

Introduction to Science & Chemistry

1. Science & Significant Figure

- Q 1. Which of the following Steps is not present in Scientific Method?
 (A) Observation
 (B) Formation of Law
 (C) Theory Formation
 (D) Scientific Notation
- Q 2. What is the difference between theory, model and hypothesis?
- Q 3. Which of the following has lowest probability to be correct?
 (A) Theory (B) Law
 (C) Hypothesis (D) Model
- Q 4. In Scientific Notation $y \times 10^n$, The value of Y can be
 (A) $1.0 \leq Y < 10$ (B) $1.0 \leq Y \leq 10$
 (C) $1.0 \leq Y \leq 9$ (D) +ve or -ve Integer
- Q 5. Express the following in scientific notation.
 [NCERT]
 (A). 0.0048 (B). 2340000
 (C). 8008 (D). 500.0
 (E). 6.0012
- Q 6. Two students perform the same experiment and each of them recorded two readings of mass which are given below. [NCERT Exemplar]
- | Student | Reading (i) | Reading (ii) |
|---------|-------------|--------------|
| A | 3.01 | 2.99 |
| B | 3.05 | 2.95 |
- If correct reading of mass is 3.0 g then which of the following statement is correct.
 (A). Result of both students are neither accurate nor precise
 (B). Result of student A are both accurate & precise
 (C). Result of student B is neither accurate nor precise
 (D). Result of student B are both accurate & precise
- Q 7. The no of Significant Figure in 6.020 is
 (A) 2 (B) 3
 (C) 4 (D) 1
- Q 8. The number of significant figure in 0.005020 is
 (A) 3 (B) 4
 (C) 6 (D) 2
- Q 9. How many significant figures are in each of the following? [CBSE PMT 98 including]
 (A) 0.0012 (B) 437,000
 (C) 161 (D) 0.161
 (E) 125,904,000 (F) 1.0012
 (G) 0.0161 (H) 0.001060
- Q 10. How many significant figures are in each of the following? [NCERT Exemplar]
 (A) 0.0025 (B) 208
 (C) 5005 (D) 126000
 (E) 500.0 (F) 2.0034
- Q 11. Which of the following are exact numbers?
 (A) The elevation of Patna city from sea level is just 53 meters.
 (B) There are 12 eggs in a dozen
 (C) One yard is equal to 0.9144 m.
 (D) Total 15000 students are selected in JEE for counseling.
 (E) One dollar's value is equal to that of 75 Indian rupees.
 (F) In 1983, 1759 Ph.D.s in chemistry were awarded in the United states.
 (G) There are 100 students in the classroom.
- Q 12. The exact number does not come in calculation
 (A) By definition (B) By Conversion factor
 (C) By Counting (D) By Measurement
- Q 13. **Assertion(A):** Significant figure for 0.200 is 3 where as for 200 it is 1
Reason(R): zero at the end or right of a number are significant provided they are not right side of decimal point. [NCERT Exemplar]
 (A) Both A & R are correct and R is correct explanation of A
 (B) Both A & R are correct and R is correct explanation of A
 (C) A is True but R is false.
 (D) Both A and R are false.

2. Significant Figure, Unit & Dimension

- Q 1. Using scientific notations express the number 582,000,000 to
 (A) Seven significant figure
 (B) Five significant figure
 (C) Three significant figure
 (D) Two significant figure
 (E) One significant figure
- Q 2. Round up the following upto three significant figure. [NCERT]
 (A) 34.216 (B) 10.4107
 (C) 0.04597 (D) 2808
- Q 3. Perform the following mathematical operations and express the result to the correct number of the significant figures.
 (A) 6.022×1.05
 (B) $6.6262 \times 2.998 \div 2.54$
 (C) $1.2678 - 1.345 + 1.56$
 (D) $(9.43 \times 4.90 + 5.67) \div 3$; where 3 is exact.
 (E) $(9.8 + 6.0 + 3.4 + 6.7 + 5.987) \div 5.6$
- Q 4. How many significant figure are present in the following calculations? [NCERT Exemplar]

$$\frac{2.5 \times 1.25 \times 3.5}{2.01}$$
- Q 5. The number of significant figure in the expression [CBSE PMT 94]

$$\frac{(29.2 - 20.2) \times 1.79 \times 10^5}{1.37}$$
 is
 (A) 1 (B) 2 (C) 3 (D) 4
- Q 6. How many significant figure are present in the following calculations? [NCERT]
 (A). $\frac{0.02856 \times 298.15 \times 0.112}{0.5785}$
 (B). 5×5.364
 (C). $0.0125 + 0.7864 + 0.0215$
- Q 7. A cube has a side of length 1.40 m. calculate its volume.
 (A) 2.7 m^3 (B) 2.74 m^3
 (C) 2.70 m^3 (D) 2.744 m^3
- Q 8. A student has two masses 2.0 Kg & 3.21 Kg in a bag. The total weight present in the bag is
 (A) 5.21 Kg (B) 5.2 Kg
 (C) 5.0 Kg (D) None of these
- Q 9. The average value of length 4.5 m, 5.41 m & 6.214 m is
 (A) 16.124 m (B) 16.12 m
 (C) 16.1 m (D) 16 m
- Q 10. In an experiment, 25 students measuring a weight 1.76 Kg and each found exactly the same weight. Sum of total weight measured by 25 students is
 (A) 44.00 kg (B) 44.0 Kg
 (C) 44 Kg (D) 1.76 Kg
- Q 11. A cube has a side of length $1.2 \times 10^{-2} \text{ m}$. calculate its volume. [Physics IIT 2003S]
 (A) $1.7 \times 10^{-6} \text{ m}^3$ (B) $1.73 \times 10^{-6} \text{ m}^3$
 (C) $1.70 \times 10^{-6} \text{ m}^3$ (D) $1.732 \times 10^{-6} \text{ m}^3$
- Q 12. If the density of a solution is 3.12 g/ml, then mass of 1.5 ml solution is [NCERT Exemplar]
 (A) 4.7 g (B) $3680 \times 10^{-3} \text{ g}$
 (C) 4.680 g (D) 46.80 g
- Q 13. The mass of a box measured by a grocer's balance is 2.3 Kg. Two gold pieces of masses 20.15 gm and 20.17 g are added to the box. What is (a) total mass of the box. (b) the difference in the masses of the pieces to the correct significant figure.
- Q 14. A student performs a titration with different burettes and find the titre value as 25.2 ml, 25.25 ml & 25.0 ml. The number of significant figure in the average value of titre is [JEE Adv. 2010]
- Q 15. Which of the following is not fundamental unit?
 (A) Mass (B) Charge
 (C) Current (D) Time
- Q 16. The S.I. unit of Temperature is
 (A) Fahrenheit (B) Degree Celsius
 (C) Kelvin (D) Rankin
- Q 17. An equation is dimensionally correct, the equation
 (A) must be correct (B) may be correct
 (C) May be correct (D) both b & C
- Q 18. If Specific charge of a substance is taken to be 0.3 Coul/gm. What is the mass of substance having 50 coulomb of charge is
 (A) 15 g (B) 166.67 g
 (C) 150 g (D) None of these
- Q 19. If Aqueous Tension of a solution is 0.20 atm at a particular temperature then it represents
 (A) Vapour pressure of Solution
 (B) Force exerted in Solution
 (C) Aqueous Solution
 (D) None of These

- Q 20. Carry out the following operations.
- (1). $6.98 \text{ m} + 5.69 \text{ cm} + 33 \text{ mm}$
 - (2). $3.70 \text{ kg} - 50.97 \text{ gm}$
 - (3). $2.0 \times 10^2 \text{ gm} + 1.12 \times 10^{-1} \text{ kg}$
 - (4). $1 \text{ m} + 1 \text{ ft}$
- Q 21. Check the correctness of the following equation from dimensional analysis.
- (1). $S = ut + Kat^2$
 - (2). $aS = V^2 - U^2$
 - (3). $S^2 = (tU^3/2a)$
- Q 22. A book with many printing error contains four different formulas for the calculation of displacement y of a particle undergoing a certain periodic motion, which is not correct at all.
- (A) $Y = A.\sin(2t/T)$
 - (B) $Y = A.\sin(xt)$
 - (C) $Y = (A/T)\sin(t/a)$
- Q 23. If Specific volume of a substance is taken as 30 ml/g. What is the mass of 50 liter volume?
- Q 24. If Specific volume of a substance is taken as 0.40 ml/g. What is the volume of 30 g substance?
- Q 25. A student has entered a 10.0 km run. How long is the run in miles? Given: $1 \text{ km} = 1000 \text{ m}$, $1 \text{ m} = 1.094 \text{ yd}$, $1760 \text{ yd} = 1 \text{ mi}$;
- Q 26. A Japanese car is advertised as having a gas mileage of 15 Km/L. Convert this rating to miles per gallon. Given: $1 \text{ liter} = 1.06 \text{ qt}$, $4 \text{ qt} = 1 \text{ gal}$.
- Q 27. The density of aluminum is 2.70 g/cc . An irregularly shaped piece of aluminum weighing 40.0 g is added to a 200 ml graduated cylinder containing 100 mL of water. To what height in the cylinder will the water level rise?

Periodic Table

1 H 1.008																	2 He 4.003
3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.30	3/IIIB 4/IVB 5/VVB 6/VIB 7/VIIB 8 VII 9										13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.61	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc 98.91	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
55 Cs 132.9	56 Ba 137.3	57 La 138.9	58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm 146.9	62 Sm 150.4	63 Eu 152.0	64 Gd 157.2	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0	
87 Fr 223.0	88 Ra 226.0	89 La 138.9	90 Ce 140.1	91 Pr 140.9	92 Nd 144.2	93 Pm 146.9	94 Sm 150.4	95 Eu 152.0	96 Gd 157.2	97 Tb 158.9	98 Dy 162.5	99 Ho 164.9	100 Er 167.3	101 Tm 168.9	102 Yb 173.0	103 Lu 175.0	
		104 Db	105 Jl	106 Rf	107 Bh	108 Hh	109 Mt	110 Uun	111 Uuu	112 Uuq	113 Uub	114 Uut	115 Uuq	116 Uuq	117 Uuh	118 Uuo	

s ← → d ← → p

f

Lanthanides

Actinides

57 La 138.9	58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm 146.9	62 Sm 150.4	63 Eu 152.0	64 Gd 157.2	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
89 Ac 227.0	90 Th 232.0	91 Pa 231.0	92 U 238.0	93 Np 237.0	94 Pu 239.1	95 Am 241.1	96 Cm 244.1	97 Bk 249.1	98 Cf 252.1	99 Es 252.1	100 Fm 257.1	101 Md 258.1	102 No 259.1	103 Lr 262.1

1. Introduction to chemistry, Nomenclature of Inorganic Compounds

Q 1. Which of the followings are elements, compounds or mixtures?

Sea water	Fire	Palladium
Helium gas	Ghee	Oxygen
Common Salt	Water	Tin
Milk shake	Mineral Water	Wood
Air in a bottle	Plastic	Tomato
Concrete	Aluminum	Rice
Milk	Brass	Ozone
Sugar	Gallium	Hydrogen

Q 2. When 10.0 g of A was heated, 4.4 g of B was given off, leaving 5.6 g of E. The same quantity of B can also be prepared by the combination of 1.2g C & 3.2 g D. The E can be electrolysed, after melting, to yield 4.0 g of F and 1.6 g of G, neither of which can be further decomposed by ordinary chemical means. E combines with water to give 1.3 g of J per g of E. A combination of E with 1.5 times its mass of water yields a homogeneous material, L. Identify as far as possible each lettered material as element, compound, or mixture.

Q 3. An atom has 9 protons and 10 neutrons in the nucleus. What is its symbol?

Q 4. An atom has 18 protons and 20 neutrons in the nucleus. What is its symbol?

Q 5. What is the symbol of an ion with 16 protons, 18 neutrons and 18 electrons?

Q 6. What is the symbol of an ion with 37 protons, 39 neutrons and 36 electrons ?

Q 7. How many protons, neutrons and electrons are present in each of the following atoms or ions?

- | | | |
|-------------------------------|-----------------------------------|---|
| (A). ${}_{12}^{24}\text{Mg}$ | (E). ${}_{27}^{59}\text{Co}^{3+}$ | (I). ${}^{39}\text{Ca}$ |
| (B). ${}_{15}^{31}\text{P}$ | (F). ${}_{28}^{59}\text{Ni}^{2+}$ | (J). H_2SO_4 |
| (C). ${}_{17}^{35}\text{Cl}$ | (G). ${}_{13}^{27}\text{Al}^{3+}$ | (K). ${}_{47}^{108}\text{Ag}$ ${}^{35}\text{Cl}$ |
| (D). ${}_{55}^{132}\text{Cs}$ | (H). ${}_{37}^{76}\text{Rb}^+$ | (L). ${}_{19}^{39}\text{K}$ ${}_{35}^{80}\text{Br}$ |

Q 8. Name the following compounds:

- (A) NaCl, AlI₃, MgCl₂, RbBr, CsF, AlP, Na₃N, Al₄C₃, Al₂O₃, Mg₃P₂
- (B) CrO₃, Cr₂O₃, AuCl₃, Hg₂I₂, Fe₂S₃, PbS, MnO, MnO₂, Mn₂O₇, NiS

(C) Ca₃(PO₄)₂, NaNO₂, KClO₃, KClO₄, BaSO₃, KMnO₄, K₂Cr₂O₇

(D) Pb(NO₃)₂, Al(IO)₃, K₂CrO₃, , NaMnO₃, Ba(ClO)₂, NH₄TcO₄, K₂SO₃

(E) Ba(HSO₄)₂, Ba(H₂PO₃)₂, Cs(HSO₃), Al(CH₃COO)₃, (NH₄)₂CrO₃, NaHSO₄

(F) Hg₂(NO₃)₂, Mn(BrO₂)₄, Cu₃(PO₄)₂, Pb(CrO₃)₂, Co(BrO₄)₃, Cu₃(PO₃), Co(BrO₄)₃

(G) N₂F₄, NF₃, H₂Se, N₂Cl₂, NO, NI₃, SF₆, N₂O, N₂O₅, N₂O₃, NO, BCl₃, NCl₃,

(H) P₄O₁₀, P₂O₅, CS₂, CCl₃H, CCl₂H₂, Cl₂O, ClO₂, SiF₄, SeO₃, PCl₅, SeO₂

(I) HI, HBr, HBrO₂, HClO₄, H₂CrO₄, HNO₃, HIO₂, HClO₃, H₂SO₃, HBrO₃

Q 9. Name the following compounds:

Cu₂(CN)₂, Cu(OH)₂, AlCl₃, RbI, Hg₂(CN)₂, SCl₂, PdCl₄, SeCl₄, XeO₂, XeO₂F₂, XeOF₄, N₂Cl₄, CO₂, N₂O₃, NaKCO₃, ClO₂, SiF₄, SeO₃, PCl₅, SeO₂, H₂CrO₃, HNO₂, BaTiO₃, NaAl₂O₄, KTCO₄

Q 10. Write the formula for the following compounds.

Cesium Bromide, Silicon tetrachloride, Barium sulfate, Sodium nitride, Calcium carbide, Aluminium nitride, Mercurous perchlorate, Barium hydrogensulphate, Aluminum iodite, Sodium carbide, Cuprous sulphate, Chromium(VI) chloride, Manganese(IV) Oxide, Chlorine trifluoride, Ammonium chloride, Magnesium fluoride, Chlorine monoxide, Ammonium hydrogen phosphate, Hydrobromic acid, Bromic acid, Bromus acid, perchloric acid, mercury sulfide, Perbromic acid, Potassium Hydrogen Sulphate, Nitrogen Trichloride, Cobalt(III) Nitrate, Chromium (III) Carbonate, Tin(II) Fluoride, Lead (II) Oxide, Lead (IV) Oxide, Gallium Arsenide, Lead (II) hypobromite, Stannic perchlorate.

Q 11. The formula for calcium pyrophosphate is Ca₂P₂O₇. Determine the formulas of Sodium pyrophosphate & Iron (III) Pyrophosphate.

Q 12. The formula for Sodium Oxalate is Na₂C₂O₄. Determine the formulas of Calcium Oxalate & Iron (III) Oxalate.

Q 13. The formula of pervoksite is AB₂O₄, if A is a divalent Cation & O represent oxide ion, then find valency of B.

Q 14. Find the value of 'x' in

- (A) Ba_x[Al(CN)₆]₂ (B) K_x[AlF₆]
(C) Mg_xTiO₃ (D) Na_x[Al(C₂O₄)₃]

2. Laws of Conservation of mass & atom, Balancing of Chemical Reaction

Q 1. Which of the following equation does not obey the law of conservation of mass? [AIIMS 2002]

- (A) $4H + O_2 \rightarrow 2H_2O$
 (B) $H_2 + O \rightarrow 2H_2O$
 (C) $2H_2 + O_2 \rightarrow H_2O$
 (D) None of these

Q 2. Which of the following best explains the law of conservation of mass?

- (A) No change in mass is observed when 2.0 gm of Mg is heated in vacuum.
 (B) 1.2 gm of C when burnt in excess of O consumes only 3.2 gm of it to form 4.4 gm of CO_2 .
 (C) 12 gm of carbon when heated in limited supply of air produces only 20 gm of CO.
 (D) A sample of air on heating does not show any change in mass but volume increases.

Q 3. The balancing of equation is based on the law

- (A) Law of conservation of atom
 (B) Law of definite proportion
 (C) Law of multiple proportion
 (D) Law of combining volume

Q 4. Balancing the chemical equations by systematic method:

- $H_2 + O_2 \rightarrow H_2O$
- $S_8 + O_2 \rightarrow SO_3$
- $HgO \rightarrow Hg + O_2$
- $Zn + HCl \rightarrow ZnCl_2 + H_2$
- $Na + H_2O \rightarrow NaOH + H_2$
- $C_{10}H_{16} + Cl_2 \rightarrow C + HCl$
- $Si_2H_3 + O_2 \rightarrow SiO_2 + H_2O$
- $Fe + O_2 \rightarrow Fe_2O_3$
- $C_7H_6O_2 + O_2 \rightarrow CO_2 + H_2O$
- $FeS_2 + O_2 \rightarrow Fe_2O_3 + SO_2$
- $Fe_2O_3 + H_2 \rightarrow Fe + H_2O$
- $K + Br_2 \rightarrow KBr$
- $C_2H_2 + O_2 \rightarrow CO_2 + H_2O$
- $H_2O_2 \rightarrow H_2O + O_2$
- $C_7H_{16} + O_2 \rightarrow CO_2 + H_2O$
- $SiO_2 + HF \rightarrow SiF_4 + H_2O$
- $KClO_3 \rightarrow KCl + O_2$
- $KClO_3 \rightarrow KClO_4 + KCl$
- $P_4O_{10} + H_2O \rightarrow H_3PO$

- $Sb + O_2 \rightarrow Sb_4O_6$
- $C_3H_8 + O_2 \rightarrow CO_2 + H_2O$
- $Fe_2O_3 + CO \rightarrow Fe + CO_2$
- $PCl_5 + H_2O \rightarrow HCl + H_3PO_4$
- $H_2S + Cl_2 \rightarrow S_8 + HCl$
- $Fe + H_2O \rightarrow Fe_3O_4 + H_2$
- $N_2 + H_2 \rightarrow NH_3$
- $N_2 + O_2 \rightarrow N_2O$
- $CO_2 + H_2O \rightarrow C_6H_{12}O_6 + O_2$
- $SiCl_4 + H_2O \rightarrow H_4SiO_4 + HCl$
- $H_3PO_4 \rightarrow H_4P_2O_7 + H_2O$
- $CO_2 + NH_3 \rightarrow OC(NH_2)_2 + H_2O$
- $Al(OH)_3 + H_2SO_4 \rightarrow Al_2(SO_4)_3 + H_2O$
- $Fe_2(SO_4)_3 + KOH \rightarrow K_2SO_4 + Fe(OH)_3$
- $H_2SO_4 + HI \rightarrow H_2S + I_2 + H_2O$
- $Al + FeO \rightarrow Al_2O_3 + Fe$
- $Na_2CO_3 + HCl \rightarrow NaCl + H_2O + CO_2$
- $P_4 + O_2 \rightarrow P_2O_5$
- $K_2O + H_2O \rightarrow KOH$
- $Al + O_2 \rightarrow Al_2O_3$
- $Na_2O_2 + H_2O \rightarrow NaOH + O_2$
- $C + H_2O \rightarrow CO + H_2$
- $H_3AsO_4 \rightarrow As_2O_5 + H_2O$
- $Al_2(SO_4)_3 + Ca(OH)_2 \rightarrow Al(OH)_3 + CaSO_4$
- $FeCl_3 + NH_4OH \rightarrow Fe(OH)_3 + NH_4Cl$
- $Ca_3(PO_4)_2 + 6SiO_2 \rightarrow P_4O_{10} + CaSiO_3$
- $N_2O_5 + H_2O \rightarrow HNO_3$
- $Al + HCl \rightarrow AlCl_3 + H_2$
- $H_3BO_3 \rightarrow H_4B_6O_{11} + H_2O$
- $Mg + N_2 \rightarrow Mg_3N_2$
- $NaOH + Cl_2 \rightarrow NaCl + NaClO + H_2O$
- $Li_2O + H_2O \rightarrow LiOH$
- $CaC_2 + H_2O \rightarrow C_2H_2 + Ca(OH)_2$
- $Fe(OH)_3 \rightarrow Fe_2O_3 + H_2O$
- $Pb(NO_3)_2 \rightarrow PbO + NO_2 + O_2$
- $BaO + H_2O \rightarrow Ba(OH)_2$
- $Ca + AlCl_3 \rightarrow CaCl_2 + Al$
- $NH_3 + NO \rightarrow N_2 + H_2O$
- $H_3PO_3 \rightarrow H_3PO_4 + PH_3$
- $Fe_2O_3 + C \rightarrow CO + Fe$
- $FeS + O_2 \rightarrow Fe_2O_3 + SO_2$
- $NH_3 + O_2 \rightarrow NO + H_2O$
- $Si + S_8 \rightarrow Si_2S_4$
- $Hg_2CO_3 \rightarrow Hg + HgO + CO_2$
- $SiC + Cl_2 \rightarrow SiCl_4 + C$
- $Al_4C_3 + H_2O \rightarrow CH_4 + Al(OH)_3$
- $V_2O_5 + HCl \rightarrow VOCl_3 + H_2O$
- $Ag_2S + KCN \rightarrow KAg(CN)_2 + K_2S$
- $Au_2S_3 + H_2 \rightarrow Au + H_2S$
- $ClO_2 + H_2O \rightarrow HClO_2 + HClO_3$

70. $\text{KO}_2 + \text{CO}_2 \rightarrow \text{K}_2\text{CO}_3 + \text{O}_2$
 71. $\text{MgNH}_4\text{PO}_4 \rightarrow \text{Mg}_2\text{P}_2\text{O}_7 + \text{NH}_3 + \text{H}_2\text{O}$
 72. $\text{MnO}_2 + \text{HCl} \rightarrow \text{MnCl}_2 + \text{H}_2\text{O} + \text{Cl}_2$
 73. $\text{Pb} + \text{Na} + \text{C}_2\text{H}_5\text{Cl} \rightarrow \text{Pb}(\text{C}_2\text{H}_5)_4 + \text{NaCl}$
 74. $\text{Ca}(\text{OH})_2 + \text{H}_3\text{PO}_4 \rightarrow \text{CaHPO}_4 + \text{H}_2\text{O}$
 75. $\text{Zn} + \text{NaOH} + \text{H}_2\text{O} \rightarrow \text{Na}_2\text{Zn}(\text{OH})_4 + \text{H}_2$
 76. $\text{SrBr}_2 + (\text{NH}_4)_2\text{CO}_3 \rightarrow \text{SrCO}_3 + \text{NH}_4\text{Br}$
 77. $\text{Hg}(\text{OH})_2 + \text{H}_3\text{PO}_4 \rightarrow \text{Hg}_3(\text{PO}_4)_2 + \text{H}_2\text{O}$
 78. $\text{Ca}_3(\text{PO}_4)_2 + \text{SiO}_2 + \text{C} \rightarrow \text{CaSiO}_3 + \text{P}_4 + \text{CO}$
 79. $\text{I}_4\text{O}_9 \rightarrow \text{I}_2\text{O}_6 + \text{I}_2 + \text{O}_2$
 80. $\text{C}_2\text{H}_3\text{Cl} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{HCl}$
 81. $(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \rightarrow \text{NH}_3 + \text{H}_2\text{O} + \text{Cr}_2\text{O}_3 + \text{O}_2$
 82. $\text{Al} + \text{NaOH} + \text{H}_2\text{O} \rightarrow \text{NaAl}(\text{OH})_4 + \text{H}_2$
 83. $\text{NH}_4\text{Cl} + \text{Ca}(\text{OH})_2 \rightarrow \text{CaCl}_2 + \text{NH}_3 + \text{H}_2\text{O}$
 84. $\text{Al} + \text{NH}_4\text{ClO}_4 \rightarrow \text{Al}_2\text{O}_3 + \text{AlCl}_3 + \text{NO} + \text{H}_2\text{O}$
 85. $\text{H}_2\text{SO}_4 + \text{NaHCO}_3 \rightarrow \text{Na}_2\text{SO}_4 + \text{CO}_2 + \text{H}_2\text{O}$
 86. $\text{Ca}_{10}\text{F}_2(\text{PO}_4)_6 + \text{H}_2\text{SO}_4 \rightarrow \text{Ca}(\text{H}_2\text{PO}_4)_2 + \text{CaSO}_4 + \text{HF}$
 87. $\text{Ca}_3(\text{PO}_4)_2 + \text{H}_2\text{SO}_4 \rightarrow \text{CaSO}_4 + \text{Ca}(\text{H}_2\text{PO}_4)_2$
 88. $\text{H}_3\text{PO}_4 + (\text{NH}_4)_2\text{MoO}_4 + \text{HNO}_3 \rightarrow (\text{NH}_4)_3\text{PO}_4 \cdot 12\text{MoO}_3 + \text{NH}_4\text{NO}_3 + \text{H}_2\text{O}$
 89. $\text{C}_4\text{H}_{10} + \text{Cl}_2 + \text{O}_2 \rightarrow \text{CO}_2 + \text{CCl}_4 + \text{H}_2\text{O}$
 90. $\text{C}_7\text{H}_{10}\text{N} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{NO}_2$
 91. $\text{H}_3\text{PO}_4 + \text{HCl} \rightarrow \text{PCl}_5 + \text{H}_2\text{O}$
 92. $\text{HCl} + \text{K}_2\text{CO}_3 \rightarrow \text{KCl} + \text{H}_2\text{O} + \text{CO}_2$
 93. $\text{Ca}(\text{ClO}_3)_2 \rightarrow \text{CaCl}_2 + \text{O}_2$
 94. $\text{C}_2\text{H}_5\text{OH} + \text{O}_2 \rightarrow \text{CO} + \text{H}_2\text{O}$
 95. $\text{Xe} + \text{F}_2 \rightarrow \text{XeF}_6$
 96. $\text{NH}_4\text{NO}_3 \rightarrow \text{N}_2\text{O} + \text{H}_2\text{O}$
 97. $\text{Au}_2\text{O}_3 \rightarrow \text{Au} + \text{O}_2$
 98. $\text{C}_4\text{H}_{10} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
 99. $\text{Fe}_3\text{O}_4 + \text{H}_2 \rightarrow \text{Fe} + \text{H}_2\text{O}$
 100. $\text{O}_2 \rightarrow \text{O}_3$
 101. $\text{I}_2 + \text{HNO}_3 \rightarrow \text{HIO}_3 + \text{NO}_2 + \text{H}_2$
 102. $\text{C}_6\text{H}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
 103. $\text{C}_2\text{H}_5\text{OH} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
 104. $\text{HClO}_4 + \text{P}_4\text{O}_{10} \rightarrow \text{H}_3\text{PO}_4 + \text{Cl}_2\text{O}_7$
 105. $\text{BaCl}_2 + \text{Al}_2(\text{SO}_4)_3 \rightarrow \text{BaSO}_4 + \text{AlCl}_3$
 106. $(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \rightarrow \text{Cr}_2\text{O}_3 + \text{N}_2 + \text{H}_2\text{O}$
 107. $\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}$
 108. $\text{Fe}_2(\text{C}_2\text{O}_4)_3 \rightarrow \text{FeC}_2\text{O}_4 + \text{CO}_2$
 109. $\text{Ca}_3\text{P}_2 + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{PH}_3$
 110. $\text{As} + \text{NaOH} \rightarrow \text{Na}_3\text{AsO}_3 + \text{H}_2$

Q 5. Balancing the chemical reaction by systematic method:

- $\text{FeO} + \text{V}_2\text{O}_5 \rightarrow \text{Fe}_2\text{O}_3 + \text{VO}$
- $\text{CO}_2 + \text{N}_2\text{O}_5 \rightarrow \text{NO}_2 + \text{C}_3\text{O}_4$
- $\text{Re}_2\text{O}_7 + \text{CO} \rightarrow \text{Re}_2(\text{CO})_{10} + \text{CO}_2$
- $\text{A} + \text{BO}_3 \rightarrow \text{A}_3\text{O}_4 + \text{B}_2\text{O}_3$
- $\text{B}_2\text{O}_5 + \text{AO} \rightarrow \text{A}_2\text{O}_7 + \text{BO}_2$

5. Basic Laws of Chemistry (definite Proportion, Multiple Proportion)

- Q 1. What weight of P_4O_6 & P_4O_{10} will be produced when 31 g of P_4 & 32 g of O_2 completely react with each other?
 (A) 2.75 g, 219.5 g (B) 27.5 g, 35.5 g
 (C) 55 g, 71 g (D) 17.5 g, 190.5 g
- Q 2. What mass of AgNO_3 will react with 5.85 g NaCl to produce 14.35 g AgCl & 8.5 g NaNO_3 .
 (A) 17 g (B) 34 g
 (C) 68 g (D) 51 g
- Q 3. 6.3 g sodium bicarbonate is dissolved in 15 g acetic acid. Weight of residue was found to be 18 g. The weight of CO_2 gas formed is
 (A) 33 g (B) 21.3 g
 (C) 3.3 g (D) 39.3 g
- Q 4. If water sample taken from sea, river or lake, they found to contain hydrogen and oxygen in the same mass ratio 1:8. This indicates the law of
 (A) Multiple Proportion
 (B) Definite Proportion
 (C) Conservation of mass
 (D) None of these
- Q 5. A sample of CaCO_3 has the percentage of Ca, C & O as 40 % , 12 % & 48 % respectively. If the law of constant proportion is true then find the weight of Ca in 4 g of CaCO_3
 (A) 0.016 g (B) 0.16 g
 (C) 1.6 g (D) 16 g
- Q 6. Consider the following isotopes of Carbon & Oxygen [AIIMS 2000]
 (1) Isotopes of C : ^{12}C , ^{13}C , ^{14}C
 (2) Isotopes of O : ^{16}O , ^{17}O
 Find the total no of CO_2 molecules of different isotopic composition can be formed?
 (A) 9 (B) 15
 (C) 6 (D) 12
- Q 7. Consider the following isotopes of Carbon & Oxygen
 (1) Isotopes of C : ^{12}C , ^{13}C , ^{14}C
 (2) Isotopes of O : ^{16}O , ^{17}O , ^{18}O
 Find the total no of CO_2 molecules of different isotopic composition can be formed?
 (A) 9 (B) 18
 (C) 24 (D) 12

- Q 8. which of the following statement about a compound is wrong? [NCERT Exemplar]
 (A) A molecule of a compound has atoms of different elements.
 (B) A compound can not be separated into its constituent elements by physical methods of separation.
 (C) A compound retain the physical properties of its constituent elements
 (D). The ratio of atoms of different elements in a compound is fixed.
- Q 9. One of the statements of Dalton's atomic theory is given below. [NCERT Exemplar]
 "compound are formed when atoms of different element combine in fixed ratio"
 Which of the following law is not related to this statement?
 (A) law of conservation of mass
 (B) law of definite proportion
 (C) law of multiple proportion
 (D) Avogadro law
- Q 10. Two sample of sodium chloride is produced when sodium combines separately with two isotopes of chlorine ^{35}Cl & ^{37}Cl . Which law is illustrated by the above facts?
 (A) Law of multiple proportion
 (B) Law of definite proportion
 (C) Law of constant volume
 (D) None of these
- Q 11. Carbon & Oxygen combine together to form two oxides CO & CO_2 in which the weight ratio of Carbon & Oxygen is respectively 12:16 & 12:32 respectively. This figure illustrate
 (A) Law of multiple proportion
 (B) Law of definite proportion
 (C) Law of constant volume
 (D) law of conservation of mass
- Q 12. Which of the following pairs illustrate the law of multiple proportion?
 (A) NaCl & NaBr (B) H_2O , D_2O
 (C) KOH & NaOH (D) SO_2 & SO_3
- Q 13. Which of the following pairs illustrate the law of multiple proportion?
 (A) NH_3 & NCl_3 (B) H_2S , SO_2
 (C) CS_2 & FeSO_4 (D) CuO & Cu_2O
- Q 14. Which of the following pairs illustrate the law of multiple proportion?
 (A) NH_3 & HCl (B) N_2O , NO_2
 (C) CS_2 & CO_2 (D) CuO & Cu_2O
- Q 15. Which of the following statement indicates that Law of multiple proportion is valid ? [NCERT Exemplar]
 (A) sample of Carbon dioxide taken from any Will always have carbon & oxygen in ratio 1:2
 (B) carbon form two oxide CO & CO_2 , Masses of oxygen which combine with fixed mass of oxygen in the ratio 1:2.
 (C) when Mg is brunt in oxygen, the amount of Mg taken for the reaction is equal to the amount of Mg in MgO formed.
 (D) At Constant temperature and pressure 200 ml of H_2 combine with 100 ml of O_2 to form 200 ml of H_2O .
- Q 16. Which of the following pairs illustrate the law of multiple proportion? [JEE 1982]
 (A) KOH, CsOH (B) H_2O , D_2O
 (C) ethane, benzene (D) KCl, KBr
- Q 17. Does in compounds CH_4 and C_2H_6 , law of multiple proportions satisfied? Explain.
- Q 18. Verify that the laws of multiple proportions for the element X which forms oxides having Percentage of X (by weight) equal to 77.4%, 63.2%, 69.6% and 72.0%.
- Q 19. Verify that the law of multiple proportion for the element X which forms chlorides containing 59.68 %, 68.95%, and 74.75 % of chlorine in the three chlorides.
- Q 20. Verify that the law of multiple proportion for the element Carbon which forms oxides in which 1st oxide has 20 g of Oxygen for 5 g of Carbon & in 2nd oxide has 4 g Oxygen with 3 g of Carbon.
- Q 21. A box contains some identical red colored balls, labeled as A, each weighing 2 g. Another box contains identical blue colored balls, labeled as B, each weighing 5 g. consider the combination AB, AB_2 , A_2B & A_2B_3 and show that law of multiple proportion is applicable. [NCERT Exemplar]

Answer Key

1. Science & Significant Figure

- (1). D (2). From Notes (3). C
 (4). A
 (5). (A). 4.8×10^{-3} (B). 2.34×10^6
 (C). 8.008×10^3 (D). 5.000×10^2
 (E). 6.0012×10^0
 (6). A (7). C (8). B
 (9). A).2, B).3, C).3, D).3, E).6, F).5,
 G).4, H).4
 (10). (A).2 (B).3 (C).4 (D).3 (E).4 (F).5
 (11). B, C, D, E, F, G
 (12). D (13). C

2. Significant Figure, Unit & Dimension

- (1). A). 5.820000×10^8 B). 5.8200×10^8
 C). 5.82×10^8 D). 5.8×10^8
 E). 6×10^8
 (2). (A).34.2 (B).10.4 (C).0.046 (D).2810
 (3). A). 6.32 B). 7.82 C). 1.48
 D). 17.29 E). 5.7
 (4). 2 (5). C
 (6). (A). 3, (B). 4, (C). 4
 (7). B (8). B (9). C
 (10). A (11). A (12). A
 (13). A). 2340.3 g B). 0.02 g (14). 3
 (15). B (16). C (17). D
 (18). B (19). A
 (20). 1). 7.58 m 2). 3.65 Kg 3). 3.12×10^{-1} kg
 4). 4.38084 ft
 (21). 1). Correct 2). Correct 3). Correct
 (22). B, C (23). 1.67 kg (24). 12 g
 (25). 6.22 miles (26). 35.2 miles/galon
 (27). 114.27 ml

1. Introduction to chemistry,

Nomenclature of Inorganic Compounds

- (1). Mixture, Element, Compound, Mixture, Mixture, Mixture, Mixture, Compound, Mixture, Mixture, Compound, Mixture, Compound, Element, Mixture, Element, Element, Compound, Element, Mixture, Mixture, Mixture, Compound, Compound
 (2). Compound : A, B, E, D, L, Element : C, F, G, Mixture : J
 (3). ${}_{9}^{19}\text{F}$ (4). ${}_{18}^{38}\text{Ar}$
 (5). ${}_{16}^{34}\text{O}^{2-}$ (6). ${}_{37}^{76}\text{Rb}^{+}$
 (7).
 a). 12 P, 12 N, 12 e g). 13 P, 14 N, 10 e
 b). 15 P, 16 N, 15 e h). 37 P, 39 N, 36 e
 c). 17 P, 18 N, 17 e i). 20 P, 19 N, 20 e
 d). 55 P, 77 N, 55 e j). 50 P, 48 N, 50 e
 e). 27 P, 32 N, 24 e k). 64 P, 79 N, 64 e
 f). 28 P, 31 N, 26 e l). 54 P, 65 N, 54 e
 (8).
 (A). Sodium Chloride, Aluminium Iodide, Magnesium Chloride, Rubidium Bromide, Cesium Fluoride, Aluminium Phosphide, Sodium Nitride, Aluminum Carbide, Aluminium Oxide, Magnesium Phosphide
 (B). Chromium (VI) Oxide, Chromium (III) oxide, Gold (III) Chloride, Mercurous Iodide, Iron (III) Sulphide, Lead (II) Sulphide, Manganese (II) Oxide, Manganese (VII) oxide, Nickel (II) Sulphide
 (C). Calcium Phosphate, Sodium Nitrite, Potassium Chlorate, Potassium Perchlorate, Barium Sulphite, Potassium permanganate
 (D). Lead (II) Nitrate, Aluminum Hypoiodite, Potassium Chromite, Sodium Manganite, Barium Hypochlorite, Ammonium Perchlorate, Potassium Sulphite
 (E). Barium Hydrogen Sulphate, Barium dihydrogenphosphite, Calcium bishphite, Aluminum Acetate, Ammonium chromite, Sodium bisulphate
 (F). Mercury (I) Nitrate, Manganese (IV) Bromite, Copper (II) Phosphate, Lead (II) Chromite,

- (G) Cobalt (III) Perbromate, Copper(I) Phosphite, Cobalt(III) Perbromate
- Dinitrogen TetraFluoride, Nitrogen Trifluoride, Hydrogen Selenide, Dinitrogen dichloride, Nitrogen Monooxide, Nitrogen Triiodide, Sulphur Hexafluoride, Dinitrogen Monooxide, Dinitrogen Pentaoxide, Dinitrogen Trioxide, Nitrogen Monooxide, Boron Trichloride, Nitrogen Trichloride
- (9). Cuprous Cyanide, Cupric Hydroxide, Aluminium Chloride, Rubidium Iodide, Mercurous Cyanide, Sulphur diChloride, Palladium (IV) Chloride, Selenium TetraChloride, Xenon Dioxide, Xenondioxodifluoride, xenon OxoTetraFluoride, Dinitrogen TetraChloride, Carbondioxide, Dinitrogen trioxide, Sodium Potassium Carbonate, Chlorine dioxide, Silicon Tetrafluoride, selenium trioxide, phosphorus PentaChloride, Selenium Dioxide, Chromous Acid, Nitrous Acid, Barium Titanium Oxide, Sodium diAluminium Oxide, Potassium pertechnetate
- (10). CsBr, SiCl₄, BaSO₄, Na₃N, Ca₄C, AlN, Hg₂(ClO₄)₂, Ba(HSO₄)₂, Al(IO₃)₃, Na₄C, Cu₂(SO₄), CrCl₆, MnO₂, ClF₃, NH₄Cl, MgF₂, Cl₂, NH₄HPO₄, HBr, HBrO₃, HBrO₂, HClO₄, HgS or Hg₂S, HBrO₃, KF, PbO, PbO₂, GaAs, Pb(BrO)₂, Sn(ClO₄)₂

- (11). Na₄P₂O₇ & Fe₄(P₂O₇)₃
 (12). CaC₂O₄ & Fe₂(C₂O₄)₃
 (13). +3
 (14). A). 3 B). 3 C). 1 D). 3

2. Laws of Conservation of mass & atom, Balancing of Chemical Reaction

- (1). D (2). B (3). A
 (4). Balancing of chemical reaction.
 (5). Balancing of chemical reaction.

3. Basic Laws of Chemistry (definite Proportion, Multiple Proportion)

- (1). B (2). A (3). C
 (4). B (5). C (6). A
 (7). B (8). C (9). A, D
 (10). D (11). A (12). D
 (13). D (14). B (15). B
 (16). C (17). Yes (18). Verified
 (19). A (20). Yes (21). Yes