CHEMISTRY

BOOKS - JEEVITH PUBLICATIONS CHEMISTRY (KANNADA ENGLISH)

SOME BASIC CONCEPTS OF CHEMISTRY

One Mark Questions And Answers

1. Define compounds.

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2. Define Atomic weight.

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3. Give an example for compounds.

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4. Define mixtures.

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5. Give an example for mixtures.

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6. Define mixtures.

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7. Define atom.

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8. Define molecule.

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9. What is a unit?

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10. Define avogadro's law.

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11. Give the S.I. unit of Length.

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12. Give the S.I. unit of Mass.

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13. What is the physical quantity of mole?

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14. What is the physical quantity of ampere.

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15. Give the SI unit of density

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16. Give the SI unit of a Force b.Energy c.Pressure

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17. Write the scientific notation of 1,86,000

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18. Write the S.I. base unit for 1 day.

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19. Write 93 million mile in SI unit

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20. Define empirical formula.

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21. Define Molecular formula.

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22. What is the relation between empirical and molecular formula?

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23. Express 46° C in SI unit.

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24. Define law of conservation of mass.

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25. Write 50000 g in exponential form (3 significant figures).

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26. Write 53400 g in exponented form (significant figures).

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27. What physical quantities are represented by the following units and what are their most common names? (i) kg m s^{-2}, (ii) kgm^2s^{-2}, (iii) dm^3

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28. Who discovered law of conservation of mass.

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29. Classify the following substances into elements, compounds and mixtures: (i) Milk, (ii) 22-caret gold , (iii) Iodized table salt , (iv) Diamond, (v) Smoke, (vi) Steel, (vii) Brass, (viii) Dry ice (ix) Mercury, (x) Air, (xi) Aerated drinks, (xii) Glucose, (xiii) Petrol/Diesel/Kerosene oil, (xiv) Steam (xv) cloud.

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30. Why is air sometimes considered as a heterogenous mixture?

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31. Who discovered law of constant composition a definite proportion.

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32. Who discovered law of constant composition a definite proportion.

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33. Who proposed atomic theory of matter?

A. Dalton

B. Thomson

C. Mandleev

D. None of these

Answer: A

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34. What is amu?

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35. Define amU (u)

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36. Define atomic mass.

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37. Calculate the percentage of nitrogens in NH_3. (Atomic mass of N=14, H=1 amu)

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38. Define molecular mass.

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39. Calculate the number of He atoms in (i) 52 u, (ii) 52 g, (iii) 52 moles of He. Atomic weight of He is 4u.

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40. How many electrons are present in 16 g of CH_4 ?

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41. Boron occurs in nature in the form of two isotopes ${}^{11}_{5}B$ and ${}^{10}_{5}B$ in ratio of $81\ \%$ and 19% respectively. Calculate its average atomic mass.

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42. If 2 litres of N_2 is mixed 2 litres of H_2 at a constant temperature and pressure. What will be the volume of NH_3 formed?

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43. How many atoms are present in 4 ml of NH_3 at STP?

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44. Which of these weights most? (i) 32 g of oxygen, (ii) 2 g atom of hydrogen, (iii) 0.5 mole of Fe, (iv) 3.01×10^{23} atoms of carbon.

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45. An element has a specific heat of $0.113 cal / gC^{\circ}$. Calculate atomic weight of element.

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46. Why are the atomic masses of most of the elements fractional?

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47. Define one mole.

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48. Match the following prefixes with their multiples.

Prefixes	Multiples
(i) micro	10^{6}
(ii) deca	10^{9}
(iii) mega	10^{-6}
(iv) giga	10^{-15}
(v) femto	10

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49. Calculate the molar mass of the following: (i) H_2O, (ii) CO_2, (iii) CH_4

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50. What is molar mass.

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51. What is the value of one mole.

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52. What is percentage composition.

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53. How to calculate % mass of an element.

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54. Define G and g. how are they telated to eachother ? Use this relation to calculate mass of earth.

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55. Define limiting reagent.

A. reactant which is completely consumed during the reaction.

B. reactant which is present in limiting amount

C. reactant which decides the amount of product formed

D. All of these

Answer: D

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56. Define solution.

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57. What is solute and solvent.

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58. What is the unit of molarity.

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59. What is the unit of molality.

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60. What is the molarity of a dilution formula.

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Two Marks Questions And Answers

1. Write any two differentiate between a compound and a mixtures.

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2. Explain homogenous mixtures? Give one example.

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3. Explain heterogenous mixtures Give one example

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4. Explain the concept of element.

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5. Gun powder is a mixture of sulphur, charcoal and potassium nitrate (KNO_3). How would you separate it into its constituent.

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6. Give S.I. unit of the following physical quantity time, thermodynamic temperature, luminous intensity.

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7. Write the mathematical form for mole fraction.

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8. Define one mole.

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9. Match the following prefixes with they multiples:

Prefixes	Multiples
Peta	10^{-15}
Femto	10^{21}
Tera	10^{12}
Zeta	10^{15}

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10. Calculate molarity and normality of the following solution. (a) HCl,

(b) $H_2C_2O_4$

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11. How many significant figures are there in the following (a) 6.022×10^{23}, (b) 0.080, (c) 8.002

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12. Express 150 pounds in SI units

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13. Write 325 g and 0.0010 g in exponential notation.

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14. Define law of conservation of mass.

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15. Explain law of constant composition with suitable example.

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16. State Gay Lussac's law.

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17. Compute the mass of one molecule and the molecular mass of C_6H_6 (benzene). (At mass of C=12, H=1 u).

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18. An organometallic compound on analysis was found to contain, $C = 64.4\,\%$, $H = 5.5\,\%$ and Fe = 29.9%. Determine its empricial formula. (At. Mass of Fe = 56 u).

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19. 4 g of copper chloride on analysis was founded to contain 1.890 g of copper (Cu) and 2.110 g of chlorine (Cl). What is the empirical formula of copper chloride? [At. Mass of Cu= 63.5 u, Cl = 35.5 u].

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20. Calculate the number of grams of oxygen in 0.10 mol of $Na_2CO_3.10H_2O$.

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21. How many grams of Cl_2 are required to completely react with 0.4 g of H_2 to yield HCl? Also calculate the amount of HCl formed.

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22. Conc. HCl is $38\,\%$ HCl by mass. What is the molarity of this solution is d=1.19 g cm^{-3}? What volume of conc. HCl is required to make 1.00 L of 0.10 M HCl?

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23. State Gay Lussac's law.

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24. Calculate the volume of O_2 at STP liberated by heating 12.25 g of $KCIO_3$. (At. Wt. of K=39, Cl=35.5, O=16 u)

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25. 1 M solution of $NaNO_3$ has density 1.25 g cm^{-3}. Calculate its molarity. (Mol. Weight of $NaNO_3 = 85gmol^{-1}$).

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26. Explain how compounds differ from elements? Give two differences.

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27. Explain how mixture differs from pure substances? Give 2 difference.

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28. Classify each of the following as pure substances or mixture, (a) Ethyl alcohol,(b) Oxygen, (c) Blood, (d) Carbon, (e) Steel, (f) Distilled water.

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29. Define avogadro's law.

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30. Discuss average atomic mass with an example.

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31. Calculate the molecular mass of water (H_2O) and water (O_2) and oxygen (O_2).

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32. Define Avogadro constant (N_A).

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33. Define limiting reagent.

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34. What is mass percent $\left(\frac{W}{W}\%\right)$

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35. What is mole fraction (X)

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36. Write mathematical form for A and B substance of mole fraction.

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37. What is molarity (m).

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38. What is molarity (m).

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Three Marks Question With Answers

1. Calculate the moles of NaOH required to neutralize the solution produced by dissolving 1.1 g P_4O_6 in water. Use the following reactions:

$P_4O_6 + 6H_2O \rightarrow 4H_3PO_3, 2NaOH + H_3PO_3 \rightarrow Na_2HPO_3 + 2H_2O$

(At. Mass/g mol^{-1} P=31, O=16).

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2. (a) A sample of NaOH weighting 0.38 g is dissolved in water and the solutions is made to 50.0 cm^3 in a volumetric flask. What is the molarity of the solution? (b) State and explain law of multiple proportion.

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3. Calculate the amount of water (g) produced by the combustion of 16 g of methane.

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4. Explain the classification of matter

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5. (a) How many significant figures are there in 1.00×10^4?

(b) One mole of sugar contains..... Oxygen atoms.

(c) Give an example of moleules in which the empirical formula is CH_2O and the ratio of molecular formula weight and empirical formula weight is 6.

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6. An organic monobasic acid was found to contain $39.5\,\%$ carbon, 6.4% hydrogen and the rest oxygen. If the equivalent mass of the acid is 60, find out its molecular formula.

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7. Calcualte the mass of $95\,\%$ pure MnO_2 to produce 35.5 g of Cl_2 as per the following reaction. $MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + H_2O$. (At. Mass of Mn = 55).

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8. Classify the following into homogenous and heterogenous mixtures: milk, 10 dread table salt, air, tap water, 22 carat gold, steel.

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9. Discuss the properties of matter.

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10. Express the following in scientific notation: (a) 4007 (b) 0.0068 (c) 700.0 , (d) 7.0042

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11. Express the following S.I. bases units using power 10 notations (a) 48 μg ,(b) 0.0426 in

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12. Calculate the weight of CaO that can be obtained by heating 200kg of limestone which is 95% pure. (At. Mass of Ca = 40, C=12 and O=16).

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13. 20g of sample containing $Ba(OH)_2$ is dissolved in 10 ml of 0.5 M HCl solution. The excess of HCl was then titrated against 0.2 M NaOH. The volume of NaOH used in the titration was 10 ml. Calculate the percentage of $Ba(OH)_2$ in the sample. (Mol. wt. of $Ba(OH_2) = 171$)

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14. Express the following in S.I. units (a) 100 miles per hours, (b) 5 feet 2 inches

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15. Explain law of multiple proportions with example:

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16. Write the postulates of Daltons Atomic theory.

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17. Define formula mass and given an example.

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18. Write the empirical formula of the compounds having molecular formulae.

Molecular Formula	Empirical Formula
C_6H_6	CH
C_6H_{12}	CH_2
H_2O_2	HO
H_2O	H_2O
B_2H_6	BH_3
N_2O_4	NO_2
Na_2CO_3	Na_2CO_3
C_2H_2	CH
H_3PO_4	H_3PO_4

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Numerical Problems And Answers

1. How many significant figures are there in each of the following numbers? (i) 6.005, (ii) 6.002×10^{23}, (iii) 8000, (iv) 0.0025, (v) π, (vi) the sum 18.5 + 0.4235, (vii) the product 14×6.345

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2. Express the following to four significant figures: (i) 6.45372, (ii) 48.38250, (iii) 70000, (iv) 2.65986×10^3, (v) 0.004687

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3. 10.0 g of $CaCO_3$ on heating game 4.4g of CO_2 and 5.6 g of CaO. Show that these observation are in agreement with law of conservation of mass.

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4. Express the result of the following calculation to the appropriate number of significant figures $\frac{3.24 \times 0.08666}{5.006}$

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5. The mass of precious stones is at present in terms of carat Given that 1 carat = 3.168 grains and 1 gram = 15.4 grains, calculate the total mass of the ring is grams and kilograms which contains 0.500 carat diamond and 7.00 gram gold.

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6. The graphite present in a pencil weighs is 140 mg. Calculate the number of carbon atoms in it.

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7. Calculate the percentage of the naturally occuring isotopes ^{35}Cl and ^{37}Cl that accounts for the atomic mass of chlorine taken as 35.45.

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8. Convert 22.4 L into cubic metres.

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9. Calculate the molar mass of water if it contains $50\,\%$ heavy water (D_2O).

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10. 60 cc of oxygen was added to 24 cc of carbon monoxide and the mixture ignited. Calculate the volume of oxygen used up nd the volume of carbon dioxide formed.

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11. $200cm^3$ of carbon monoxide is mixed with $200cm^3$ of oxygen at room temperature and ignited. Calculate the vol. of CO_2 formed on cooling to room temperature. What other gas if any may also be present.

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12. Calculate the volume of oxygen required to burn completely a mixture of 22.4 dm^3 of CH_4 and 11.2 dm^3 of H_2 (all volumes measured at STP) $\left[1dm^3 = \text{litre}\right]$.

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13. Calculate the mass of 50 cc of CO at STP (C=12, O=16)

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14. Calculate the volumes at STP occupied by 6.023×10^{23} molecules of a gas X.

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15. Calculate the number of molecules in 1 kg of sodium chloride. [Na =23, C, = 35.5].

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16. Calculate the value of 1 a.m.u. in grams.

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17. 0.48 g of a gas forms $100cm^3$ of vapours at STP. Calculate the gram molecular wt. of the gas.

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18. Calculate the number of moles in the following mass (a) 7.85 g Fe (atomic mass = 56) (b) 4.68 mg of is (at mass 28).

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19. Calculate the normality of oxalic acid solutions containing 0.895 g crystals in $250cm^3$ of its solutions.

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20. $25cm^3$ of ferrous ammonium sulphate solution require $20cm^3$ of 0.1 N potassium dichromate solution. Calculate the amount of ferrous ammonium sulphate crystals dissolved in $250cm^3$ of the solution. (Given equivalent).

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21. What should be the normality of a solution prepared by diluting 250 ml of 0.4 NH_2SO_4 with 1000 ml of water?

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22. $20cm^3$ of a solution of oxalic acid requires $25cm^3$ of 0.2 N potassium permanganate to react completely (a) Calculate the normality of oxalic acid solutions. (b) What volume of this oxalic acid solution when made upto $250cm^3$ gives 0.2 N solution?

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23. $200cm^3$ of a solution of a dibasic acid contains 1.512 g of the acid and the normality of the solution is 0.12. Calculate (i) the equivalent mass and (ii) the molecular mass of the acid.

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24. Calculate the mass of 3.5 gram atom of calcium. Atomic mass of calcium is 40

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25. Calculate the volume of concentrated nitric acid of normality 14 required to prepare $1dm^3$ of $\frac{N}{10}$ nitric acid.

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26. Calculate the mass of hydrochloric acid in $200cm^3$ of 0.2 N solution of it. What volume of this acid solution will react exactly with $25cm^3$ of 0.14 N solution of sodium hydroxide?

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27. 0.99 g of an acid was dissolved in water and the solution made up to $200cm^3$, $20cm^3$ of this solution required 15 cm^3 of 0.105 N sodium hydroxide solution for complete neutralization. Find the equivalent mass of the acid.

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28. Calculate the mass of 2.5 gram molecular of water (H_2O)

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29. Calculate the mass of one molecule of methane (CH_4).

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30. Find the Molarity of Hydrochloric acid containing 31.5% of hydrochloric acid. Its specific gravity is 1.16.

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31. Calculate the molecular mass of (i) oxalic and (ii) Formic acid (iii) H_2SO_4 (iv) FAS, (v) Na_2CO_3 (vi) sucrose

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32. $25.0cm^3$ of an acid required exactly $20.5cm^3$ of deci molar base for complete neutralization. What is the normality of the acid?

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33. Exactly $20.0cm^3$ of nitric acid neutralized $28.4cm^3$ of 0.25 M NaOH. What is the molarity of the acid?

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34. 18.5 cm^3 of oxalic acid was completely neutralised by $20.0cm^3$, 0.125 N base. Calculate the (a) normality (b) molarity and (c) mass of oxalic acid crystals in 1 dm^3 of solution.

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35. Calculate the number of moles of atoms in 10.2 g of sodium.

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36. Calculate the number of moles in (a) 10 g of Hydrogen molecules (b) 30 g of H_2O

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37. Calculate the mass of the following is grams (a) 5.4 moles of O_2 (b) 2.5 moles of CO_2, (c) 4.2 mole of nitrogen atoms.

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38. How many atoms of oxygen are present in 300 g of $CaCO_3$?

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39. Calculate number of atoms in (a) 2.5 mole atoms of nitrogen (b) 8.4 of sulphur

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40. Calculate the number of molecules in each of the following (a) 24 g of nitrogen (b) 8.0 g of H_2S.

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41. A substances on analysis for the following percentage composition the formula composition: $Na = 43.4\,\%$, $C = 11.3\,\%$, O= 45.3%. Calculate the emperical formula [Na = 23, C=12, O=16]

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42. A compound has the following composition $Mg = 9.76\,\%$, $S = 13.01\,\%$, $O = 26.01$, $H_2O = 51.22\,\%$, What is its emperical formula $[Mg = 24, S = 32, O = 16, H = 1]$

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43. A compound has the following percentage composition. Carbon 80%, Hydrogen 20%? If the molecular mass is 30, Calculate the molecular formula.

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44. An organic compound on analyis found to contain 92.3 % carbon and 7.7% hydrogen. It vapour density is 39. Find its molecular formula.

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45. 4.2 g of Mg is burnt in 4.8 g of slushy to form magnesium sulphide.What is the limiting reagent? Calculate the amount of the reactions which remain unreached.

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46. 50.0 kg of $N_2(g)$ and 10.0 kg of H_2 (g) are mixed, to produce $NH_3(g)$. Calculate the $NH_3(g)$. Formed. Identify the limiting reagent in the production of NH_3 in this situation.

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47. Commercially available conc. HCl contains 38% HCl by mass. (a) What is the molarity of this solutions. The density is 1.10 g ML-1? (b) What volume of conc. HCl is resumed to make 1.00 L of 0.10 M HCl?

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48. How many grams of oxgyen (O_2) are required to completely react with 0.300 gof hydrogen (H_2) to yield H_2O? Also calculate the amount of water formed.

$2H_2 + O_2 \rightarrow 2H_2O$

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49. What is the volume of oxygen at STP can be produced by 8.1 g of potassium chlorate according to the reaction $2KCl_3 \rightarrow 2KCl + 3O_2$?

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