General Studies : General Science

All about Vitamins

MINERALS	ALTERNATIVE NAME	DEFICIENCY DISEASE
Vitamin A	Retinol	Night blindness
Vitamin B1	Thiamine	Beri-Beri
Vitamin B2	Riboflavin	Extreme and unusual sensitivity to light
Vitamin B3	Niacin/ Nicotinic acid	Pellagra
Vitamin B5	Pantothenic acid	Irritability, fatigue, tiredness, and apathy.
Vitamin B6	Pyridoxine	Responsible for protein in metabolism, formation of blood; found in all food grains
Vitamin B7	Biotin	Dermantitis
Vitamin B9	Folic Acid	Megalonlastic anaemia Pernicious / Megaloblastic anemia
Vitamin B12	Cobalamine	Scurvy
Vitamin C	Ascorbic acid	Rickets, Osteomalacia
Vitamin D	Calcipherol	Animals' sterility (Reproduction capacity reduces)
Vitamin E	Tocopherol	Hemorrhage
Vitamin K	Phillioquine	Tetany and Rickets
Calcium	Ca	Tetany and Rickets
Phosphorous	P	Disturbed Protein metabolism
Sulphur	S	Nervous disorder
Potassium	K	Nervous, depression, PH disbalance
Sodium	Na	Loss of appetite muscle camps
Chlorine	Cl	Irregularity of metabolism
Magnesium	Mg	Anaemia and low immunity
Iron	Fe	Weak immunity ,fertility
Zinc	Zn	Anaemia
Cobalt	Co	Goitre
Iodine	I	

Facts About Animal Cell

- Robert Hook was the first to coin the term **'Cell'**
- Cell is defined as structural and functional unit of the body

PROTOPLASM

- It is the **living substance** of the cell. It is a viscous, colourless fluid and is the **seat for all physiological functions.**

ENDOPLASMIC RETICULUM

- The endoplasmic reticulum is a network of membranes found throughout the cell and connected to the nucleus. The membranes are slightly different from cell to cell and a cell's function determines the size and structure of the ER

RIBOSOMES

- They are the **smallest organelles of the cell**
- **Ribosomes** are the **site of protein synthesis in the cell**

GLOGI COMPLEX (DICTYOSOMES)

- The **main function** of Golgi complex is **cell secretion** e. it packs and transports certain materials like **proteins** and **polysaccharides** out of the cells.
- It is involved in the **formation of primary lysosmes**

MITOCHONDRIA

- Mitochondrion are called '**power house of the cell'.**

PLASTIDS

The plastids are of three types :-

1. Leucoplast
2. Chromoplast
3. Chloroplast

- **Leucoplasts** are colourless plastids, found in the **underground parts of plants** which are not exposed of light.
- **Chromoplasts** are orange, yellow or red coloured plastids found in petals, fruits and roots in certain higher plants. The **red colour of ripe tomatoes** is the result of Chromoplasts which contain the red pigment lycopene
- **Chloroplasts** are the most important and most common plastids found in all the **photosynthesising cells** except prokaryotes. Blue-green algae however, lacks chloroplasts

LYSOSOMES : are also called suicidal bags as when these are injured by a toxic substance, the enzymes thus released can digest the whole cell.

Some facts about Biology :

- Length of Alimentary Canal Approximately- **8 metres.**
- BMR (Basal Metabolic Rate) – **1600 K. Cal / day.**
- Number of Cells in Body **75 trillion**
- Longest Bone **Femur (Thigh bone).**

- Weight of Brain : **1400 gms**
- Blood Volume **6.8 litres (in 70 kg body)**
- Normal B.P **120 / 80 mm Hg**
- Number of R.B.C **(a) In Male : 4.5 – 5.0 million / cubic mm.(b) In Female : 4.0 – 4.5 million / cubic mm**
- Life Span of R.B.C : **120 days**
- Normal W.B.C Count 5000 – **1000 / cubic mm**
- Life Span of W.B.C : **3 – 4 days**
- L.C. (Differential Leucocyte Count)
- (a) Basophils : 0.5 – 1%
- (b) Eosinophils : 1 – 3%
- (c) Monocytes : 3 – 8%
- (d)Neutrophils : 40 – 70%
- (e) Lymphocytes : 2 – 25%
- Blood Platelets Count : **2,00,000 – 4,00,000 / cubic mm**
- Haemoglobin (a) In Male : 14 – 15.6 gm / 100 c.c. of blood(b)In Female : 11 – 14 gm / 100 c.c. of blood
- Hb Content in Body **500 – 700 gm**
- Universal Blood Donor: **O Rh -ve**
- Universal Blood Recipient : **AB**
- Blood Clotting Time: **2 – 5 minutes**
- Average Body Weight: **70 kg**
- Normal Body Temperature : **98.4° F or 37° C**
- Breathing Rate : **16 – 20 / minute**
- Dental Formula Adult : **2123 / 2123 = 32;**
- Child : **22 Milk Teeth**
- Largest Endocrine Gland : **Thyroid**
- Gestation Period 9 months **(253 – 266 days)**
- Normal Heart Beat" **72 – 75 / minute**
- Largest Gland : **Liver**
- Largest Muscle in the Body **Gluteus maximus (Buttock Muscle)**
- Largest Artery: **Abdominal Aorta**
- Largest Vein: **Inferior Venacava**
- Largest W.B.C : **Monocyte**
- Smallest W.B.C : **Lymphocyte**
- Longest Nerve : **Sciatic**
- Longest Cell : **Neuron (Nerve Cell)**

- Menstrual Cycle : **28 days**
- Menopause Age : **45 – 50 Years**
- Minimum Distance for proper vision : **25 cm**
- Pulse Rate **72 / minute.**
- Normal Sperm Count **200 – 350 million / ejaculation.**
- FSR (normal Erythrocyte Sedimentation rate) **4 – 10 min / hr**
- pH of Gastric Juice : **1.4**
- pH of Urine : **6.0**
- pH of Blood: **35 – 7.45**
- pH of Bile : **7.5**
- pH of Pancreatic Juice : **8.5**
- Total Number of Muscles in the Body: **639**
- Total Number of Bones in the Body : **206**
- Largest Organ of Human Body: **Skin**
- 70% of human body consists of water
- Bitter taste buds located at the mid of the tongue
- Sweet taste buds located at the tip of the tongue
- Sour/salt taste buds located at either side of the tongue

All about Human Blood

Blood is a fluid connective tissue. It is 6.8 litres in man and 500 ml less in woman. 6 – 8% of body weight (pH 7.4).

Blood is made up of :

Red Blood Corpuscles (RBC)

- Also called Erythrocytes, disc – shaped (for increased Surface Area), no nucleus contains a pigment called Haemoglobin, which gives blood its Red Color.
- Life of RBC is 120 days after which they are broken down in spleen or liver.

White Blood Corpuscles (WBC)

- Also called Leucocytes, rounded, with a nucleus, far less numerous than RBCs (1 : 400 – 500) (5,000 – 10,000 / cu mm), life 3 – 4 days, soldiers of body's defence system.

Platelets

- Also called Thrombocytes, formed in bone marrow, about 250,000 / cu mm of blood, life 3 – 7 days, sets off blood clotting.

Plasma (65% of total blood)

- Plasma transports nutrients from the small intestine to the body tissues, and return the waste material to the kidneys, where it is filtered out.

- Regulates pH of blood.

Blood Groupings:

- Father of Blood Grouping: Karl Landsteiner (Australian pathologist). He discovered A, B and O blood groups in 1900.

Possible Blood Groups:

Parents' Blood Types	Possible Children	Impossible
A & A	A, O	B, AB
A & B	A, B, AB, O	none
A & AB	A, B, AB	O
A & O	A, O	B, AB
B & B	B, O	A, AB
B & AB	A, B, AB	O
B & O	B, O	A, AB
AB & AB	A, B, AB	O
AB & O	A, B	AB, O
O & O	O	A, B, AB

List of Diseases caused by Bacteria

DISEASES	CAUSED BY	MODES	EFFECTS
Diphtheria	Pathogenic (disease **causing**) bacterium Corynebacteriumdiphtheriae (C. diphtheriae).	Contact	Throat, respiratory System
Pneumonia	Diploccocus	Contact	Pain in chest, Jaundice
TB	Mycobacterium	Contact	Lungs (fever in evening and loss of wt.)
Plague/Bubonic Plague	Short rod (Yesinia)	Rats	Lymph
Tetanus(lockjaw)	Clostridium	Through Wounds	Muscles
Typhoid (Enteric Fever)	Salmonella	Files and Food	Low fever, Headache; Nausea, vomiting, diarrhea, stomach pain; or mild skin rash.

Cholera	Vibrio	Flies AND Foods	Muscular Cramps, Stoppage of urine(Kidney)

List of Diseases caused by Viruses

DISEASES	CAUSED BY	MODES	EFFECTS Skin Skin air or skin Lungs Skin, respiratory
Small pox	Variola Varicella	Direct contact	
Chicken pox	Rhino Virus	Contact	Tract Salivary glands, ears,
Cold	Orthiomixo	Contact	jaws Brain
Influenza	Paramyxo	Contact	Paralysis (Brain) Paralysis,
Measles (Rubella)	Paramyxo	Contact	
Mumps	Encephalitis	Contact	Death, insomnia
Viral	(Arbovirus) Enterovirus	Domestic Animals	
Polio		Contact, food,	
Rabies (Hydrophobia)	Rhabdovirus	houseflies &water	
Dengue (Break-Bone)	Arbovirus	Mad dog	
AIDS	Human T-cell Leukamia	Aecies(Mosquito) bite	
	Virus(HTLV-3) Lav(Retrovirus) AVR	Besides other, Hemophiliacs, Promiscuous indi.	

Commonly used Chemicals in Everyday Life

COMPOUND	COMPOSED OF	FORMULA	USE
Baking powder	Sodium Bicarbonate	NaHCO3	For bug bites and bee stings
Baking soda	Sodium Bicarbonate	NaHCO3	Fire Extinguishers, Baking soda
Bleaching powder	Calcium hypochlorite/ chloride of lime	CaOCL2	For water treatment
Caustic soda	Sodium Hydroxide	NaOH	Manufacture of pulp and paper, textiles, drinking water, soaps and detergents
Chalk (Marble)	Calcium Carbonate	CaCO3 CHCL3	For raising pH in soils
Chloroform	Tri-Choloro Methane	CO2 FeSO4.	For sleep and anesthetic
Dry Ice	Solid carbon dioxide	7H2O	To keep things frozen
Green Vitriol	Ferrous sulphate		Mordant for varying the colors of natural dyes and iron gall ink.
Gypsum		CaSO42H2O	Added to Cement to increase its setting time
Laughing gas	Nitrous oxide	N2O	Surgical, food service
Lime	Calcium oxide	CaO	Basic lining in furnaces
Lime Stone	Calcium carconate	CaCO3	Soil conditioner to neutralize acidic soils
Mohr's Salt	Ammonium Ferrous Sulphate	FeSO4(NH4) 2SO4. 6H2O	Common laboratory reagent.
Plaster of Paris		(CaSO4) 2H2O	Fractured bones. Fine proofing

Potash Alum	Potassium Aluminium Sulphate	K2SO4AL2(SO4)3. 24H2O	water purification, leather tanning, dyeing, fireproof textiles
Potash Ash	Potassium carbonate	K2CO3	To manufacture soap, glass, and even gunpowder.
Quick Lime	Calcium oxide	CaO	To remove acidic acids
RDX		C3H6N6O6	Military and industrial applications
Rock Salt	Sodium chloride	NaCL	For making ice cream, Food
Silica		SiO2	Exists in sand, Flint, Quartz, Opal
Sodium Thiosulphate	(hypo)	S2O32-	Used in photography
Vinegar	Acetic Acid	CH3COOH	Cleaning purpose
Washing soda	Sodium Carbonate	Na2CO3. 10 H2O	Softening hard water

Alloys and different types of fuel

ELEMENT	**ITS ALLOYS**	**ITS COMPONENTS** Al + Mn + Cu +
Aluminium	Duralium Magnalium Alnico	Manganese Al + Magnesium AL + Ni + Cu + Fe (Ni is nickel)
Iron (Fe)	Steel Stainless Steel	Fe + C (c is carbon) Fe + Cr + Ni + C (Cr is chromium)
Copper (Cu)	Brass Bronze German silver Munz metal Gun Metal	Cu + Zn (Zn is zinc) Cu + Tn (brown Tn) Cu + Zn + Ni (no silver in German silver) Cu+Zn Cu+Sn+Zn
Lead (Pb)	Solder	Pb + Sn
Tin (Sn)	Rose metal	Pb + Sn + Bi

Some Important Fuels:

Fuel Biogas	**Chemical Formula**
Coke gas	Methane+Co2+Hydrogen+Nitrogen
Liquid fuel	CH+ H + CO Liquid H2
LPG Mustard	Butane+Propane War gas
gas Natural	Methane+Ethane CH4+C2H4+C2H2
gas Oil gas	N2+ CO Nerve gas Hydrazine
Producer gas	Insulating material H2+ CO
Sarin gas	
Solid fuel	
Teflon Water gas	

Some Metal and it's Ore :

Metal	Ore Bauxite, Corundum, felspar, Cryolite, Kaolin
Aluminium (Al)	Stibnite
Antimony (Sb)	Barite, Witherite
Barium (Ba)	Beryl
Beryllium (Be)	Greenockite
Cadmium (Cd)	Chalk, Quicklime, Calcite, Dolomite, Gypsum, Asbestus,
Calcium (Ca)	Flurospar Chromite
Chromium (Cr)	Malachite, Chalcocite, Chalcopyrite, Cuprite
Copper (Cu)	Quartz, Calaverite, Silvenites
Gold (Au)	Hematite, Magnetite, Lemonite, Copper pyrites
Iron (Fe)	Galena, Cerrusite
Lead (Pb)	Magnesite, Dolomite, Epsom salt, Carnalite
Magnesium (Mg)	Pyrolusite
Manganese (Mn)	Cinnabar
Mercury (Hg)	Pentlandite, Milarite
Nickel (Ni)	Carnalite, Sylvite, Potash, Nitre
Potassium (K)	Argentite
Silver (Ag)	Rock Salt, Trona, Borax
Sodium (Na)	Strontianite, Silestine
Strontium (Sr)	Monazite Cassiterite
Thorium	Wolframite, Scheelite Uraninite Zincite, Ferulinite ,
Tin (Sn)	Calamine
Tungsten (W)	
Uranium (U)	
Zinc (Zn)	

Source of Acids

Acid	Source Vinegar Lemon,
Acetic acid	Orange, Grapes Red ant
Citric acid	Stomach Milk Unripe
Formic acid	apple Tomato Tamarind
Hydrochloric acid	
Lactic acid	
Maleic acid	
Oxalic acid	
Tartaric acid	

Various Scientific Disciplines

• **Acarology :** Branch of zoology dealing with ticks and mites.

• **Acoustics :** The study of sound (or the science of sound).

• **Aerodynamics :** The branch of mechanics that deals with the motion of air and other gases; the study of the motion and control of solid bodies like aircraft, missiles in air.

• **Aeronautics :** The science or art of flight.

• **Aerostatics :** The branch of statics that deals with gases in equilib¬rium and with gases and bodies in them.
• **Anatomy :** The science dealing with the structure of animals, plants or human body.
• **Anthropology :** The Science that deals with the origin and physical and cultural development of mankind.
• **Arboriculture :** Cultivation of trees and vegetables.
• **Archaeology :** The study of antiquities.
• **Astronautics :** The science of space travel.
• **Astronomy :** The study of the heavenly bodies.
• **Astrophysics :** The branch of astronomy concerned with the physical nature of heavenly bodies.
• **Biometry :** The application of mathematics to the study of living things.
• **Bionics :** The study of functions, characteristics and phenomena ob¬served in the living world and the application of this knowledge to the world of machines.
• **Biophysics :** The physics of vital processes (living things).
• **Botany :** The study of plants.
• **Cardiology :** A branch of medicine dealing with the heart.
• **Cytochemsitry :** The branch of cytology dealing with chemistry of cells.
• **Cytogenetics :** The branch of biology dealing with the body of heredity from the point of view of cytology and genetics.
• **Cytology :** The study of cells, especially their formation, structure and functions.
• **Dactylography :** The study of fingerprints for the purchase or identification.
• **Dactylology :** The study of fingerprints.
• **Dandrology :** Science dealing with study of trees.
• **Dietetics :** Science dealing with study of diet and nutrition.
• **Epidemiology :** The branch of medicine dealing with communicable diseases.
• **Epigraphy :** The study of inscriptions.
• **Epistemology :** Study of the nature of knowledge.
• **Eugenics :** The study of the production of better offering by the care¬ful selection of parents.
• **Genesiology :** The science of generation.
• **Geology :** The science that deals with the physical history of the earth.
• **Geomedicine :** The branch of medicine dealing with the influence of climate and environmental conditions on health.
• **Geomorphology :** The study of the characteristics, origin and devel¬opment of landforms.
• **Gynaecology :** Dealing with female diseases of the reproductive sys¬tem.
• **Haemetology :** Relating to study of blood and blood disorders.
• **Hepatology :** Branch of medicine relating to study of liver and its diseases-
• **Metallography :** Study of the crystalline structures of metals and alloys.
• **Meteorology :** Science of the atmosphere and its phenomena.

• **Metrology :** Scientific study of weights and measures, bacteria, molds and pathogenic protozoa.
• **Minerology :** Study of distribution, identification and properties of minerals
• **Mycology** - Study of fungi.
• **Myology** - Study of muscles.
• **Nephrology** - Study of kidneys.
• **Neurology** - The branch of medicine dealing with the nervous system and its disorders
• **Nuclear Physics** - The branch of physics concerned with the nucleus of the atom
• **Numismatics** - Study of coins and medals.
• **Obstetrics** - Branch of medicine dealing with pregnancy.
• **Oceanography** - Study of the earth's oceans and their interlinked ecosystems and chemical and physical processes
• **Omithology** - Study of birds.
• **Oneirology** - Study of dreams.
• **Ophthalmology** - Study of eyes .
• **Organic Chemistry** - The branch of chemistry dedicated to the study of the structures, synthesis, and reactions of carbon-containing compounds
• **Ornithology** - The study of birds
• **Osteology** - Study of bones.
• **Paleontology** - The study of life-forms existing in former geological time periods
• **Pathology** - Study of disease causing organisms.
• **Pedology** - Stydy of soils.
• **Petrology** - The branch of geology that studies the origin, composition, distribution and structure of rocks
• **Philately** - Study of Stamp collecting.
• **Philology** - Study of languages.
• **Phonetics** - Concerning the sounds of a language.
• **Phycology** - Study of algae.
• **Physics** - The study of the behavior and properties of matter
• **Physiography** – Study of Natural phenomenon.
• **Physiology** - The study of the mechanical, physical, and biochemical functions of living organisms
• **Pisciculture** - Study of Breeding, Rearing, and Transplantation of Fish
• **Pomology** - Study of fruits.
• **Psychology** - Study of the mind and behaviour
• **Radiology** - The branch of medicine dealing with the applications of radiant energy, including x-rays and radioisotopes
• **Seismology** - The study of earthquakes and the movement of waves through the earth
• **Sericulture** – Study of Production of Raw Silk by rearing of Silk Worms
• **Serpentology** - Study of snakes.
• **Taxonomy** - The science of classification of animals and plants

• **Telepathy** - Communication between two minds at a distance with the help of emotions, thoughts and feelings.
• **Thermodynamics** - The physics of energy, heat, work, entropy and the spontaneity of processes
• **Toxicology** - The study of poisons and the effects of poisoning
• **Virology** - Study of virus.

Waves

A wave is a disturbance which propagate energy from one place to another place.

Two Types:

Mechanical waves : Require medium for propagation

i.Longitudinal waves ii. Transverse waves

Electromagnetic waves : Do not require medium for propagation

i.Wavelength range = 10-4 m to 104 m

ii.Light and geat are examples of electromagnetic waves

Sound waves :

It is longitudinal mechanical waves(20Hz to 20000Hz => audible sound waves)

Less than 20Hz : Infrasonic

Greater than 20000 : Ultrasonic(Bat and Dolphins are generating ultrasonic waves to find their path)

Speed of sound maximum in solids and minimum in gases

Speed of sound in air: 332 m/s, water : 1483 m/s

Speed of sound remain unchanged by the increase or decrease pressure

Mach number :

The ratio of velocity of source to velocity of sound

Subsonic : Mach No <1

Supersonic: Mach No >1

Hypersonic : Mach No >5

Different Types of Rays

INCREASING WAVELENGTH

Cosmic Rays Gamma Rays X Rays UV Visible Rays Infra Red Microwave Radio

- Cosmic rays – it originates in outer space and continuously falls on earth.
- Ultra Violet Rays – invisible + Sun's rays have it.
- Infra red – High Thermal effects.
- Micro – Telephone circuits and radar.
- Radio – used for Broad Casting.
- VIBGYOR (Max. Wavelength of Red colour)

Important Definition & Laws :

Force :

A force has both magnitude and direction, making it a vector quantity. It is measured in the SI unit of newtons and represented by the symbol F. The original form of Newton's second law states that the net force acting upon an object is equal to the rate at which its momentum changes with time.

F = ma

Centripetal Force :

A centripetal force is a force that makes a body follow a curved path

Centrifugal force :

Centrifugal force is a force, arising from the body's inertia, which appears to act on a body moving in a circular path and is directed away from the centre around which the body is moving.

Newton's law of motion :

First Law :

Newton's first law states that every object will remain at rest or in uniform motion in a straight line unless compelled to change its state by the action of an external force. This is normally taken as the definition of inertia.

Second law:

The rate of change of momentum of a body is directly proportional to the impressed force and takes place in the direction of the force.

So, F= dp/dt or F = ma

Third Law:-

To Every action there is an equal and opposite reaction.

FAB = - FBA

Newton's Law of Cooling states that the rate of change of the temperature of an object is proportional to the difference between its own temperature and the ambient temperature

kinetic energy :

kinetic energy is the **energy** that it possesses due to its motion. It is **defined** as the work needed to accelerate a body of a given mass from rest to its stated velocity.

K.E. = 1/2 **m v**2. Where m = mass and V = velocity

Potential energy :

Potential energy is energy possessed by a body by virtue of its position relative to others, stresses within itself, electric charge, and other factors.

P.E = mgh, where g = gravity, h = height above surface

Law of conservation of energy :

The law of conservation of energy states that the total energy of an isolated system remains constant—it is said to be conserved over time. Energy can neither be created nor destroyed; rather, it transforms from one form to another.

Power :

Rate of doing work by a body is called power

P = Workdone/Time = w/t watt

1 W = 1 J/2

1 horse power = 746 W

Gravitational Force :

It is the weakest force and attractive in nature

F_G= GM m/r2 , G = 6.673 x10-11 nm/kg^2 ^{2}

The value of gravity at the surface of the earth is (g)9.8 m/s2.The value of g is maximum on the surface of the earth

Kepler's three laws of planetary motion :

- The path of the planets about the sun is elliptical in shape, with the center of the sun being located at one focus. (The Law of Ellipses)
- An imaginary line drawn from the center of the sun to the center of the planet will sweep out equal areas in equal intervals of time. (The Law of Equal Areas)
- The ratio of the squares of the periods of any two planets is equal to the ratio of the cubes of their average distances from the sun. (The Law of Harmonies)

Pascal's law :

Pascal's law states that when there is an increase in pressure at any point in a confined fluid, there is an equal increase at every other point in the container.

Archimedes Principle :

The archimedes principle a law stating that a body totally or partially immersed in a fluid is subject to an upward force equal in magnitude to the weight of fluid it displaces.

Bernoulli's principle :

Bernoulli's principle states that an increase in the speed of a fluid occurs simultaneously with a decrease in pressure or a decrease in the fluid's potential energy

$$\frac{1}{2}\rho v^2 + \rho g z + p = \text{constant}$$

Doppler effect :

The Doppler effect (or the Doppler shift) is the change in frequency of a wave (or other periodic event) for an observer moving relative to its source.

Law of thermodynamics

- The first law, also known as Law of Conservation of Energy, states that energy cannot be created or destroyed in an isolated system.
- The second law of thermodynamics states that the entropy of any isolated system always increases.
- The third law of thermodynamics states that the entropy of a system approaches a constant value as the temperature approaches absolute zero.
- The zeroth law of thermodynamics states that if two thermodynamic systems are each in thermal equilibrium with a third, then they are in thermal equilibrium with each other.

Ohm's law :

This law stating that electric current is proportional to voltage and inversely proportional to resistance.

Stefan Law :

Stefan–Boltzmann law, statement that the total radiant heat energy emitted from a surface is proportional to the fourth power of its absolute temperature.

Law of refraction :

Snell's law is a formula used to describe the relationship between the angles of incidence and refraction, when referring to light or other waves passing through a boundary between two different isotropic media, such as water, glass, or air

Sin i/Sin r = μ2 / μ1

Total Internal Reflection:

The complete reflection of a light ray reaching an interface with a less dense medium when the angle of incidence exceeds the critical angle.This is the working principle of Optical fibre.

Coulomb's law :

The electrical force between two charged objects is directly proportional to the product of the quantity of charge on the objects and inversely proportional to the square of the separation distance between the two objects.

Boyle's law :

The pressure of a given mass of an ideal gas is inversely proportional to its volume at a constant temperature. PV = k

Charle's law :

The volume of an ideal gas at constant pressure is directly proportional to the absolute temperature.

Avogadro's law :

Equal volumes of gases at the same temperature and pressure contain equal numbers of molecules.

Graham's law of diffusion :

The rate of effusion of a gas is inversely proportional to the square root of either the density or the molar mass of the gas.

De broglie concept :

Every matter posses dual nature(wave as well as particle)

Heisenberg uncertainty principle :

It is impossible to determine the simultaneously the exact position an exact momentum of an electron

List of Indian Missiles with Range

SURFACE TO SURFACE MISSILES:

- Prithvi-I: (Range: 150 km, Payload: 1000 kg, User: Army)
- Prithvi-II: (Range: 250 km – 350 km, Payload: 500 kg – 1000 kg, User: Air Force, Army)
- Prithvi-III:(Range: 350 km – 600 km, Payload: 250 kg – 500 kg, User: Army, Air Force, Navy)
- Agni-I:(Range: 700 – 1,200 km, Type: Medium Range Ballistic Missile (MRBM), User: Army, Air Force)

INTERMEDIATE RANGE BALLISTIC MISSILES (MRBM):

- Agni-II: (Range: 2,000 – 2,500 km, User: Army, Air Force)
- Agni-III: (Range: 3,000 – 5,000 km, User: Army, Air Force)
- Agni-IV: (Range: 2,500 – 3,700 km, User: Army, Air Force)

INTERCONTINENTAL BALLISTIC MISSILES (ICBM):

- Agni-V: (Range: 5,000 – 8,000 km, User: Army, Air Force)
- Agni-VI: (Range: 8,000 – 10,000 km, User: Army, Air Force)

A FEW MORE IN THE LIST ARE AS FOLLOWS:

- K-15: (Range: 750 km, Weight: 10 tonne, Warhead: 1 tonne, length: 10 m)
- K-4: (Range: 3,500-5,000 km, Weight: 17 tonnes, Warhead: 1 tonne – 2.5 tonnes, length: 10 m)
- K-5: (Range: 6,000 km, Weight: Unspecified, Warhead: 1 tonne, length: Unspecified)
- BrahMos: (Type: Supersonic, Range: 290 km, Status: Inducted)
- Shaurya; (Type: Hypersonic, Range: 1000-1800 Km, Status: Inducted)
- SRSAM; (Type: Hypersonic, Range: 15 Km, Status: Inducted)
- Pinaka: (Range: 40 km, Status: Inducted)
- Nag: (Range: 4km, Status: Induction)
- Akash: (Range: 30 Km , Status: Inducted)
- MRSAM: (Range: 70 km, Used: Air force)

SI Derived Units

Area Volume Speed, Velocity	Square Meter
Acceleration Wave Number Mass	Cubic Meter
Density Specific Volume Current	Meter Per Second
Density Magnetic Field Strength	Meter Per Second Squared
Amount-Of-Substance Concentration	Reciprocal Meter
Luminance Plane Angle Solid Angle	Kilogram Per Cubic Meter
Frequency Force Pressure, Stress	Cubic Meter Per Kilogram
Energy, Work, Quantity Of Heat Power,	Ampere Per Square Meter
Radiant Flux Electric Charge, Quantity	Ampere Per Meter
Of Electricity Electric Potential	Mole Per Cubic Meter
Difference,	Candela Per Square Meter
Electromotive Force	Radian (A)
Capacitance	Steradian(A)
Electric Resistance	Hertz
Electric Conductance	Newton
Magnetic Flux	Pascal
Magnetic Flux Density	Joule
Inductance	Watt
Celsius Temperature	Coulomb
Luminous Flux	Volt
Illuminance	Farad
Activity (Of A Radionuclide)	Ohm
	Siemens
	Weber
	Tesla
	Henry
	Degree Celsius
	Lumen
	Lux
	Becquerel
Absorbed Dose, Specific Energy (Imparted), Kerma	Gray
Dose Equivalent (D)	Sievert
Catalytic Activity	Katal