solution

117. In which of the following the oxidation number of oxygen has been arranged in increasing order :

(a) $BaO_2 < O_3 < OF_2 < KO_2$

(b) $BaO_2 < KO_2 < O_3 < OF_2$

(c) $OF_2 < KO_2 < BaO_2 < O_3$

(d) $KO_2 < OF_2 < O_3 < BaO_2$

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118. What is the oxidation numbers of oxygen in KO_3 and Na_2O_2?

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119. The oxidation number of phosphorus in $Ba(H_2PO_2)_2$ is :

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120. If it is known that $Fe_{0.96}O$, Fe is present in $+2$ and $+3$ oxidation state, What is the mole fraction of Fe^{2+} in the compound ?

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121. Which of the following sequence of compounds is according to the decreasing order of the oxidation state of nitrogen ?

(a) HNO_3, NO, NH_4Cl, N_2

(b) HNO_3, NO, N_2, NH_4Cl

(c) HNO_3, NH_4Cl, NO, N_2

(d) NO, HNO_3, NH_4Cl, N_2

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122. 2 mole of N_2H_4 loses 16 mole of electron is beings converted to a new compound X. Assuming that all of the N appears in the new compound. What is the oxidation state of 'N' in X ?

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123. When $K_2Cr_2O_7$ is converted to K_2CrO_4 then change in the oxidation state of chromium is :

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124. When a manganous salt is fused with a mixture of KNO_3 and solid $NaOH$, the oxidation number of Mn change from $+2$ to :

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125. The oxidation number of nitrogen atoms in NH_4NO_3 are :

Watch Video Solution

126. In $Fe(II) - MnO_4^-$ titration, HNO_3 is not used because :

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127. Which species are oxidized and reduced in the reaction ? $FeC_2O_4 + KMnO_4 \rightarrow Fe^{3+} + CO_2 + Mn^{2+}$

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128. In which of the following reactions, H_2O_2 is acting as a reducing agent?

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129. Following reaction describe the rusting of iron $4Fe + 3O_2 \rightarrow 4Fe^{3+} + 6O^{2-}$

Which one of the following is incorrect?

(a) This is an example of Redox reaction.

(b) Metallic iron is reduced to Fe^{3+}

(c) Fe^{3+} is an oxidising agent.

(d) Metallic iron is a reducing agent.

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130. Which reaction does not represent auto redox or disproportionation ?

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131. Which of the following is redox reaction ?

Watch Video Solution

132. Which of the following is a redox reaction ?

Watch Video Solution

133. For the redox reaction, $MnO_4^{-} + C_2O_4^{2-} + H^{+} \rightarrow Mn^{2+} + CO_2 + H_2O$ the correct coefficients of the reactants for the balanced reaction are respectively $MnO_4^{-}, C_2O_4^{-}, H^{+}$:

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134. In the chemical reaction, $K_2Cr_2O_7 + xH_2SO_4 + ySO_2 \rightarrow K_2SO_4 + Cr_2(SO_4)_3 + zH_2O$, the value of x, y and z respectively are :

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135. Balance the followings equations and choose the quantity which is the sum of the coeffficients of reactants and products : $....... CS_2 + ...Cl_2 \rightarrow CCl_4 + ...S_2Cl_2$

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136. Balance the followings equations and choose the quantity which is the sum of the coefficients of reactants and products : $........ PtCl_4 + ... XeF_2 \rightarrow PtF_6 + ...ClF + ... Xe$

Watch Video Solution

137. It 0.1 mole H_3PO_x is completely neutralised by $5.6 g KOH$ then select the true statement.

A. x=3 and given acid is dibasic

B. x=4 and given acid has no P-H linkage

C. x=2 and given acid does not form acid salt

D. all of the above

Answer: D

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138. When potassium permanganate is titrated against ferrous ammonium sulphate in acidic medium, the equivalent mass potassium permanganate is ,

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139. Equivalent mass of FeS_2 inthe half reaction, $FeS_2 \rightarrow Fe_2O_3 + SO_2$ is :

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140. The equaivalent mass of HCI in the given reaction is : $K_2Cr_2O_7 + 14HCl \rightarrow 2KCl + 2CrCl_3 + 3Cl_3 + H_2O$

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141. Equivalent mass of H_3PO_2 when it disproportionate into PH_3 and H_3PO_3 is (mol. wt. of H_3PO_2 = M) :

Watch Video Solution

142. In the following reaction, $As_2S_3 + H^+ + NO_3^- \rightarrow NO + H_2O + AsO_4^{3-} + SO_4^{2-}$ the equivalent mass of As_2S_3 is related to its molecular mass M by :

Watch Video Solution

143. Sulphur forms the chlorides S_2CI_2 and SCI_2. The equivalent mass of sulphur in SCI_2 is :

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144. The equivalent mass of an element is 4. Its chloride has a vapour density 59.25. Then, the valency of the elements is :

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145. 6×10^{-3} mole $K_2Cr_2O_7$ reacts completely with 9×10^{-3} mole X^{n+} to given $XO_3^{-} \text{ and } Cr^{\wedge}(3+)$. The value of n is :

Watch Video Solution

146. What mass of $H_2C_2O_4.\ 2H_2O$ (mol.mass $= 126$) should be dissolved in water to prepare $250mL$ of centinormal solution which act as a reducing agent ?

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147. The equivalent mass of the salt, $KHC_2O_4.\ H_2C_2O_4.4H_2O$ when it act as reducing agent is :

(a) M/1

(b) M/2

(c) M/3

(d) M/4

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148. The equivalent mass of divalent metal is W. The molecular mass of its chloride is :

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149. When BrO_3^- iron reacts with Br^- in acid medium, Br_2 is liberated. The equivalent mass of Br_2 in this reaction is :

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150. If M_A gram of metal A displaces m_B gram of another metal B from its salt solution and if the equivalent mass are E_A and E_B respectively then equivalent mass of A can be expressed as :

Watch Video Solution

151. Hydrazine reacts with KIO_3 in presence of HCl as :

$N_2H_4 + IO_3^- + 2H^+ + Cl^- \rightarrow ICI + N_2 + 3H_2O$

The equivalent masses of N_2H_4 and KIO_3 respectively are :

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152. What will be the normality of solution obtained by mixing $0.45N$ and $0.60NNaOH$ in the ratio $2:1$ by volume ?

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153. A solution containing 2.7×10^{-3} mol of A^{2+} irons required 1.6×10^{-3} mole of MnO_4^- for the oxidation of A^{2+} to AO_3^- the medium used is :

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154. H_2O_2 is used as bleaching reagent because on dissociation it gives oxygen

$$\left(H_2O_2 \rightarrow H_2O + \frac{1}{2}O_2\right)$$

"Chachi420" used H_2O_2 solution to bleach her hair and she required $2.24LO_2$ gas at 1atm and 273K. She has a H_2O_2 solution labelled '5.6V' then what volume of such solution must she required to bleach her hair?

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155. $1.25g$ of a solid dibasic acid is completely neutralised by $25mL$ of 0.25 molar Ba $(OH)_2$ solution. Molecular mass of the acid is :

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156. $10mL$ of an $NHCI$, $20mL$ of $\frac{N}{2}H_2SO_4$ and $30mL$ of $\frac{N}{3}HNO_3$ are mixed together and volume made to one litre. The normality of H^+ in the resulting solution is :

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157. $0.45g$ of an acid of mol. Mass 90 was neutralised by $20mL$ of $0.54N$ caustic potash (KOH). The basicity of acid is :

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158. A $3.4g$ sample of H_2O_2 solution containing $x\%\,h_2O_2$ by mass requires xmL of a $KMnO_4$ solution for complete oxidation under acidic condition. The molarity of $KMnO_4$ solution is :

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159. What volume of $O_2(g)$ measured at 1 atm and $273K$ will be formed by action of $100mL$ of $0.5NKMnO_4$ on hydrogen peroxide in an acid solution ? The skeleton equation for the reaction is $KMnO_4 + H_2SO_4 + H_2O_2 \rightarrow K_2SO_4 + MnSO_4 + O_2 + H_2O$

Watch Video Solution

160. A sample of 1.0g of solid $Fe_2O_3of80\%$ purity is dissolved in a moderately concentrated HCl solution which is reduced by zinc dust. The resulting solution required 16.7mL of a 0.1M solution of the oxidant. Calculate the number of electrons taken up by the oxidant.

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161. $KMnO_4$ reacts with oxalic acid according to the equation $2MnO_4^- + 5C_2O_4^{2-} + 16H^+ \to 2Mn^{2+} + 10CO_2 + 8H_2O$ Here, $20mL$ of $0.1MKMnO_4$ is equivalent to :

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162. Ratio of moles of Fe (II) oxidised by equal volumes of equimolar $KMnO_4$ and $K_2Cr_2O_7$ solutions in acidic medium will be :

Watch Video Solution

163. The mass of a mixture containing HCI and H_2SO_4 is $0.1g$ On treatment with an excess of an $AgNO_3$ solution , reacted with this acid mixture given $0.1435g$ of $AgCI$. Mass % of the H_2SO_4 mixture is :

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164. A solution of $Na_2S_2O_3$ is standardized iodometrically against $0.167g$ of $KBrO_3$. This process requires $50mL$ of the $Na_2S_2O_3$ solution. What is the normality of the $Na_2S_2O_3$. ?

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165. $0.80g$ is impure $(NH_4)_2SO_4$ was boiled with $100mL$ of $0.2NNaOH$ solution till all the $NH_3(g)$ evolved. The remaining solution was diluted to $250mL$. $25mL$ of this solution was neutralized using $5mL$ of $0.2NH_2SO_4$ solution. The percentage purity of the $(NH_4)_2SO_4$ sample is :

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166. The NH_3 evolved due to complete conversion of N from $1.12g$ sample of protien was absorbed in $45mL$ of $0.4NHO_3$. The excess acid required $20mL$ of $1.0NaOH$. The % N in the sample is :

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167. Find out % of oxalate ion in a given sample of an alkali metal oxalate salt, $0.30g$ of it is dissolved in $100mL$ water and its required $90mL$ of centimolar $KMnO_4$ solution in acidic medium :

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168. $320mg$ of sample of magnesium having a coating of its oxide required $20mL$ of $0.1M$ hydrochloric acid for the complete neutralisation of the latter. The composition of the sample is :

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169. The concentration of bivalent lead ions in sample of polluted water that also contains nitrate ions is determined by adding solid sodium sulphate $(m = 142)$ to exacty $500mL$ water. Calculate the molarity of lead ions if $0.355g$ of solium sulphate was needed for complete precipitation of lead ions as sulphate.

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170. What volume of HNO_3 (sq.gravity $1.05gmL^{-1}$ containing $12.6\left(\frac{w}{W}\right)$ of HNO_3) that reduce into NO is required to oxidise iron $1gFeSO_4.\ 7H_2O$ in acid medium is :

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171. The total volume of $0.1MKMnO_4$ solution that are needed to oxidize $100mg$ each of ferrous oxalate and ferrous sulphate in a mixture in acidic medium is :

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172. When $2.5g$ of a sample of mohr's salt reacts completely with $50mL$ of $\frac{N}{10}KMnO_4$ solution. The % purity of the sample of Mohr's salt is :

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173. A mole of a mixture of Mohr's salt and Fe_2(SO_4)_3$requires$500mL ofMK_2Cr_2O_7` for complete oxidation in acidic medium. The mole % of the Mohr's salt in the mixture is :

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174. The equivalent mass of a metal is twice to that of oxygen. How many times is the equivalent mass of it's oxide than the equivalent mass of the metal ?

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175. A metal oxide has the formula X_2O_3. It can be reduced by hydrogen to give free metal and water. 0.1596g of metal oxide requires 6mg of hydrogen for complete reduction. The atomic mass of the metal (in amu) is:

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176. Calculate the mass of anhydrous oxalic acid, which can be oxidised to $CO_2(g)$ by $100mL$ of an MnO_4^- solution, $10mL$ of which is capable of oxiding $50mL$ of $1NI^-$ to I_2.

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177. A mixture of $NaHC_2O_4$ and $KHC_2O_4.H_2C_2O_4$ required equal volumes $0.2NKMnO_4$ and $0.12NNaOH$ separately. What is the molar ratio of $NaHC_2O_4$ and $KHC_2O_4.H_2C_2O_4$ in the mixture ?

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178. Stannous sulphate $(SnSO_4)$ and potassium permanganate are used as oxidising agents in acidic medium for oxidation of ferrrous ammnium sulphate to ferric sulphate. The ration of number of moles of stannous sulphate required per mole of ferrous ammonium sulphate to the number of moles of $KMnO_4$ required per mole of ferrous ammonium sulphate, is:

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179. If ag is the mass of $NaHC_2O_4$ required to neutralize $100mL$ of $0.2MNaOH$ and bg that required to reduce $100mL$ of $0.02mKMnO_4$ in acidic medium, then :

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180. 2 mole, equimolar mixture of $Na_2C_2O_4$ and $H_2C_2O_4$ required V_1L of $0.1MKMnO_4$ in acidic medium for complete oxidation. The same amount of the mixture required $V_2 L$ of $0.2 M NaOH$ for neutralization. The ratio of $V_1 \rightarrow V_2$ is :

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181. A mixture containing 0.05 mole of $K_2Cr_2O_7$ and 0.02 mole of $KMnO_4$ was treated with excess of KI in acidic madium. The librated iodine required $1.0 L$ of NaS_2O_3 solution for titration. Concentration of $Na_2S_2O_3$ solution was :

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182. $25 mL$ of $2 NHCI$, $50 mL$ of $4 NHNO_3$ and $x mL$ of $2 MH_2SO_4$ are mixed together and the total volume is made up to $1 L$ after dilution. $50 mL$ of this acid mixture completely reacted with $25 mL$ of a $1 \mathbb{N}a_2CO_3$ solution. The value of x is :

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183. In a iodomeric estimation, the following reactions occur

$2Cu^{2+} + 4I^- \rightarrow Cu_2I_2 + I_2, I_2 + 2Na_2S_2O_3 \rightarrow 2NaI + Na_2S_4O_6$

0.12 mole of $CuSO_4$ was adde to excess of KI solution and the liberated iodine required 120mL of hypo. The molarity of hypo soulution was:

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184. $1g$ mixture of equal number of mole of Li_2Co_3 and other metal carbonate (M_2CO_3) required $21.6mL$ of $0.5NHCI$ for complete neutralisation reaction. What is the approximate atomic mass of the other metal ?

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185. 32g of a sample of $FeSO_4.7H_2O$ were dissolved in dilute sulphuric aid and water and its volue was made up to 1litre. 25mL of this solution required 20mL of $0.02MKMnO_4$ solution for complete oxidation. Calculate the mass% of $FeSO_4.7H_2O$ in the sample.

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186. In the mixture of $(NaHCO_3 + Na_2CO_3)$, volume of HCI required is x mL with phenolphthalein indicator and y mL with methly orange indicator in the same titration. Hence, volume of HCI for complete reaction of Na_2CO_3 is :

(a) 2x

(b) y

(c) x/2

(d) (y-x)

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187. $0.1g$ of a solution containing Na_2CO_3 and $NaHCO_3$ requires $10mL$ of $0.01NHCI$ for neutralization using phenolphthalein as an indicator. mass % of Na_2CO_3 in solution is :

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188. A mixture $NaOH + Na_2CO_3$ required 25mL of 0.1 M HCl using phenolpththalein as the indicator. However, the same amount of the mixture required 30mL of 0.1M HCl when methyl orange was used as the indicator. The molar ration of $NaOH$ and Na_2CO_3 in the mixture was:

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189. When 100mL solution of $NaOH$ and $NaCO_3$ was first titrated with N/10 HCl in presence of HPh, 17.5mL were usedtill end point is obtained. After this end point MeOH was added and 2.5mL of same HCl were required to attain new end point. The amount NaOH in mixture is:

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190. 1gram of a sample of $CaCO_3$ was strongly heated and the CO_2 liberated was absorbed iun 100mL of 0.5 M NaOH solution. Assuming 90% purity for the sample, how many mL of 0.5M HCl would be required to react with the resulting solution to reach the end point inpresence of phenolphthaein?

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191. A sample of pure sodium carbonate $0.318g$ is dissolved in water and litrated with HCI solution. A volume of $60mL$ is required to reach the methly orange end point. Calculate the molarity of the acid.

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192. $10L$ of hard water required $5.6g$ of lime for removing haardness. Hence temporary hardness in ppm of $CaCO_3$ is :

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193. $1L$ of pond water contains $20mg$ of Ca^{2+} and $12mg$ of mg^{2+} ions. What is the volume of a $2NNa_2CO_3$ solution required to soften $5000L$

of pond water ?

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194. One litre of sample of hard water contain $4.44 mg CaCI_2$ and $1.9 mg$ of $MgCI_2$. What is the total hardness in terms of ppm of $CaCO_3$?

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195. A mixture of NH_4NO_3 and $(NH_4)_2HPO_4$ contain 30.40% mass per cent of nitrogen. What is the mass ratio of the two components in the mixture?

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196. What volume of 75% acohol by weight $\left(d = 0.80\frac{g}{c}m^3\right)$ must be used to prepare $150 cm^3$ of 30% alcohol by mass $\left(d = 0.90\frac{g}{c}m^2\right)$?

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197. Calculate the number of millilitre of $NH_3(aq)$ solution $\left(d = 0.986\frac{g}{m}L\right)$ contain 2.5% by mass NH_3, which will be required to precipitate iron as $Fe(OH)_3$ in a $0.8g$ sample that contains 50% Fe_2O_3.

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198. In the preparation of iron from haematite (Fe_2O_3) by the reduction with carbon $Fe_2O_3 + C \rightarrow Fe + CO_2$ how much 80% pure iron may be produced from $120kg$ of 90% pure Fe_2O_3 ?

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199. A mineral consists of an equimolar mixture of the carbonates of two bivalent metals. One metal is present to the extent of 12.5% by mass $2.8g$ of the mineral on heating lost $1.32g$ of CO_2. What is the % by mass of the other metal ?

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200. $6.2g$ of a sample containing Na_2CO_3, $NaHCO_3$ and non-volatile inert impurity on gentle heating loses 5% of its mass due to reaction $2NaHCO_3 \rightarrow Na_2CO_3 + H_2O + CO_2$. Residue is dissolved in water and formed $100mL$ solution and its $10mL$ portion requires $7.5mL$ of $0.2M$ aqueous solution of $BaCI_2$ for complete precipitation of carbonates. Determine mass (in gram) of Na_2CO_3 in the original sample.

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201. Nitric acid can be produced from NH_3 in three steps process below

(I) $4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(g)$ (II)

$2NO(g) + O_2 \rightarrow 2NO_2(g)$ (III)

$3NO_2(g) + H_2O(l) \rightarrow 2HNO_3(aq) + NO(g)$ percent yield of 1^{st}, 2^{nd} and 3^{rd} step are respectively 50% , 60% and 80% respectively then what volume of $NH_3(g)$ at 1 atm and $0^\circ C$ required to produced $1575g$ of HNO_3.

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202. $1MNaOH$ solution was slowly added into $1000mL$ of $183.75g$ impure H_2SO_4 solution and the following plot was obtained. The percentage purity of H_2SO_4 sample and slope of the curve respectively are :

(a) 75%,-1/3

(b) 80%,-1/2

(c) 80%,-1

(d) None of these

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203. MnO_2 on ignition converts into Mn_3O_4. A sample of pyrolusite having 75% MnO_2, 20% inert impurities and rest water is ignited in air to constant mass. What is the percentage of Mn in the ignited sample ?

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204. A 1.0g sample of a pure organic compound containing chlorine is fused with Na_2O to convert chlorine to NaCl. The sample is then dissolved in water, and the chloride precipitated with $AgNO_3$, giving 1.96g of AgCl. If the molecular weight of organic compound is 147, how many chlorine atoms does each molecule contain?

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205. A $0.60g$ sample consisting of only CaC_2O_4 and MgC_2O_4 is heated at $500^\circ C$ converting the two salts of $CaCo_3$ and $MgCO_3$. The sample then weighs $0.465g$. If the sample had been heated to $900^\circ C$, where the products are CaO and MgO. What would the mixtures of oxides have weighted ?

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206. A metal M forms the sulphate $M_2(SO_4)_3$. $A0.596$ gram sample of the sulphate reacts with excess $BaCI_2$ to given $1.220gBaSO_4$. What is the atomic mass of M? (Atomic mass : $S = 32$, $Ba = 137.3$)

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207. Urea (H_2NCONH_2) is manufactured by passing $CO_2(g)$ through ammonia solution followed by crystallization. CO_2 for the above reaction is prepared by combustion of hydrocarbons. If combustion of 236kg of a saturated hydrocarbon (C_nH_{2n+2}) produces as much CO_2 as required for production of $999.6kg$ urea then molecular formula of hydrocarbon is :

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208. $11.6g$ of an organic compound having formula C_nH_{2n+2} is burnt in excess of $O_2(g)$ initially taken in a 22.41 litre steel vessel. Before reactioOn the gaseous mixture was at $273K$ with pressure reading 2 atm. Aftercomplete combustion and loss of considerable amount of heat, the mixture of product and excess of O_2 had a temperature of $546K$ and 4.6 atm pressure. The formula of organic compound is :

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209. $H_2O_2 + 2KI \rightarrow 40\,\%\,yield I_2 + 2KOH$

$H_2O_2 + 2KMnO_4 + 3H_2SO_4 \rightarrow 50\,\%\,yield$

$K_2SO_4 + 2KMnSO_4 + 3O_2 + 4H_2O$ $150mL$ of H_2O_2 sample was divided into two parts. First part was treated with KI and formed KOH required $200mL$ of $\frac{M}{2}H_2SO_4$ for neutralisation. Other part was treated with $KMnO_4$ yielding 6.74 litre of O_2 at 1 atm. and $273K$. Using % yield indicated find volume strength of H_2O_2 sample used.

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210. SO_2CI_2 (sulphuryl chloride) reacts with water to give a mixture of H_2SO_4 and HCI. What volume of $0.2MBa(OH)_2$ in needed to completely neutralize $25mL$ of $0.2MSO_2CI_2$ solution :

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211. $5g$ sample contain only Na_2CO_3 and Na_2SO_4. This sample is dissolved and the volume made up to $250mL$. $25mL$ of this solution neutralizes $20mL$ of $0.1 M H_2SO_4$. Calculate the percent of Na_2SO_4 in the sample.

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212. By how much will the potential of half cell Cu^{+2}/Cu change if the solutin is diluted to 100 times at 298 K ?

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213. A silver coin weighing $11.34g$ was dissolved in nitric acid. When sodium chloride was added to the solution all the silver (present as $AgNO_3$) was precipitated as silver chloride. The mass of the precipitated silver chloride was $14.35g$. Calculate the percentage of silver in the coin.

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214. Two elements X (at.mass 16) and Y (at.mass 14) combine to form compounds A, B and C. The ratio be different masses of Y which combine with a fixed mass of X in A, B and C is $1:3:5$. If 32 parts by mass of X combines with 84 parts by mass of Y in B then in C, 16 parts by mass of X will combine with ...... parts by mass of Y :

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215. The conversion of oxygen to ozone occurs to the extent of 15% only. If mass of ozone that can be prepared from 67.2 of oxygen at 1 atm and $273K$ will be :

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216. RH_2 (ion exchange resin) can replace Ca^{2+} ions in hard water as $RH_2 + Ca^{2+} \rightarrow RCa + 2H^+$. If 1 L of hard water after passing through RH_2 has $pH = 3$ then hardness in parts per million of Ca^{2+} is :

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217. $100cm^3$ of a solution of an acid (Molar mass $= 98$) containing $29.4g$ of the acid per litre were completely neutralized by $90.0cm^3$ of aq. $NaOH$ containing $20g$ of $NaOH$ per $500cm^3$. The basicity of the acid is :

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218. $20mL$ of $0.1M$ solution of compound $Na_2CO_3.\ NaHCO_3.\ 2H_2O$ is titrated against $0.05MHCI.\ xmL$ of HCI is used when phenolphthalein is used as an indicator and y mL of HCI is used when methly orange is the indicator in two separate titrations. Hence $(y - x)$ is :

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219. A sample containing $HAsO_2$ (mol. mass $= 108$) and weighing $3.78g$ is dissolved and diluted to $250mL$ in a volumetric flask. $A50mL$ sample (aliquat) is withdrawn with a pipet and titrated with $35mL$ of $0.05M$ solution of I_2. Calculate the percentage $HAsO_2$ in the sample :

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220. A mixture of FeO and Fe_2O_3 is completely reacted with $100 mL$ of $0.25M$ acidified $KMnO_4$ solution. The resulting solution was then treated with Zn dust which converted Fe^{3+} of the solution to fe^{2+}. The $Fe^{2=}$ required $100 mL$ of $0.10 M K_2Cr_2O_7$ solution. Find out the weight $\% Fe_2O_3$ in the mixture.

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221. To a $10 mL$, $1M$ aqueous solution of Br_2, excess of $NaOH$ is added so that all Br_2 is disproportionated to Br^{-} and BrO_3^{-}. The resulting solution is free from Br^{-}, by extraction and excess of OH^{-} neutralised by acidifying the solution. The resulting solution is sufficient to react with $2g$ of impure $CaC_2O_4\left(M = 128\frac{g}{m}ol\right)$ sample. The % purity of oxalate sample is :

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222. $0.10g$ of a sample conining $CuCo_3$ and some inert impurity was dissolved in dilute sulphuric acid and volume made up to $50mL$. This solution was added into $50mL$ of $0.04MKI$ solution where copper precipitates as CuI and I^- is oxidized into I_3^-. A $10mL$ portion of this solution is taken for analysis, filtered and made up free I_3^- and then treated with excess of acidic permanganate solution. Liberated iodine required $20mL$ of $2.5mM$ sodium thiosulphate solution to reach the end point . Determine mass percentage of $CuCO_3$ in the original sample.

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223. 1 mole of equimolar mixture of ferric oxalate and ferrous oxalate requires x mole of $KMnO_4$ in acidic medium for complete oxidation. x is :

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224. An impure sample of sodium oxalate $(na_2C_2O_4)$ weighing $0.2g$ is dissolved in aqueous solution of H_2SO_4 and solution is titrated at

$70^{\circ} C$, requiring $45 mL$ of $0.02 M KMnO_4$ solution. The end point is overrun, and back titration in carried out with $10 mL$ of $0.1 M$ oxalic acid solution. Find the % purity of $Na_2C_2O_4$ in sample :

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225. $0.5 g$ mixture of $K_2Cr_2O_7$ and $KMnO_4$ was treated with excess of KI in acidic medium. Iodine liberated required $150 cm^3$ of $0.1 N$ solution of thiosulphate solution for titration. Find the percentage of $K_2Cr_2O_7$ in the mixture :

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226. A $50 mL$ of solution of I_2 is divided into two unequal parts. I part with hypo solution in acidic medium. 15mL of $0.4 M$ hypo was consumed. II part was added with 100mL of $0.3 M NaOH$ solution. Residual base required to mL of $0.3 M H_2SO_4$ solution for complete neutralization. What was the initial concentration of I_2 ?

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227. A mixture of H_2SO_4 and $H_2C_2O_4$ (oxalic acid) and some inert impurity weighing $3.185g$ was dissolved in water and the solution made up to 1 litre. $10mL$ of this solution require $3mL$ of $0.1NNaOH$ for complete neutralization. In another experimant $100mL$ of the same solution in hot condition required $4mL$ of $0.02MKMnO_4$ solution for complete reaction. The mass % of H_2SO_4 in the mixture was :

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228. The concentration of an oxalic acid solution is x mol litre^-1. $40mL$ of this solution reacts with $16mL$ of $0.05M$ acidified $KMnO_4$. What is the pH of 'x' M oxalic acid solution ? (Assume that oxalic acid dissociates completely).)

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