# Ready Reckoner

10th Class Physical Science

## Values

1.Melting point of ice(OR) Freezing point of water (OR)Solidification of water = **$0^0$ C or 273K**
2.Boiling point of water = **$100^0$ C or 373K**
3.Specific heat of ice(S)= **0.5 cal/g- $^0$ C**
4. Specific heat of water(S)= **1 cal/g- $^0$ C**
5.Latent heat of fusion of ice(L)=**80 cal/g**
6. Latent heat of fusion of water(L)=**540 cal/g**
7.Refractive index of air(n)=**1.0003 or 1**
8.Refractive index of Diamond(n)=**2.42**
9.Critical angle of Diamond=**$24.4^0$**
10.At critical angle of incidence, the angle of refraction=**$90^0$**
11.Sign of the object distance from the lens taken as **–ve**
12.Focal length of the convex or convergent lens taken as **+ve**
13. Focal length of the concave or divergent lens taken as **-ve**
14.Least distance of distinct vision of human being is **25 cm**
15. Least distance of distinct vision at young age is **7 or 8 cm**
16. Least distance of distinct vision at old age is **1 to 2 m or even more**
17.The angle of vision for a healthy human being **is $60^0$**
18.Range of the focal length of the human eye lens is **2.27cm** (Minimum) **to 2.5 cm** (Maximum)
19.Distance between eye lens to retina is **2.5 cm**
20.Number of receptors in retina is **125 million**
21.If person suffering from Myopia , then Focal length is less than **2.5 cm**
22.If person suffering from Hypermetropia, then Focal length is more than **2.27 cm**
23.Rainbow is formed when the angle between the incoming and outgoing rays are **$40^0$ C to $42^0$**
24.The intensity is maximum at **$90^0$**angle of scattering
25.Range of resistance of the human body is **100Ω to 500000Ω**
26. 1KWH=**$3.6x10^6$J**
27.The $p^H$ of neutral solutions is **7**
28. The $p^H$ of acidic solutions is **0 to below 7**
29. The $p^H$ of basic solutions is **above 7 to 14**
30. The $p^H$ scale is from **0-14**
31.Tooth decay start when the $p^H$ of mouth is **lower than 5.5**
32.Number of water molecules present in washing soda is **10**
33.The value of Plank constant =**$6.626x10^{-34}$ Js**
34.*l* value of s-orbital is **0**
35. *l* value of p-orbital is **1**
36. *l* value of d-orbital is **2**
37.(n+*l*) value of 3d orbital **=(3+2)=5**
38.Spin of electron is **+1/2** means clockwise direction
39.Spin of electron is **-1/2** means anticlock wise direction
40. 1 pm(pico meter)=**$10^{-12}$ m**
41.No.of periods and no.of groups in modern periodic table are **7 and 18**
42.In Na*Cl* crystal, coordination number of $Na^+$ is **6** and coordination number of $Cl^-$ is **6**
43.Bond angle in $BeCl_2$ is **$180^0$**
44.Bond angle in $NH_3$ is **$107^048^1$**
45. Bond angle in $BF_3$ is **$120^0$**
46.Bond angle in $H_2O$ is **$104^031^1$**
47.Bond angle in $CH_4$ is **$109^028^1$**
48.No.Of carbons in Buckminsterfullerene is **60**
49.Fullerene($C_{60}$) contains **12** pentagonal and **20** hexagonal faces

## Units

1.S.I unit of Temperature is **Kelvin(K)**
2.S.I unit of Heat is **Joule (J)**
3. C.G.S unit of Heat is **calorie (cal)**
4.S.I unit of Specific heat is **J/kg-K**
5.CGS unit of Specific heat is **cal/g- $^0$c**
6.S.I unit of Latent heat is **J/kg**
7. CGS unit of Latest heat is **cal/g**
8.S.I or CGS unit of refractive index is **no unit**
9.S.I unit of power of the lens is **dioptre(D)**
10.S.I unit of Current is **ampere(A) or C/s**
11.S.I unit of electric charge(Q) is **Coloumb(C)**
12.S.I unit of potential or potential difference or electromotive force(emf) is **volt(V)**
13.S.I unit of resistance is **Ohm(Ω)**
14.S.I unit of Specific resistance or Resistivity is **ohm-m (Ω-m)**
15.S.I unit of conductance is **mho or $Ω^{-1}$**
16.S.I unit of conductivity is **$(Ω-m)^{-1}$**
17.S.I unit of electric power is **watt**
18.S.I unit of electric energy is **KWH**
19.S.I unit of Magnetic flux is **weber**
20.S.I unit of Magnetic flux density or Magnetic field or magnetic field induction (B) is **$wb/m^2$ or tesla**
21.S.I unit of Induced emf is **volt**
22.Units of atomic radius is pico meter(pm)
23.Unit of Ionization energy is KJ/mol

## Shape/Structure

1.S-orbital (OR) *l=0* shape is Sherical
2. p-orbital (OR) *l=1* shape is dumbell
3.d-orbital (OR) *l=2* shape is double dumbell
4.Na*Cl* – Face centred cubic lattice crystal structure
5.Methane ($CH_4$) shape is Tetrahedral
6. $BeCl_2$ shape is Linear
7. $BF_3$ shape is Trigonal
8. $NH_3$ shape is pyramidal
9. $H_2O$ shape is V-shape
10.Diamond shape is Tetrahedral environment
11.Graphite shape is Trigonal Planar environment
12.Buckminsterfullerene($C_{60}$) shape is Soccer ball
13.For ohmic conductors, the shape of V-I graph is Straight line passing through origin
14.For non-ohmic conductors, the shape of V-I graph is curved

## Connections

1.Ammeter is always connected in series to the circuit
2.Voltmeter is always connected in parallel to the Circuit
3.Head lights of a vehicle connected in parallel
4.House hold appliances are connected in parallel
5.Decation lamps are connected in series
6.In series connection, current is same
7.In parallel connection, potential difference is same

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## Equations

1) **1cal=4.186 J** 2) **$0^0$ C=273K** 3) **K=C+273** 4)**Q=mSΔT**
5) **1cal/g-$^0$C=4.186x103 J/kg-K**
6) Final or mixture temperature**(T)=$m_1$ $T_1$ +$m_2$ $T_2$ /($m_1$ +$m_2$ )**
7)Latent heat of fusion or Latent heat of Evaporation**(L)=Q/m**
8)Refractive index or Absolute refractive index**(n)=C/V**
9)Relative refractive index**($n_{21}$)=$n_2/n_1=v_1/v_2$**
10)Snell's law **$n_1$ sin i=$n_2$ sin r** 11) Critical angle, **Sin C=1/n12**
12)Refractive index of glass slab(n)=$\boldsymbol{\frac{Thickness\ of\ the\ glass\ slab}{(Thickness\ of\ the\ glass\ slab - Vertical\ shift)}}$
13) 1 micrometer=**$10^{-6}$ m** 14)Radius of curvature **( R)=2f**
15) Formula used at curved surface $\frac{n2}{v}-\frac{n1}{u}=\frac{(n2-n1)}{R}$
16)Formula used at plane surface $\frac{n2}{v}-\frac{n1}{u}=0$ $(OR)$ **n2/v=n1/u**
17)Lens formula $\frac{1}{f}=\frac{1}{v}-\frac{1}{u}$
18)Lens maker's formula $\frac{1}{f}=(n-1)(\frac{1}{R1}-\frac{1}{R2})$
19)Focal length of symmetrical converging lens (or) equi convex lens $f=\frac{R}{2(n-1)}$
20) Focal length of bi-convex lens $\frac{1}{f}=(n-1)\left(\frac{1}{R1}+\frac{1}{R2}\right)$
21)Focal length of plano-convex lens $f=\frac{R}{n-1}$
22) Focal length of symmetrical converging lens (or) equi convex lens $f=-\frac{R}{2(n-1)}$
23) Focal length of bi-convex lens $\frac{1}{f}=-(n-1)\left(\frac{1}{R1}+\frac{1}{R2}\right)$
24) Focal length of plano-convex lens $f=-\frac{R}{n-1}$
25) If person suffering from myopia, the focal length of the eye lens is **f= -D**
26) If person suffering from hypermetropia, the focal length of the eye lens $f=\frac{25d}{d-25}$
27)Power of the lens **(P)**=$\frac{1}{f}$ (f in metre)
28) Power of the lens **(P)**=$\frac{100}{f}$ (f in centimeter)
29) Refractive index of the prism**(n)**=$\frac{\sin(A+D)}{2}/\sin(\frac{A}{2})$
30)Electric current $I=\frac{Q}{t}$ 31)Potential difference $V=\frac{W}{q}$
32)Ohm's law equation $V=IR$ **3**3)Resistivity $\rho=\frac{RA}{l}$
34) Effective Resistance in series $R=R1+R2+R3$
35)Effective Resistance in parallel $\frac{1}{R}=\frac{1}{R1}+\frac{1}{R2}+\frac{1}{R3}$
36)Electric power $P=VI$ =$I^2R=V^2/R$
37)**Magnetic flux density(B)= Magnetic flux(Φ)/Area(A)**
38)Formula of magnetic flux when plane makes an angle with the magnetic field **Φ=BA cos ɵ**
39)Formula of magnetic flux when plane is perpendicular to the magnetic filed **Φ=BA**
40) Formula of magnetic flux when plane is parallel to magnetic field **Φ=0**
41)The force experienced by a charge moving in a magnetic making some angle is **F=qVB sinɵ**
42)The force experienced by a charge moving perpendicular to the field is **F=qVB**
43) The force experienced by a charge moving parallel to the field is **F=0**
44)If **ɵ** be the angle between direction of current and magnetic field ,then the force acting on the current currying wire is given by F=ILB sinɵ
45)The force acting on the current currying wire when direction of current is perpendicular to field is F=ILB
46) The force acting on the current currying wire when direction of current is parallel to field is F=0
48)Faraday law of induction of equation is ε=$\frac{\Delta\Phi}{\Delta t}$
49)Induced emf (ε)=B*l*V
50) Planck equation $E=hv$
51)Acid+Base→Salt+water

## Formulae

1)Bleaching poweder –CaOC$l_2$
2)Baking soda(Sodium hydrogen carbonate)-$NaHCO_3$
3)Washing Soda(Sodium Carbonate)-$Na_2CO_3.10H_2O$
4)Gypsum(Calcium sulphate)-$CaSO_4.2H_2O$
5)Plaster of paris(Calcium sulphate hemihydrates)-$CaSO_4.1/2H_2O$
6)Methane-$CH_4$
7)Urea- $CON_2H_4$
8) General formula of Alkanes-$C_nH_{2n+2}$
9) General formula of Alkenes-$C_nH_{2n}$
10) General formula of Alkynes-$C_nH_{2n-2}$
11)Stearic Acid-$C_{17}H_{35}COOH$

## Indicators-Colours

- Natural indicators- Blue and red litmus
- Synthetic indicators-Methyle orange and Phenolphthalein
  - Acid(HC*l*,$H_2SO_4$,$HNO_3$,$CH_3COOH$)-Blue litmus changes to Red colour
  - Base($NaOH$,$KOH$,$Mg(OH)_2$,$NH_4OH$)-Red litmus changes to Blue colour
  - Acid-Methyle Orange changes to red colour
  - Acid-Phenolphthalein changes to no colour
  - Base- Methyle Orange changes to yellow colour
  - Base- Phenolphthalein changes to pink colour

## *Dependable factors*

1)Heat- Nature of the substance,mass,change in Temperature
2)Specific heat-nature of the substance,Temperature
3)Evaporation-Surface area, temperature and amount of vapour already present in the surrounding air
4)Refractive index-Natural of material, Wave length of light used
5)Focal length of the lens-Surrounding medium
6) Focal length of eye's lens-Working of ciliary muscles
7)Resistance of the material-Nature of material, Temperature ,length and cross section area of the Material
8)Resistivity-Nature of the material and temperature

### Another Name

- Refractive index- Absolute refractive index
- Myopia-Near Sightedness
- Hypermetropia-Far sightedness
- Specific Resistance-Resistivity
- Magnetic flux density-Magnetic Induction – Magnetic field

## Scientists-Introduced the concept/Theory/Item

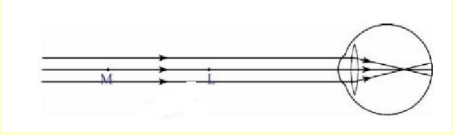
- $P^H$ Scale- Sorenson
- Scattering of light-Sir C.v.Raman
- Circular orbits and Principal quantum number-Bohr
- Elliptical Orbits and Angular momentum quantum number(*l*)-Sommerfeld
- Quantum theory –Max Planck
- The filling order of atomic orbitals-Moeller
- First classification of elements –Dobereriner
- Law of triads-Dobereriner
- Law of Octaves-Newland
- Electronegativity values for element on the basis of bond energies-Pauling
- The valence electrons in the atom of an element is depicated in a short form-Lewis
- Electronic theory of valence-Lewis and Kossel
- VSEPRT-Sidgwick and Powell
- The ratio of Sin i and sin r is constant-Snell's law
- The ratio between V and I is constant-Ohm
- Junction law and Loop law –Kirchhoff
- Buckminsterfullerene($C_{60}$)-Curl,Kroto and Smalley
- Nanotubes-Sumio Ii jima

## Uses/Applications

1)Specific heat capacity-Stabilising atmospheric temperature, water melon contain longer time cooling, Samosa contains ingredient with higher specific heat
2) $p^H$ in everyday life-Living organisms can survive only a narrow range of $p^H$, Tooth decay start lower than 5.5,Digestive system, $p^H$ of the soil
3)Bleaching Poweder-Textial industry,Oxidizing agent,Disinfecting drinking water, preparation of chloroform
4)Baking soda-Mild antiseptic, Soda-acid in fire extinguishers, Ingredient in antacids
5)Washing soda-Glass,soap and paper industries, manufacture of borax, cleaning agent, removing permanent hardness of water
6)Plaster of paris-Making toys,materials for decoration and for making surfaces smooth
7)Total internal reflection-Mirages, Brilliance of diamond, Optical fibres
8)Lens-Telescope, binoculars,cameras, Glasses
9)Myopia- use Concave lens
10) Hypermetropia-use Convex lens
11)Presbyopia-Use bi-focal lens
12) Kirchhoff's laws-Any DC circuit containing batteries and resistors connected in any way
13)Fuse- Save the house holding wiring and devices by using Fuses, prevent damages due to overloading
14)Faraday's law induction-Security checking,Tape recorder,ATM machines, Induction stove, Electrical generators

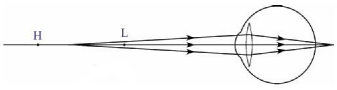
## Identify

1



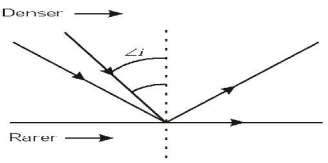

Identify the eye defect from the given figure

2



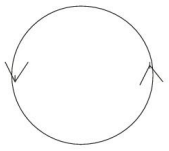

Identify the eye defect from the given figure

3



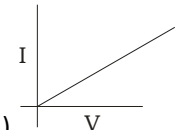

Identify the phenomenon

4



Write the direction of the current from the given figure

5




What type of material indicates given figure

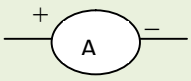
6

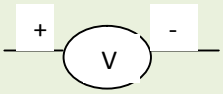
Identify the light phenomenon involved this figure

## Symbols

1.Convex lens 

2.Concave lens 

3.Ammeter 


4.Voltmeter 


5.Resistace — 

**Visit: srini science mind**

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