shiksha

IMPORTANT CHEMISTRY FORMULAE

For Success in Engineering Entrance Exams

Chap-07 – Some Basic Concepts of Chemistry

Formulas Chart

1. Mole = $\frac{W}{M}$ = $\frac{N}{N_A}$
2. $N_A = 6.02 \times 10^{23}$
3. Molar volume = $\frac{\text{Mass of one atom (or) molecule}}{\text{Molecular mass}} \times N_A$
4. Number of gram atoms = $\frac{\text{Mass of given element}}{\text{Atomic mass of element}}$ = Mole × atomicity
5. Number of gram molecules = $\frac{\text{Mass of given compound}}{\text{Molecular mass of compound}}$ = Mole
6. Avogadro's No. $N_A = 6.023 \times 10^{23}$
7. Mass of a single atom = $\frac{\text{Atomic mass}}{N_A}$
8. Mass of a molecule of substance = $\frac{\text{Molecular mass of substance}}{N_A}$ = Mole × Mass
9. Mass of a single atom = $\frac{\text{Atomic mass of element}}{N_A}$ = Mole × Atomic mass
10. Number of molecules in 18 gm of water = $\frac{18}{18} \times N_A = N_A$
11. Number of molecules in 22.4 litre at STP = $\frac{22.4}{22.4} \times N_A = N_A$
12. Number of atoms in 1 gm atomic mass of any element = N_A
13. Number of atoms in 1 gram molecule of a triatomic gas = $3 \times N_A$
14. Mass of one atom = $\frac{\text{Atomic mass of element}}{N_A}$
15. Mass of one molecule = $\frac{\text{Molecular mass of substance}}{N_A}$
16. Mass of one molecule of diatomic element = $\frac{\text{Atomic mass of element}}{N_A}$
17. Mass of one molecule of triatomic element = $\frac{\text{Atomic mass of element}}{N_A}$
18. Mass of one molecule of compound A_2B_3 = $\frac{\text{Molecular mass of } A_2B_3}{N_A}$
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Chap-08 – Structure of Atom

Formulas Chart

1. Atomic number (Z) = number of protons in the atomic nucleus
2. Mass number (A) = Number of protons and neutrons in the atomic nucleus
3. Number of neutrons = A – Z
4. Number of electrons in a neutral atom = Number of Protons and neutrons in a neutral atom
5. Number of number of electron possible in Principal quantum Number = $2n^2$
6. Number of orbitals = n^2
7. Number of orbitals in a shell = n^2
8. Number of electrons in a shell = $2n^2$
9. Number of orbitals in a subshell = $2l + 1$
10. Number of electrons in a subshell = $4l + 2$
11. Number of electrons in a subshell = $2(2l + 1)$
12. Number of electrons in a subshell = $2(2l + 1)$
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Chap-09 – Dates of Matter

Formulas Chart

1. Boyle's Law : $PV = K$ (at constant T and n)
2. Charles' Law : $\frac{V}{T} = K$ (at constant P and n)
3. Avogadro's Law : $\frac{V}{n} = K$ (at constant P and T)
4. Ideal gas equation : $PV = nRT$
5. Universal Gas Constant : $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$
6. Combined Gas Equation : $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$
7. Partial Pressure in Terms of Mole Fraction : $P_A = x_A P_{total}$
8. Van der Waals Equation : $\left(P + \frac{an^2}{V^2}\right)(V - nb) = nRT$
9. Compressibility factor : $Z = \frac{PV}{nRT}$ = Ratio of Bulk
10. Compressibility factor : $Z = \frac{PV}{nRT}$ = Ratio of Bulk
11. Root mean square speed : $u_{rms} = \sqrt{\frac{3RT}{M}}$
12. Average speed : $u_{av} = \sqrt{\frac{8RT}{\pi M}}$
13. Most probable speed : $u_{mp} = \sqrt{\frac{2RT}{M}}$
14. Relation between u_{rms}, u_{av} and u_{mp} : $u_{rms} : u_{av} : u_{mp} = 1.73 : 1.59 : 1.41$
15. Relation between u_{rms} and u_{mp} : $u_{rms} = 1.22 \, u_{mp}$
16. Relation between u_{av} and u_{mp} : $u_{av} = 1.13 \, u_{mp}$
17. Relation between u_{rms} and u_{av} : $u_{rms} = 1.08 \, u_{av}$
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83. Relation between u_{rms} and u_{av} : $u_{rms} = 1.08 \, u_{av}$
84. Relation between u_{rms} and u_{mp} : $u_{rms} = 1.22 \, u_{mp}$
85. Relation between u_{av} and u_{mp} : $u_{av} = 1.13 \, u_{mp}$
86. Relation between u_{rms} and u_{av} : $u_{rms} = 1.08 \, u_{av}$
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95. Relation between u_{rms} and u_{av} : $u_{rms} = 1.08 \, u_{av}$
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97. Relation between u_{av} and u_{mp} : $u_{av} = 1.13 \, u_{mp}$
98. Relation between u_{rms} and u_{av} : $u_{rms} = 1.08 \, u_{av}$
99. Relation between u_{rms} and u_{mp} : $u_{rms} = 1.22 \, u_{mp}$
100. Relation between u_{av} and u_{mp} : $u_{av} = 1.13 \, u_{mp}$

Chap-10 – Solutions

Formulas Chart

1. Molarity = $\frac{\text{Number of moles of solute}}{\text{Volume of solution in litre}}$
2. Molality = $\frac{\text{Number of moles of solute}}{\text{Mass of solvent in kg}}$
3. Normality = $\frac{\text{Number of gram equivalent of solute}}{\text{Volume of solution in litre}}$
4. Mole fraction = $\frac{\text{Number of moles of solute (or) solvent}}{\text{Total number of moles in solution}}$
5. Mole fraction of solute = $\frac{\text{Number of moles of solute}}{\text{Total number of moles in solution}}$
6. Mole fraction of solvent = $\frac{\text{Number of moles of solvent}}{\text{Total number of moles in solution}}$
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Chap-11 – Electrochemistry

Formulas Chart

1. Faraday's First Law of Electrolysis : $W = Z \times Q$
2. Faraday's Second Law of Electrolysis : $\frac{W_1}{W_2} = \frac{E_1}{E_2}$
3. Electrochemical Equivalent : $Z = \frac{E}{96500}$
4. Equivalent Weight : $E = \frac{\text{Atomic weight}}{\text{Valency}}$
5. Equivalent Weight : $E = \frac{\text{Molecular weight}}{\text{Total change in oxidation number}}$
6. Equivalent Weight : $E = \frac{\text{Molecular weight}}{\text{Total change in oxidation number}}$
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