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CIVIL ENGINEERING E-TEXTBOOKS AND

GATE MATERIALS, NOTES

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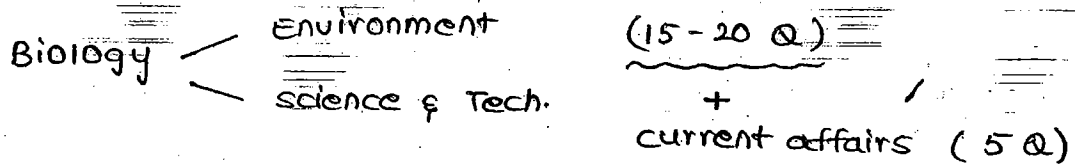
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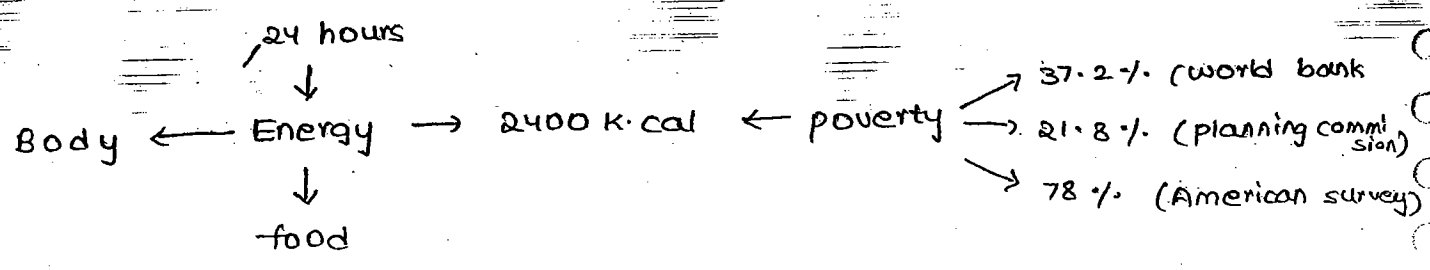CIVIL ENGINEERING STUDENTS AND GRADUATES

GENERAL SCIENCE

A₃ - Civil

Biology
- Environment
- Science & Tech.

(15 - 20 Q)
+
current affairs (5 Q)

Biology syllabus :-

* 1. Human physiology (4 - 6 Q)

    a. Nutrition Diet (or) Balanced Diet.

2. Human Blood (or) Blood groups (1 Q)

3. Human skeleton system (1 Q)

4. Human Digestive system (2 Q)

    a. Enzymes

5. Heart and Circulatory system of Blood (1 Q)

6. Human Excretory system (1 Q)

7. Human eye (1 Q)

* 8. Human Disease (4 - 6 Q)

9. Animal kingdom ⎤
                ⎬ (2 - 3 Q)
10. Plant kingdom ⎦

11. Bio - Technology (1 Q)

20-10

UNIT – I

NUTRITION (or) BALANCED (or) COMPOSITION OF DIET [4-6Q]

24 hours

Body ← Energy → 2400 K·cal ← poverty → 37·2·/. (world bank
→ 21·8·/. (planning commission)
→ 78·/. (American survey)

↓
food

N·I·N – National Institute of Nutrition is located in India at Hyderabad.

Balanced diet :-

1. Carbohydrates
2. Fats / Lipids   → Macro food (or) energy food (or) major food
3. proteins
4. Minerals   → Micro food (or) Minor food (or) No energy
5. vitamins   Both are essential for Metabolic action.
6. Fibres
7. water

Vitamins :-

They did not produce any energy but it is essential for till death

100·/. = 2400 K·cal

1. Carbohydrates :-

1. It produces 50·/. energy to the body

2. Carbohydrates consists of carbon, hydrogen and oxygen elements

3. carbohydrates taste sweet taste

4. 1 gm carbohydrate → 4·2 K·cal energy

Sources of carbohydrates:-

1. "Whole Grains"

Rice, wheat, Maize, soyabeans, potato, bread

→ "potato and wheat" having a high carbohydrates.
   (vegetable)   (grain)
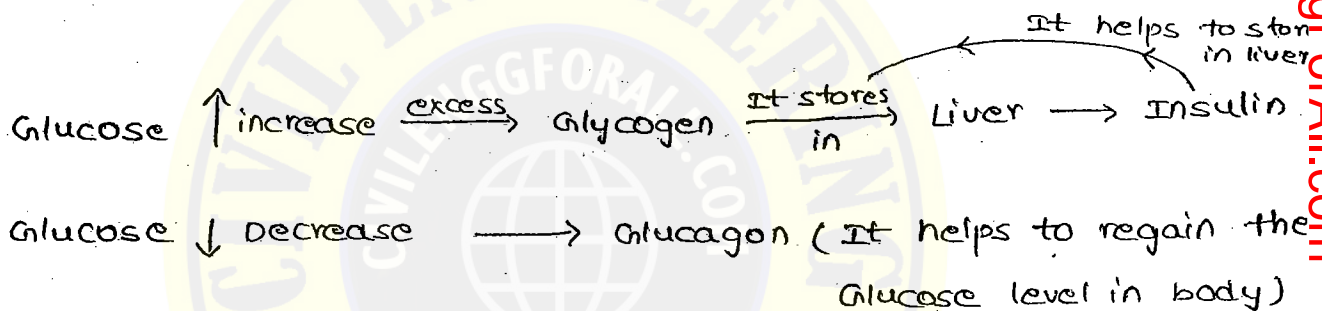
→ sweet potato having a rich carbohydrates.

Types of carbohydrates:-

1. Mono Sacchrides :-

1. Mono means single, - sacchrides means sugar

2. Easy dissolves in the water

EX:- 1. Glucose

Glucose ↑increase $\xrightarrow{\text{excess}}$ Glycogen $\xrightarrow[\text{in}]{\text{It stores}}$ Liver ⟶ Insulin

It helps to store in liver

Glucose ↓ Decrease ⟶ Glucagon (It helps to regain the Glucose level in body)

2. ⇒ "Fructose" is the sweetest sugar on the earth

Fructose is a natural sugar available in all fruits.

3. Galactose

2. Di - Sacchrides :-

1. Di means Dual, sacchrides means sugar.

Ex:- Maltose

1. It is a malt sugars

2. Maltose is used in alcohol products

3. All soft drinks are made by Maltose

4. Maltose comes from Glucose + Glucose

5. Maltose are carbonated sugars.

Sucrose:-

1. It is called sugarcane sugars

2. Sucrose = Glucose + Fructose

Lactose:-

1. It is called Milk sugars

2. Lactose = Glucose + Galactose

3. Milk is a complete diet

4. Milk appears white in the presence of ~~carbohydrates~~ Lactose

** 5. Milk is produce due to "Fat Emulsification" in animal.

6. The milk production will be more in "winter".

7. Iron and calcium are present in Milk.

8. "Lacto bacillus" bacteria which converts milk into curd

9. /

Poly - sacchrides:-

1. poly means Many, sacchrides means sugar.

2. This are not dissolve in water.

Ex:- Starch, Glycogen, Cellulose,
↓ ↓
plant food animal food

** cellulose:-

1. All animals can digest this food except humans.

2. paper, wood, Grass are made of cellulose.

→ All sports persons for instant energy they must take carbohydrates before entering into play ground.

FATS:-

1. These are essential only 12%.

2. Fats consists of carbon, oxygen, Hydrogen

3. 1 gm fat gives 9.3 k.cal energy

4. Excess fats are stored at adipose cells under the skin (or) beneath the skin.

Uses:-

1. Healthy skin ⎫
2. Healthy hair ⎬ "Good fat"
3. Healthy Nails ⎭

4. Excess fats are converted into vitamin-D by sunrays

Epidermis ~~~~~~~
Endo dermis ――――― ← fat converts vitamin-D

Types of fats:-

1. Satturated fatty acids → not essential for the human body

2. Unsatturated fatty acids → essential for the human body.

3. Trans fats → very dangerous for the human body.

→ sa Groundi Ground nut oil, Mustard oil, castor oil contains saturated fatty acids.

→ sunflower oil, corn oil, soyabean oil contain unsatturated fatty acids.

→ Vanaspathi Ghee (or) Dalda, Meat, chicken, Bakery food all are Trans fatts.

Good fats (or) cholestrol:-

1. Fish meat → It dilutes bad cholestrol

2. Meckerol, Tuna → Omega-3 fatty acids

3. Almonds

PROTEINS :-

1. proteins contain <u>carbon, Hydrogen, oxygen,</u> <u>Nitrogen, Sulphur.</u>

 ⇒ proteins are tissue repair food
 (or)
 Body building food

2. Below 14 years children essential for proteins (Growth of children)

3. Nitrogen is a tissue growth.

4. Growth, Antibodies, Haemoglobin, Anti - cance Agent

5. 1 gm of protein gives 4.2 K.cal.

sources of proteins :-

1. spirulina ⎫
             ⎬ 60 to 70% of proteins
2. chlorilla ⎭

3. Algae

4. soyabeans → carbohydrates and proteins.

5. Meat ⎫
        ⎬ 50% of proteins
6. Eggs ⎭

7. Nuts

8. Mushrooms

9. pulses. } 50% of proteins

protein deficiency disease :-

1. Marasmus → Lack of hair baby born

2. kwashiyarkar

Different types of proteins :-

1. Casseine → Milk protein

2. Albumine → egg protein

3. Albumine, Globuline → Blood plasma

4. Haemoglobin → Red Blood cells
 Iron   protein

egg diagram: yolk - cholestrol, egg, Albumine, CaCO₃, calcium phosphorous
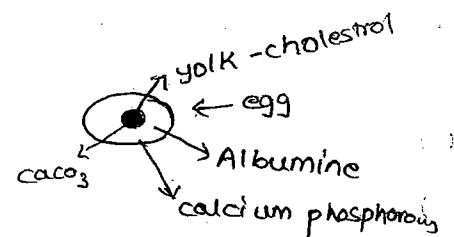
6. Keratine $\longrightarrow$ Horns, Hairs, Hoofs

MINERALS :-

Major	Minor
Calcium $\longrightarrow$ 1200 mg	Iron
Chlorine $\longrightarrow$ 3500 mg	Iodine
Sodium $\longrightarrow$ 3500 mg	zinc
Sulphur	Copper
Potassium	
phosphorous	

IRON :-

1. It helps in the formation of B_6 vitamin and B_9 vitamin
2. It is also responsible for formation of Haemoglobin.
3. Due to Iron deficiency "Anemia" occur.
4. Haemoglobin — (12% - 15%) but exactly 14·8%.
5. In India 58% women suffering Iron deficiency.

Sources of Iron :-

1. Green leafy vegetables
2. Dry fruits
3. Milk
4. Jaggery
5. Millets
6. Honey

$\longrightarrow$ "Muslin cloth" is a famous thin cloth in India. This cloth import to Egypt.

Mineral Examples:-
  CALCIUM:-

1. It is essential for formation of bones

2. strength and Rigidity to the teeth and bones.

3. It is used for blood clotting.

4. It is used for Nerve function.

Diseases due to deficiency of chlorine:-

1. Rickets disease in children.

2. "Osteo Malasia" in adults

Sources:-

1. Milk

2. curd

3. cabbage

4. cauliflower

5. Date fruit

6. Millets

7.
Iodine:-

1. parliament Enacted mineral.

2. It regulates (or) stimulate thyroid gland.

3. sources:-   ⇒ "Goitre disease" occur due to
                              insufficient Iodine

1. common salt

2. Marine products

Fluorine:-

1. A "flurosis disease" is caused by excess of fluorine

2. 1 Milli litre water = below 1 gm of fluorine is used.

potassium:-   sodium and pottasium
    Hypokalemia disease occur   ⎫ Both are used for Nerve
                                 ⎬ impulse
Sodium:-   ⎭
    Hyponatremia disease occur

Sources of potassium and sodium:-

1. Marine products
2. Coconut
3. Water Melon
4. Fresh vegetables

VITAMINS:- (2 Q)

1. Vitamins, first discovered by Hopkins.
2. Vitamin name given by Funk in 1912.
3. Vitamins are two types   i) water soluble   ii) Fat soluble.

| Water solubles | Fat solubles |
| B, C vitamins | A, D, E, K vitamins |

Vitamin - A:-

1. Chemical name Retinol
2. Diseases:-
   1. Night blindness
   2. Xeropthalmia
   3. Dry eyes

Eye — Rods (used for Night vision) ⟶ Rodaphsin
    — Cones (used for Day vision) ⟶ Idopsin

Sources:-

1. Cod fish liver oil (first highest Vit-A)
2. Spinach   (second highest Vit-A)
3. Sweet potato (Third)
4. Carrot (fourth)

Papaya ⟶ 6%
Mango ⟶ 4%
Banana ⟶ 3% (except 'K' all available)
Milk ⟶ except Vit-C all vitamins available

→ Excess vit-A is stored in liver part.

Vitamin - B-complex :-

It is a group of B-complex

Vit - B_1, B_2, B_3, B_5, B_6, B_7, B_9, B_{12}

Vitamin - B_1 :-

1. chemical name Thiamine

2. Beri-Beri disease occur. It is called "Poly-Neutrisis" disease.

3. Beri-Beri is a Japan word.

Sources :-

1. Whole grains — Rice, wheat, Milk, Maize etc.

→ Unpolished grains

Vitamin - B_2 :-

1. Chemical name is Riboflavine (or) Ariboflavine.

2. "Cataract" is a disease occur. Cataract means Retina in the eye is become very thick due to deficiency of vit-B_2.

3. "Glosites" disease means tongue, lips, both sides of mouth crack occurs.

Sources :-

1. cow milk (light yellow) cause of Riboflavine or vitamin-B_2

2. Yeast

3. Liver

4. Fresh vegetables

5. Nuts

6. pulses

7. Green leafy vegetables

Vitamin - B_3 :-

1. chemical name "Niacine".

2. pellagra is a disease occur and also "Insomnia" and "Demen[tia]"   loss of mem[ory]

3. Vitamin - B_5 :-

1. chemical name is "Panthoneic acid".

⚹⚹ Vitamin - B_6 :-

1. chemical name is peridoxine

2. "Dermatosis" and "prozeria" are disease.
   ↓
   Skin efficiency loses

   Sources:-
   Nuts, Milk etc.

Vitamin - B_7 :-

1. chemical name is Biotine.

2. It is a beauty vitamin. It uses in cosmotics.

3. B_7 supports for Healthy skin and Healthy Hair.

Vitamin - B_9 :-

1. chemical name is Folic Acid.

2. Vit - B_6, B_9 contains Iron.

3. It is called women vitamin (B_6, B_9)

4. Spina Bifid (mental retarded) disease

Vitamin - B_{12} :-

1. chemical name is cobalamine (or) cynacobalamine.

2. vitamin - B_{12} contains "cobalt".

3. "pernicious, anemia" is a disease

Vitamin - C :-

1. chemical name is Ascorbic acid. (or) ~~Citric Acid~~.

2. Scurvy disease, pyorrhea disease.

3. Sources :-

1. citrous fruits

    a. Amla (Goose berry)   e. papaya

    b. lemon   f. berry

    c. orange   g. Guava

    d. Mango   h. Fresh Tomatos.

⟹ More vitamin - c is more found in Amla (Goose berry) (usirikai).

→ Vitamin - c is easily susceptible (or) Exposture to atmos-phere.

Uses :-

1. Anti cancer Agent.

2. Anti oxins are produced

3. To healed wounded parts

4. To add broken bones

5. Anti bodies are made

→ vitamin - c is available in only in plant products.

Vitamin - D :-

1. Chemical name is "calcipherol". (calcium mineral)

2. It contains "calcium".

3. Rickets (children), Osteomalasia (Adult) disease.

4. Vitamin - D is available in sun rays. It is a natural vitamin.

Sources :-

Fish, cabbage, cauli flower, milk dry fruits etc.

Vitamin - E :-

1. chemical name is "Tokopherol".

2. It is a beauty vitamin.

3. sterility (or) F-Infertility cause due to lack of vitamin - E

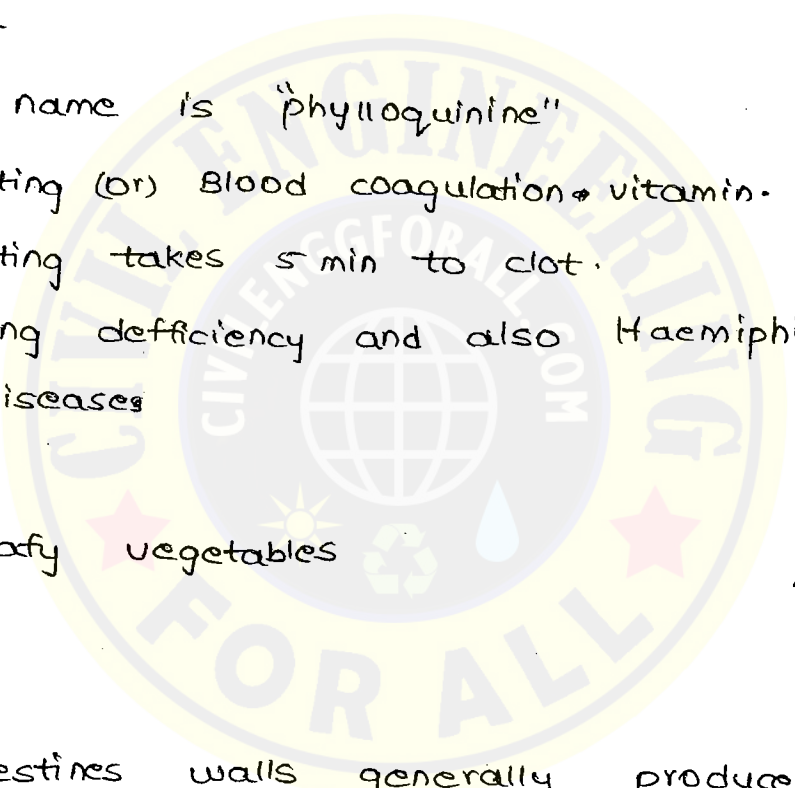Sources:-

1. Saffola

2. Nuts

3. Soyabean

4. N. All fruits

Vitamin - K :-

1. chemical name is "Phylloquinine"

2. Blood clotting (or) Blood coagulation ⊕ vitamin.

3. Blood clotting takes 5 min to clot.

4. Anti - clotting defficiency and also Haemiphilia.
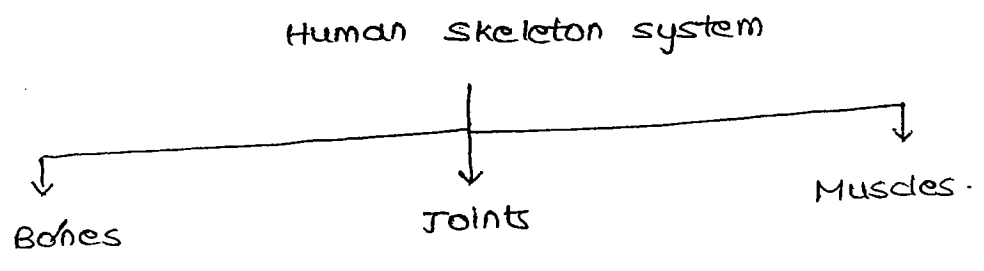
5. Genetic diseases

Sources:-

1. Green leafy vegetables

2. Tomatoes

3. Soyabean

→ small Intestines walls generally produced "vitamin - K"

22-10-

UNIT – II

HUMAN SKELETON SYSTEM

Human skeleton system

```
          Human skeleton system
                    │
       ┌────────────┼────────────┐
       ↓            ↓            ↓
    Bones        Joints       Muscles.
```

→ Dhanwanthari is a first doctor in world. He is a Indian.

→ Susrutha (Indian) is a first surgeon in world.

Bones:-

1. Study of bones are called Osteology.

2. No. of bones by birth child (290-300) bones, adult having 206 bones.

3. Since birth to death one bone never changes i.e., "Neck bone" or "u-shape bone"

Ear:-

1. In ear there are 6 bones

2. Incus – 02 bones

3. Malleous – 02 bones

4. Staples – 02 bones → Smallest bone in our body

Head:-

1. Head is a combination of skull (or) cranium and Face

2. There are 22 bones.

Skull /— 08 bones

Face — 14 bones

Hands:-

1. There are 30 + 30 = 60 bones.

Legs:-

1. There are 30 + 30 = 60 bones.

2. In leg, "Femur" is a longest bone in our body.

3. In leg "Tibia" is a strongest bone in our body.

Vertabrae:-

1. Adult - 26 bones

2. Children - 33 bones

Ribs:-

1. 12 pairs (or) 24 bones

Bones disease:-

1. Arthrities

2. Gout

3. Osteoporosis } Calcium phosphorous

4. Tetany

Children	Older Age
1. less calcium phosphorous	1. More calcium phosphorous
2. soft bones	2. Hard bones
3. Elasticity bones	3. Brittleness
4. Fibre tissueses	4. less Fibre tissues.

JOINTS:-

1. study of joints are called Orthology.

2. They are four types of joints

   a. Ball and shocket joint ⟶ Shoulder

   b. Hinge joint ⟶ Elbow

c. pivot Joint $\longrightarrow$ Neck joint

d. Gliding joint $\longrightarrow$ vertabrae.

MUSCLES:-

1. Total muscles in our body is 639.

2. stapadius is the smallest muscle.

3. Gluta myxious is the largest muscle (buttock muscle).

Types :-

1. Voluntry muscles :-

   Whatever the actions controlled by you is called voluntry' muscles.

   Ex:- walking, sitting, readings, writing, sleeping.

2. In- voluntry muscles:-

   Actions cannot be controlled

   Ex:- Heart, kidneys, mouth saliva.

$\longrightarrow$ study of muscles are called sarcology

$\longrightarrow$ sarcoma cancer effected to muscles.

$\longrightarrow$ Body temperature is 36.9°c (In human)

UNIT-III

BLOOD & BLOOD GROUPS

1. P.H of blood is 7.4

2. Study of blood is called Haemotology

3. Formation of blood is called Haemosis

4. 0 - 6.9 → Acids

   7.0 → Neutral (or) water

   7.1 - 14 → Alkaline / Base

5. Blood comes under Alkaline / Base category.

6. "Land steiner" and his students research on blood factors in 1902
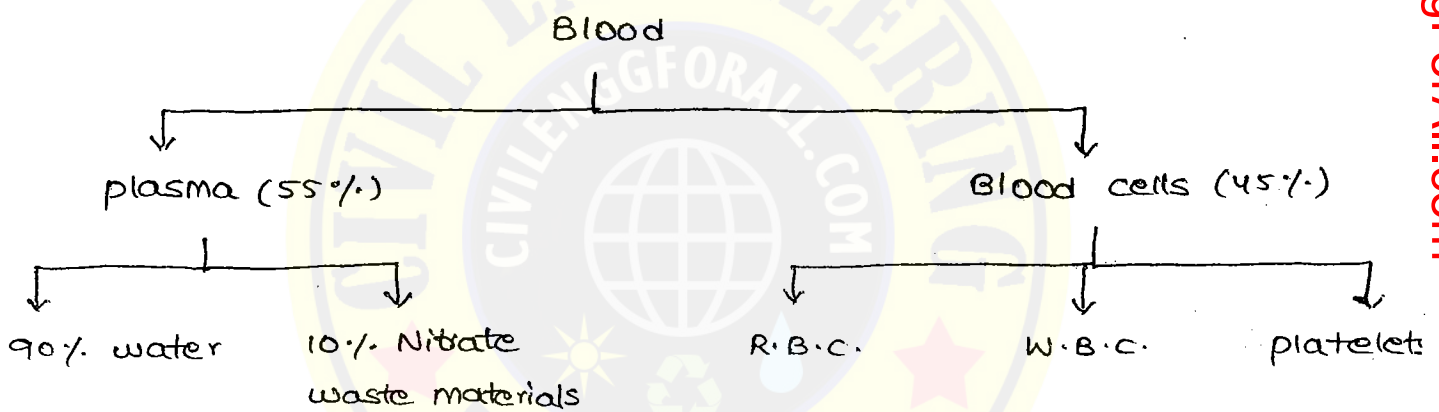
Plasma:-

1. It is a light pale color.

2. Factors in plasma are Albumine (controls osmotic pressure
   Glubuline (Body temperature)
   Fibrinozen (Blood clotting)

Red Blood corpuscles:-

1. Due to presence of H^b, blood appears Red in color

2. $H^b \underset{CO_2}{\overset{O_2}{\rightleftharpoons}} cell$

3. Shape of R.B.C. is Bi-concave. Birth of R.B.C. is "Red bone-marrow"

4. I R.B.C. are called "Erthrocytes."

4. Life span of R.B.C. is 120 days.

5. Death place is spleen (or) Graveyard.

6. One cubic milli litre blood (CMLB) contain "5 lakhs R.B.C"

7. Due to abnormal R.B.C leads to Bone marrow cancer.

** 8. Deficiency of R.B.C leads to "Thallessemia" (Genetical disease)

Q.

White blood cells:-

1. It is also called Leukocytes.

2. It is called Microscopic policeman (or) bodyguards.

3. No H^b so it is in white.

4. W.B.C. provide Immune system.

Types of W.B.C:-

1. Esinophills

2. Basophills

3. Neutrophills →(60 - 70%)

4. Monocytes

5. Lymphocytes → B-Lymphocytes and T-Lymphocytes

   → B-L, T-L find harmful bacteria in our body and it destroy (or) kills that bacteria.

→ Birth place of W.B.C is "spleen"

→ Life span of W.B.C is "2 weeks or 14 days"

→ Death /place of W.B.C. is "Liver and Lymph Nodes".

→ One cubic milli litre blood contains "4 - 11 thousand W.B.C".

→ Abnormall increasing of W.B.C. leads to "Leukemia cancer"

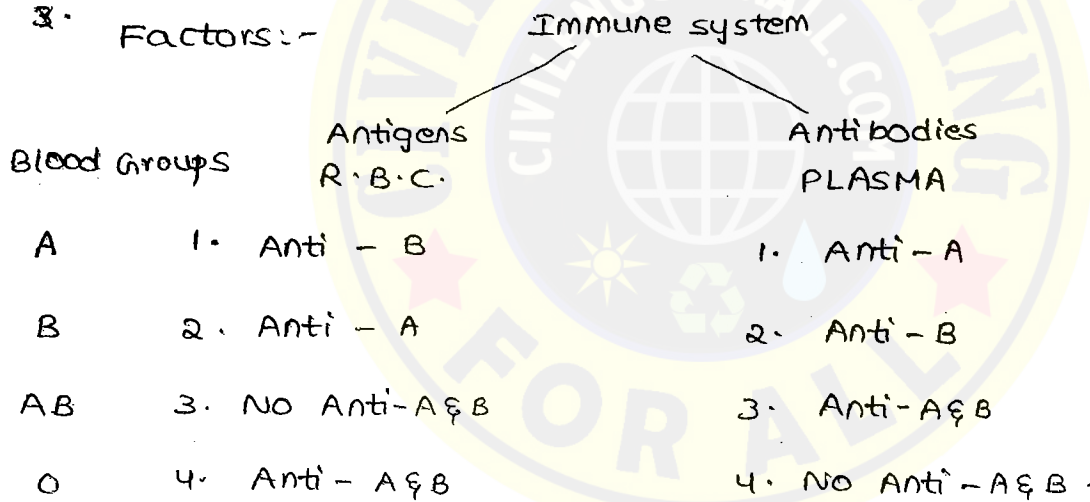→ Deficiency of W.B.C. leads to "Loss of Immune system".

Platelets :-

1. It is called Thrombocytes.

2. Less count in Dengue patient.

3. It helps for Blood clotting.

4. Inside the body Anti clotting Agent "Heparin".

5. Blood can be stored in blood bank upto 3 months.

6. "Sodium citrates" and "sodium oxylates" are used as a Heparin in Blood banks.

Blood Groups :-

1. "Land steiner" ~~introduced~~ discovered Blood Groups in 1902. He born on June-14 (world blood donation day).

2. Autopsy — post Mortum.

3. Factors :-

                    Immune system
                   /   \
            Antigens   Antibodies
            R.B.C.   PLASMA

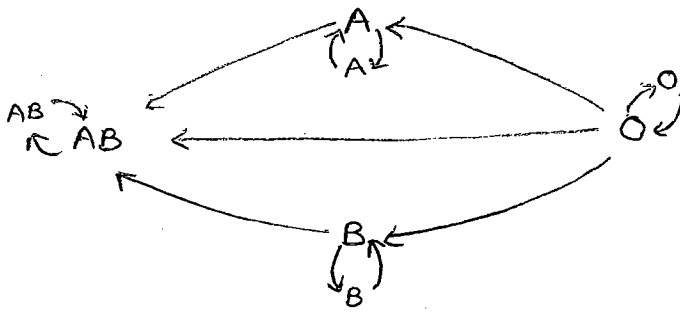| Blood Groups		
A	1. Anti - B	1. Anti - A
B	2. Anti - A	2. Anti - B
AB	3. No Anti-A & B	3. Anti-A & B
O	4. Anti - A & B	4. No Anti - A & B.

→ Rh - factor — Rhesis (conducted on monkey) by "U.S.A Scientist Weiner"

→ "AB" → Universal Receiver

→ "O" → Universal Donar.

*** → "Erythro blostosis" caused by Rh (-ve) factor.

→ B - blood group are more in India.

26-10-2014

UNIT – IV

HUMAN DIGESTIVE SYSTEM. (20)

Mouth:-

1. It is a first digestive path in our body.

2. 25 to 30% food is digested in mouth itself.

3. Mouth consists of saliva which is produced by three pairs saliva reglands.

    a) parodid glands

    b) Mandibulus glands

    c) sub lingual glands

4. PH of saliva is 5.6.

5. A Enzyme is found in saliva that is called Amylase (or) Ptyalane.

6. Amylase acts on starch food and converts into "dextrines"

Teeth:-

1. Teeth are formed in the combination of calcium and phosphorous.

2. Teeths are Di-phiodent.

3. Di-phiodent are two types i) Milk teeth (20) ii) permanent teeth (32)

4. In teeth there are four types

    a. Incisors (while laughing)

    b. cannines

    c. pre-molars

    d. Molars (wisdom teeth)

	I	C	P_M	M	
Upper Jaw	2+2	1+1	2+2	0+0	= 10
Lower Jaw	2+2	1+1	2+2	0+0	= 10

] 20 teeths in child.

	I	C	P_M	M	
lower jaw	2+2	1+1	2+2	3+3	= 16
Upper jaw	2+2	1+1	2+2	3+3	= 16

] 32 teeths in adult

5. Maximum human teeth covered by "Dentine"

6. Hardest substance in our body is "Enamle" is located on tee

7. Too cold and Too hot is dangerous to teeth, it reduces the teeth efficiency.

Oesophago:-

1. A food is injested into the stomach by the Oesophago through the peristallic movement.

Stomach:-

1. The food is stored for 3-4 hrs it produces Gastric Juice.

2. Hydro chloric acid

   Enzymes found in stomach:-

   1. pepsin

   2. Renin

   3. Liapase

Hydro chloric acid:-

1. It stimulates or activate enzymes in the stomach

2. Pepsin:-

1. It acts on proteins and converts into poly peptides.

** * Renin:-

1. It is absence in an adult.
2. It is more active in children.
3. It acts on milk like products and converts into ~~casia~~ casseine like products (milk into curd).
4. Lacto Bacillous is a milk bacteria to convert milk to curd.

Liapase:-

1. It acts on fatts and converting it into fatty acids and Glycerol.

2. spleen:-

1. It removes dead cells. It is attached to the stomach

Liver:-

1. study of liver is called Haepatology.
2. Liver is made by soft Haepatic cells.
3. Liver weight 1.5 kgs.
4. The only Regenerative organ in our body
5. Largest organ or gland

Functions of liver:-

1. It produces Bile Juices. They are two types
   a. Bile Rubin
   b. Bile yardhin
2. Bile Juice is stored at Gall bladder.
3. Bile Juice has No enzyme. It acts on ~~acts~~ fats and fatty acids.
4. Minerals are stored at liver part. vitamins are manufacture on liver. Urea is stored. Toxins are minimised.

Liver Diseases:-

1. Hepatities (Jaundice) → First vaccine developed by India in world.

   → Medicine name is san vac (1997).

   → Hepatities occur due to the "water and food".

2. Sirrosis

3. Fatty liver

Pancreas:-

1. It is called Dual gland. It produces Enzymes and Harmone.
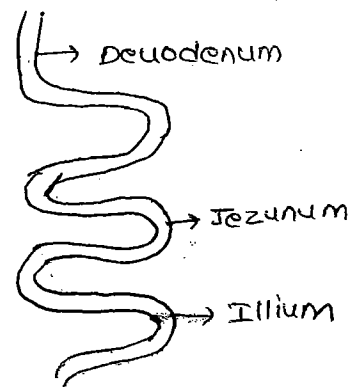
   Enzymes:-

   1. Tripsin
   2. Khymotripsin } works on proteins → poly peptides

   3. Amylase
   4. Liapase } works on fatts → Fatty acids (Glycerol)

   Harmones:-

   1. Insulin → It converts Glucose to Glycogen

      → pancreas doesn't work, Insulin is not produced

      → conversion of Glucose to Glycogen stops. So diabetic milletus disease occur.

      → world largest diabetics patient country India (10%)

      → In India, d more diabetic patients in Hyderabad.

Small Intestines:-

1. Deuodenum is the large part of the small intestines. It is a U-shaped part

2. Jezunum is the having maximum nutrients.

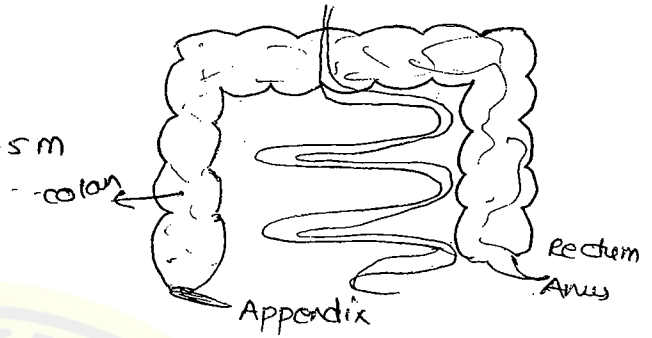3. Illium is the smallest part of the small Intestines.

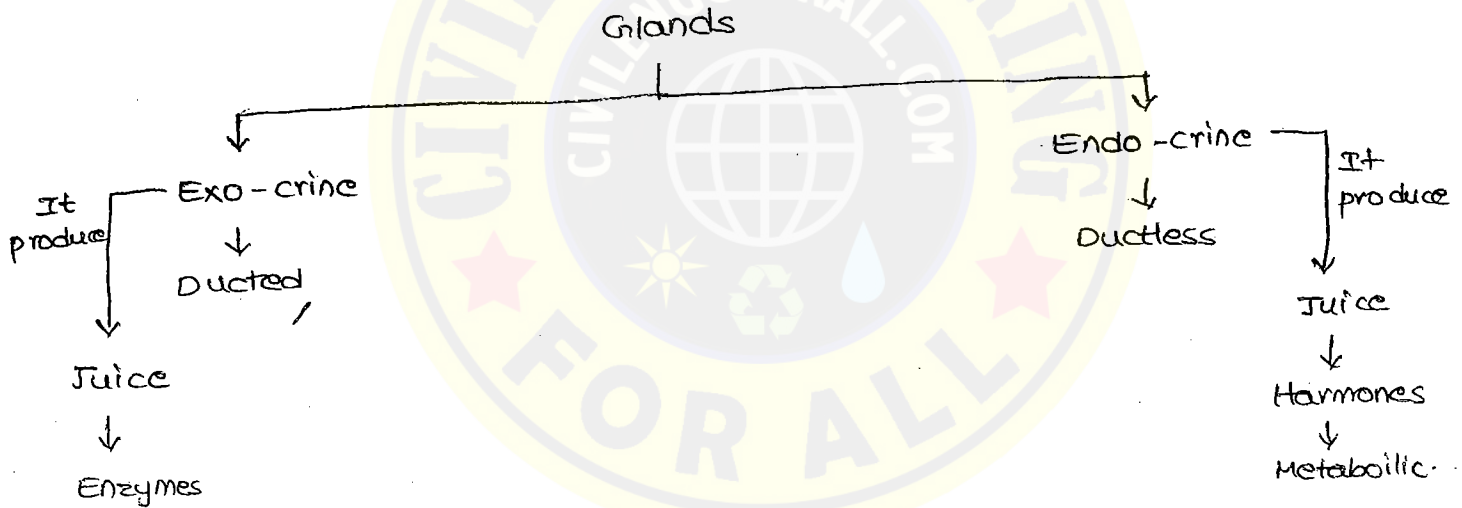4. Small intestines length is 7.1 m, dia is 7.5 mm

Succus Entricous Enzyme:-

1. Lactase $\longrightarrow$ works on Lactose $\xrightarrow{\text{Finally form}}$ Glucose

2. Sucrase $\longrightarrow$ works on Sucrose $\longrightarrow$ Glucose

3. Maltase $\longrightarrow$ works on Maltose $\longrightarrow$ Glucose

Large Intestines:-

1. Appendix, colon

2. Length of large intestine is 1.5m

colon

Appendix

Rectum
Anus

HUMAN GLAND SYSTEM

Glands

It produce — Exo-crine
↓
Ducted
↓
Juice
↓
Enzymes

Endo-crine
↓
Ductless

It produce
↓
Juice
↓
Harmones
↓
Metaboilic.

Harmones:-

1. Harmone is a natural steroid

Or Endo crine glands:-

pitutory gland:-

1. It is located in Thalamous in Brain. It looks like a peanut.

2. It is called Master gland or king of the gland.

3. It produces 10 ~~time~~ types of harmones.

a) Growth Harmone (G-H) —— over secretion ——→ Gigantism (over out) ⑬

under secretion ——→ Dwarfism

b) Melanocyte stimulating Harmone (M-S-H):-

→ It decides skin color

M.S.H —— presence ——→ black color

absence ——→ white color

→ It produces where the sun rays ~~produces~~ fall.

c) Anti-Dieuretic Harmone (A-D-H):-

→ It regulates kidneys function

A D H —— over secretion

under secretion ——→ Diabetics Insepedis (aati mutravadi)

d) Leutinizing Harmone (L-H):-

→ Estrogen progesterone regulated by Menstrual cycle.

e) Follicle stimulating Harmone (FSH):-

FSH —— ova

spermatova

} FSH works good, (ova, sperm) als good.

f) Lactogenic Harmone (L-H):-

→ "prolactic", it produced milk for women after delievery

g) —→ Oxytocine Harmone (O-H):-

→ It is a birth Harmone. It helps ~~for~~ delivery women for normal delievery.

Thyroid gland:-

1. It is, located at the base of the neck.

2. It is the largest endocrine gland.

  → Liver is the largest gland in our body. But thyroid is the largest endocrine gland.

3. It produces Thyroxine Harmone. Thyroxine is used for physical developments and Mental developments.

4. It (Thyroxine Harmone) supports Basal Metabolic rate (B.M.R)

5. The B.M.R measures by Spyrometer. It measures Energy.

6. Thyroid deficiency causes simple goitre (or) Adam's Apple (or) Gyeaves disease.

7. Thyroid deficiency causes cretinism, Odema

Para Thyroid :-

1. It is located at the base of below neck.

2. It produces paratharmone, calcitonine

3. A blood calcium level regulated by para thyroid gland.

  → Blood calcium level more causes Osteoporosis (Bones become brittle)

  → Blood calcium level less causes Tetany (Bones soft)

Thymus gland:-

1. It produces Thymoxine Harmone.

2. Thymoxine Harbone absence in adult

3. Thymoxine produces immuene system in children

Adrenal glands:-

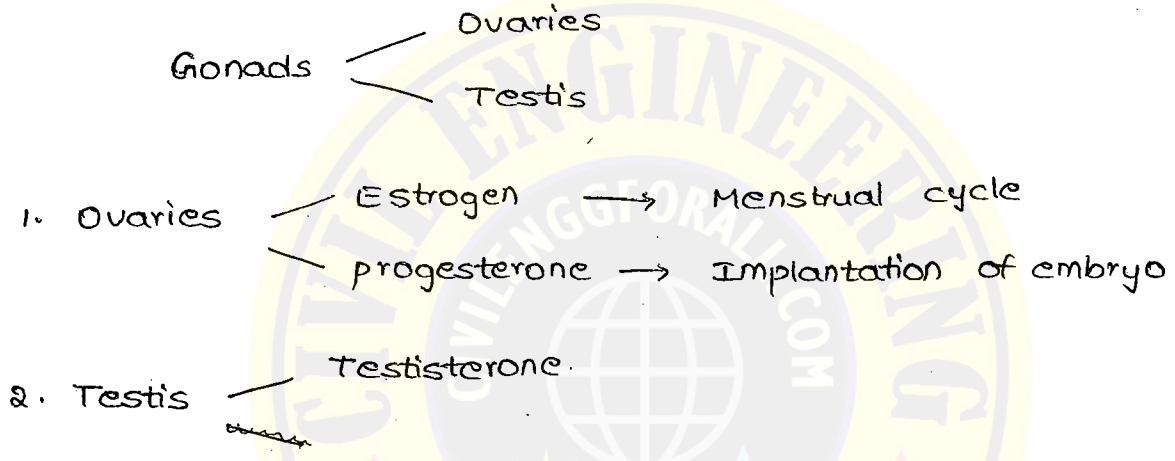1. These are located top of the both sides of the Kidneys

2. It produces

   a) Gluco corticoids Harmone $\longrightarrow$ used in CPF metabolic func

   b) Mineral corticoids Harmone $\xrightarrow{used}$ Mineral metabolic function.

   c) sexual corticoids Harmone $\xrightarrow{used}$ M/F sexual characters

   d) Adrenal corticoids Harmone $\xrightarrow{used}$ Emergency Harmone.

$\longrightarrow$ Breathing rate, Heart beat rate regulate by Adrenal corticoids Harmone.

$\longrightarrow$ Adrenal glands are Flight and Fight Harmone.

Gonads:-

   Gonads ⟨ Ovaries
            Testis

1. Ovaries ⟨ Estrogen $\longrightarrow$ Menstrual cycle
             progesterone $\longrightarrow$ Implantation of embryo
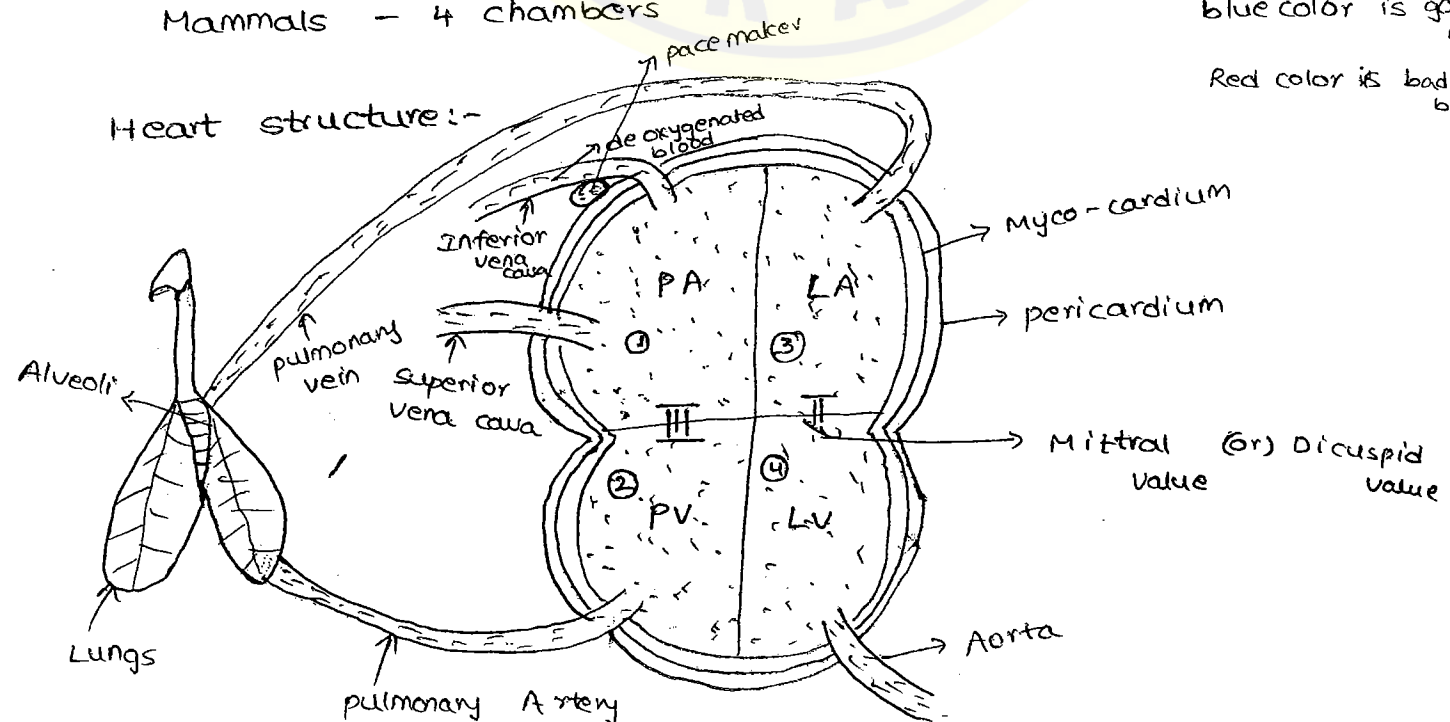
2. Testis ⟨ Testisterone.

UNIT- V

HEART AND ITS FUNCTION

Function :-

1. Blood circulatory system can be discovered by "William Harvey"

2. First heart transplantation conducted by "Christian bernad Shaw" in 1967.

3. In India first heart transplantation was conducted by Dr. Venugopal in 1984.

4. Recently in chennai Global Hospital transplantated heart within 6 hours

5. Recently Australian scientist dead cells of heart reactivated and transplanted within 20min successfully.

6. Average heart weight 350 - 500 gms

7. Heart is located left part of the chest cavity.

8. Human heart consists of four chambers

9. Fish — 2 chambers

   Amphibians — 3 chambers

   Mammals — 4 chambers

Heart structure:-

blue color is good blood

Red color is bad blood.

pace maker

de oxygenated blood

Inferior vena cava

pulmonary vein

Superior vena cava

Alveoli

Lungs

pulmonary Artery

PA

LA

PV

LV

Myco - cardium

pericardium

Mittral (or) Dicuspid value

Aorta

Arteries:-

1. Generally they carry oxygenated blood (O_2) but pulmonary artery carries deoxygenated blood from heart to lungs.

Aorta:-

1. It is the largest artery in our body.

2. Arteries are located inner part of the skin.

3. ## Veins:-

1. Generally they carry deoxygenated blood but pulmonary vein carries oxygenated blood from lungs to left auricle of the heart.

Superior vena cava:-

1. It carries deoxygenated blood from upper organs to Right auricle.

Inferior vena cava:-

1. It carries deoxygenated blood from lower organs to Right auricle.

Caronery Artery:-

It supply oxygen, Glucose and food to heart.

Caronery vein:-

It removes CO_2, and other waste from the heart.

Blood pressure:-

A blood pressure depends on few Ions sodium, potassium, Iodine. Hypertension are High B.P, Hypotension are Low B.P.

It is measured by an instrument "spygnomanometer".

Sistolic (or) Lub (or) contraction — 120 mm

Dialostic (or) Dub (or) Relaxation — 80 Hg

Heart beat rate:-

1. IN adult   72 times/min

2. children   140 - 160 times/min

3. old people   65 - 70 times/min.
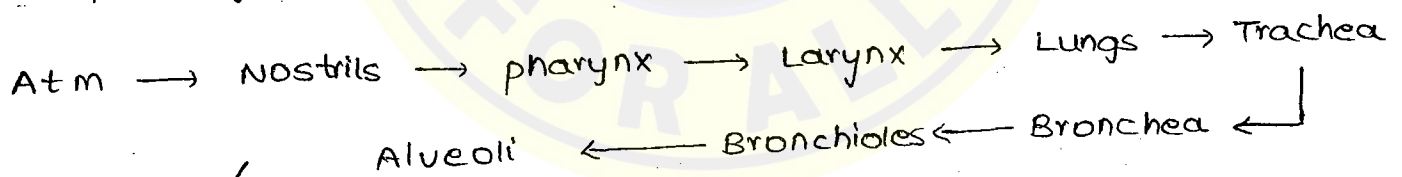
Pacemaker:-

1. It is located on the top of the Right auricle.
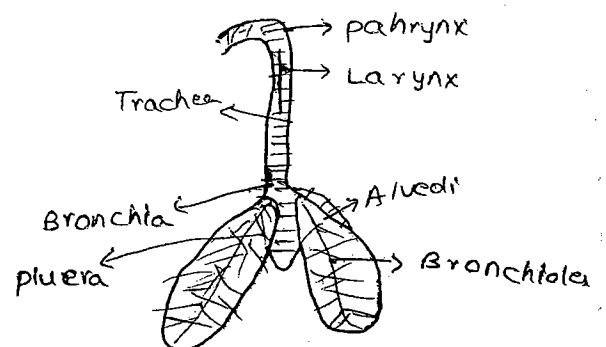
2. It gives electrical impulses to the heart.

Heart disease:-

1. caronery Artery disease

2. caronery vein disease

3. Heart attack

4. sclerosis.

Respiratory system in humans:-

Atm ⟶ Nostrils ⟶ pharynx ⟶ Larynx ⟶ Lungs ⟶ Trachea

Alveoli ⟵ Bronchioles ⟵ Bronchea ⟵┘

1. study of Lungs is pluerology

2. Lungs are blood purifying organs.

3. Each lung weight is 160-170 gms.

Aerobic Respiratory system:-

1. It occurs in the presence of O_2

2. It occurs in all living animals (both animals and plants)

3. Glucose particle completely oxidised in this process. Then more energy is released in this process.

Anaerobic Respiratory system:-

1. It occurs in the absence of oxygen.

2. Glucose particle partially oxidised. Then less energy is produced.

3. It is a fermentation process.

4. Bakery products bread, bun, cake, biscuits

5. All Alcohol products are made by fermentation process.

6. CO_2, Ethyl alcohol are produced by fermentation process.

Breathing rate :-

Adult - 17 to 18 times/min

children - 32 to 35 times/min

Lung effected disease :-

1. Asthma

    → It is a genetic disease.

    → It is mostly comes cold area disease people.

2. Emphysema

    → It damage of Alveoli.

3. Tubercluosis

4. pneumonia

5. peritusis

6. swine flu

7. Bird flu

8. SARS

UNIT - VI

HUMAN EXCREATORY SYSTEM

1. study of Human Excretory system is called Urology.

Skin :-

1. It is a largest organ according to area wise

2. It produces sweat to sweat glands. These are called Excess glands.

3. sweat glands and vitamin Melanin is a part of Epidermis.

4. Lipids (or) cholestrol, blood vessels is a part of Endodermis

5. Every thumb impression is not match because of lipids (or) cholestrol present in endodermis. are varies b/w person to person.

Skin disease :-

1. soriosis

2. Gangrine

3. prozeria

4. Eczema

Kidneys :-

1. study of kidneys "Nephrology"

2. Its main function is Osmostatic balance or fluid balance.

3. Fluid balance is maintained normally by kidneys.

   a. water

   b. Glucose

   c. Minerals

   d. Vitamins.

4. Kidney removes Nitrogenous waste, Excess urea, uric acid.

5. Kidneys are made by Nephrons.

6. Nephron is the structural functional unit of the kidneys

7. Each kidney consists of 10 millions Nephrons.

8. Left side kidney is slightly greater than right side kidney.

9. Kidneys are a bean shaped organs which are located at "abdo^{min}aemal cavity"

10. kidneys are "Ultra filtration" organ in our body.
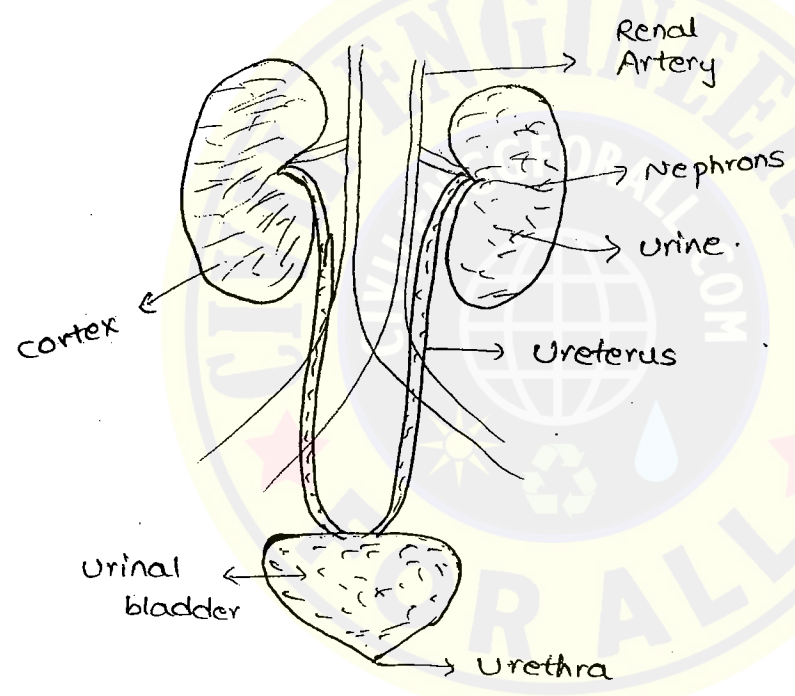
Urine formation :-

1.   96 %   — water
      2.5 %   — uric acid
      1.5 %   — Nitrogen waste.

2. Urine is a light yellow color due to presence of creatine

3. Urine is made in Nephrons

Nephron structure :-

Glomerulous

Bowman's capsule

ultra-filtration

Henry loop

Duct
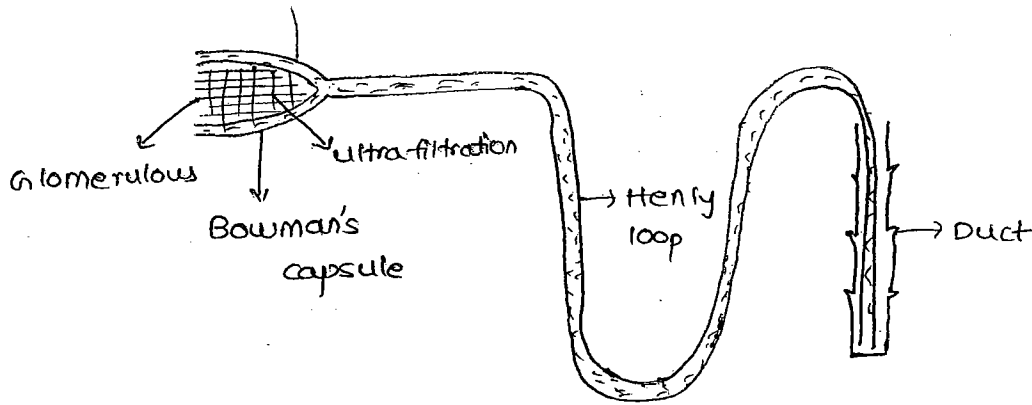
1. kidney ~~test~~ Glomerulous Efficiency ~~test~~ Rate.

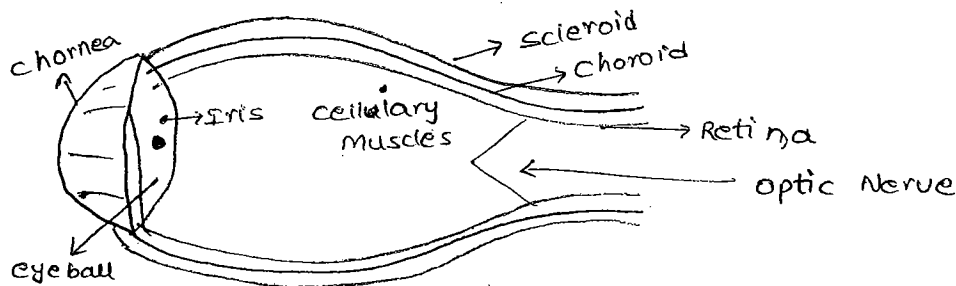2. Urine is formed in Glomerulous (Nephron).

Stones in kidneys :-

1. Due to accumulation of calcium oxylates, calcium sulphates, Uric acid crystals

→ Artificial kidneys are called Dyalasis. Discovered by Colt (1943).

→ Blue baby is a heart suffering disease.

HUMAN EYE

1. Study of eye is called Opthalmology

    150° — Monovision

    180° — Durovision

Chornea:-

1. It is a concave shape part in eye, a small thin layer light rays are entered through chronea into the eye.
2. Due to break down of chornea leads to Nutritional blindness.
3. It is only denotable part in the eye within 6 hours.
    cancer, HIV, TB, Thalasmia, Diabetic patients not donate.

Iris:-

1. It is a part of eye ball
2. It is a colorfull part in the eye.
3. In dim light it eo expands and bright light contracts.
4. Iris technology in India imported from U·K in 2005.

Scleroid:-

1. It is the largest concave in the eye.

Choroid:-

1. It consists of blood vessels

Retina:-

1. It is a small thin third layer.
2. Image reflected part in the eye.

Optic Nerve:-

1. It supports for vision and it connects to brain.

Eye disease:-

1. Hypermetropia (Long sight)
2. Myopia (short sight)
3. Astigmatism
4. presbiopia
5. Glucoma
6. Taracoma
7. conjectivities
8. colour blindness

Hypermetropia (Long sight):-

1. If a person suffering with Hypermetropia he cannot see clearly nearest Objects but he can see clearly distant Objects. This is due to eye ball is become too small
2. It is corrected by wearing of convex lenses (+)

Myopia (short sight):-

1. If Due to eye ball become too elongated image falls before retina. so that short sight people see nearest objects clearly, they cannot see longest distance objects clearly. /
2. It is corrected by wearing of concave lenses (-)

Astigmatism:-

1. Due to uncleared image (blurr) falls on retina leads to Astigmatism.
2. To correct Astigmatism such a people should wear cylindrical lenses.

presbiopia:-

1. Generally an advanced age people loss their power accomodation.

2. Such a people suffered with presbiopia. such a people both wear concave, convex lenses.

Glucoma and Teracoma:-

It is a bacteria which occurs to eye.

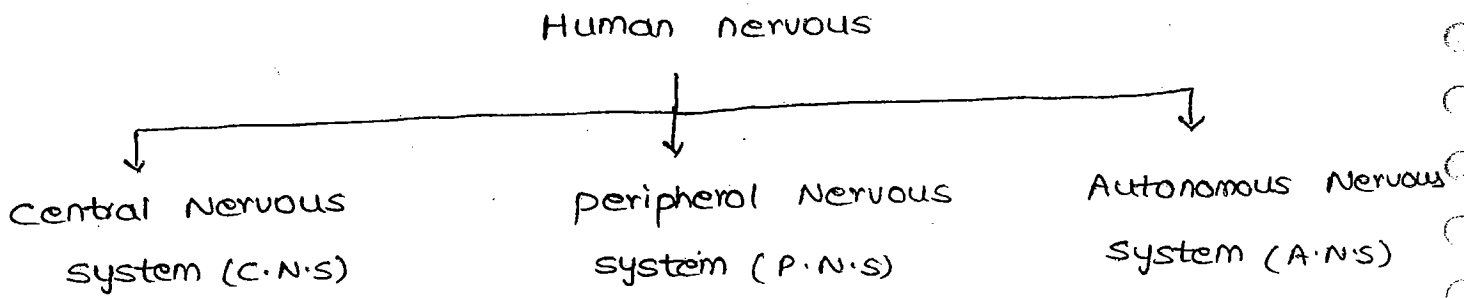## Conjectivities:-

It is a viral infection.

Color blindness:-

1. Due to damage of cones leads to colour blindness.

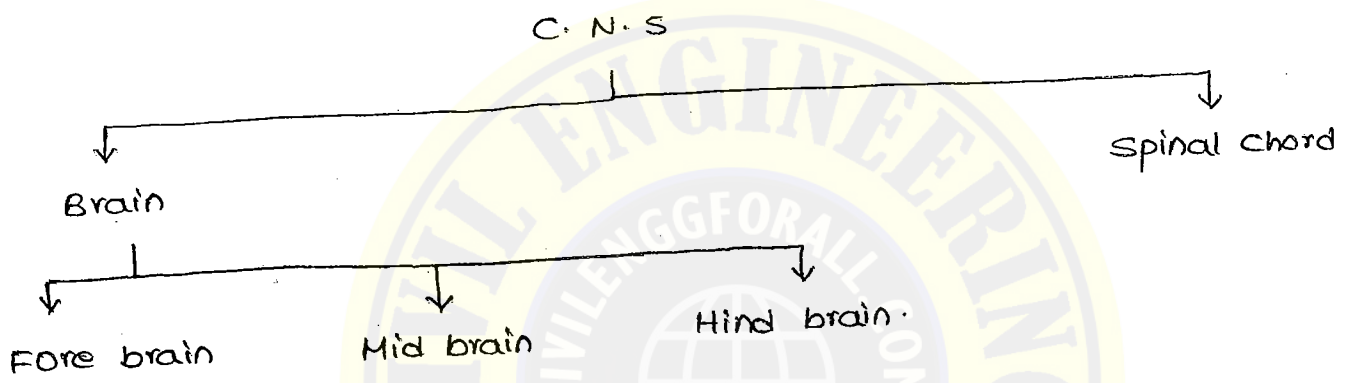2. It is a genetic disease (or) Heriditory disease.

Eye	Camera
1. Eye lid	1. camera shytter
2. Eye lenses	2. camera pix lenses
3. Retina	3. Filim
4. pupil	4. Aperture
5. Iris	5. Diaphram

HUMAN NERVOUS SYSTEM

Human nervous

↓	↓	↓
Central Nervous system (C.N.S)	peripherol Nervous system (P.N.S)	Autonomous Nervous System (A.N.S)

1. Study of Nervous are called Neurology.

Central Nervous system :-

C.N.S

Brain   Spinal chord

Fore brain   Mid brain   Hind brain.

Brain :-

- Neurons
- Fore brain
- Meninges
- Mid brain
- Hind brain
- Medulla oblangeta
- Spinal chord
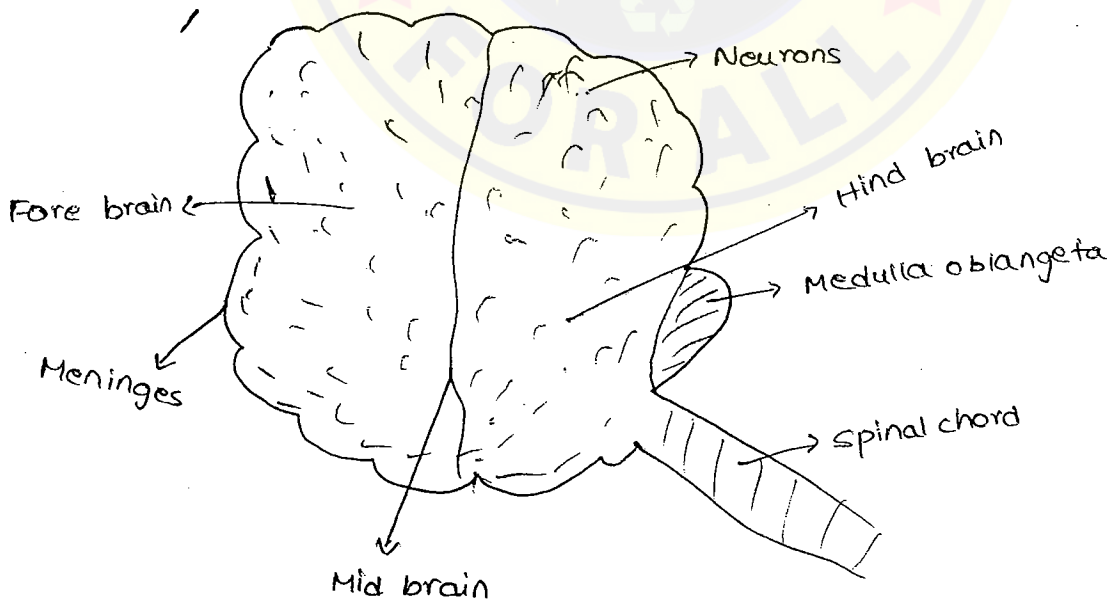
1. study of brain is called "phrinology".
2. Brain weight 1350 gms (or) 1.35 Kg.

3. Brain is covered by a small thin layer is called Meninges. ✓ ⑳

4. Brain is made by Million of Neurons.

5. Neuron is a structural functional unit of the brain.

6. Neuron is a best communicator in the brain.

Fore brain :-

1. Cerebrum

2. Thalamus

Cerebrum :-

1. It is a large part of the brain.

2. It is responsible for all intellectual properties, touch, smell, memory and taste.

3 Thalamus:-

1. It is responsible for angry, hungry, emotions, temperature control, thirst.

Hind brain :-

1. Cerebellum

2. Medulla Oblangata

Cerebellum :- ✓

1. It is a small part of the brain

2. It is a responsible for cyclic movement actions

3. It is damaged by taking excess alcohol.

4. NARCO Test is conducted for cerebellum. But it is banned by supreme court in 2010.

Medulla Oblangata:-

1. It is the last part of the brain.

2. It is responsible for involuntary actions like sneezing, coughing, vomting

Spinal chord:-

1. It is called Telephone exchange.

2. It transfers information from brain to organs and from organs to brain.
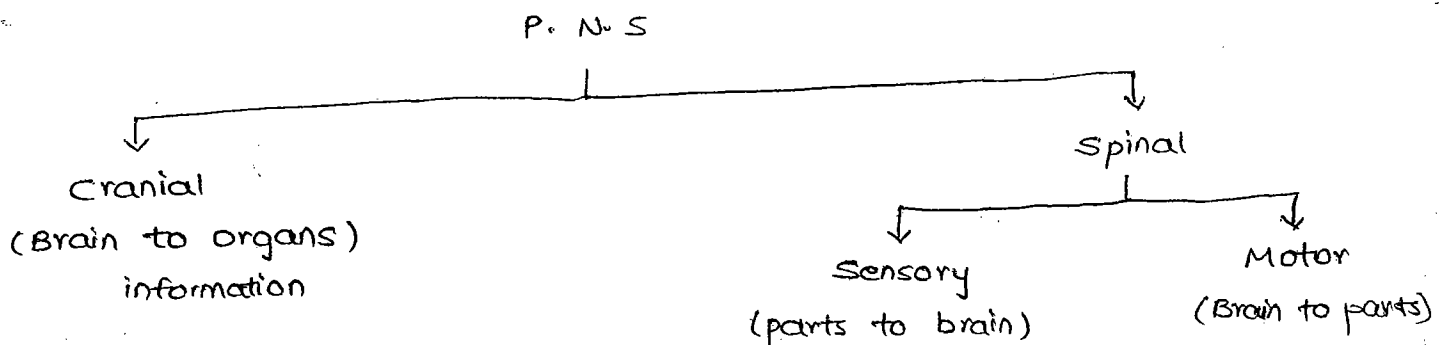
Brain disease:-

1. Epilepsy

2. Maigrain

3. parkinson (paralysis)

4. Alziamers (Loss of memory)

5. J.E. (Japanese Encephalities) → Brain swelling disease

6. Meningetis. → Damage of Meninges layer

Brain test:-

1. Electro Encephaleo Gram (E.E.G)

2. Magneto Resonence Image (M.R.I)

3. computed Tomography (Accurate test for brain)

Pheripherol Nervous system (P.N.S):-

1. A polio is caused damaged of "Motor" system

2. Olfactory $\longrightarrow$ smell sensation.

Autonomous Nervous System :- (In voluntary action)

1. Saliva (in the mouth) produced by A.N.S.

2. Urine secretion

3. Waste elimination

4. Heart beat

5. Lung function

} produced by A.N.S.

1-11-2014

UNIT – VIII

HUMAN DISEASE (2Q - 4Q)

1. According to WHO if a person is not performing his duties properly which is considered as a disease.

2. A disease depends on Immune system.

   Types of Immune system:-

   1. Natural Immune system (by birth)

   2. Artificial Immune system (by vaccination)

3. First vaccine was developed by Adward Jenner in 1798

4. He is called Father of vaccination. He developed "Small pox" vaccination

5. "Louis pasteaur" developed Anthrax and Rabies vaccine.

6. "Jonas-salk" developed "polio vaccine."

7. Bacillous callmette Gurine (B.C.G) vaccine is given to by birth child.

8. D.P.T. Vaccine (Triple antigen). Diptheria peritusis Tetanous

Disease:-

Air	Food / water	Insects
T.B.	Typhoid	Ratfly → plague
Cold	Diarrohea	Tse-Tse-fly → Sleeping Sickness
Sars	Haepatitis	Sand fly → kela Azar (Black fever)
Bird flu	cholera	
swine flu		
Ebola		

Mosquitoes :-

1. Female Anaphilous → Malaria

2. Female Qulex → Filaria

3. Female Ades → Dengue, Chicken Guniya.

⁎⁎ → Largest children death in India caused by "Diarrohea"

→ D.D.T. (Dichloro Dimethyl Trichloro Ethane) is used to kill the mosquitoes. It was invented by Paul muller i 1937.

Virus disease :-

1. In Greek terminology virion is a poison.

2. "Ivonoski" the name given by "Baizarik"

3. Virus is a mediator in between living and Non-living organisms.

4. plant attacking virus are called R.N.A.

5. Animal attacking virus are called D.N.A.

6. Small pox → Variola virus   18. Sars

7. chicken pox → Varcella virus   19. Influenza → viral fever

8. cold → Rhino virus   20. Mumps → swelling of sweat glan

9. J.E   21. Measles

10. Rabies → Hydro phobia   22. Ebola.

11. H.I.V

12. polio

13. Haepatites

14. chicken Guniya

15. Dengue

16. Birds flu

17. Swine flu

Japaneafe Encephalities :-

1. It is caused by Arbo virus
2. First it was discovered in Japan country.
3. It was discovered in India (Nellore)
4. It is caused by Mosquitoes.

H.I.V :-

1. First AIDS case discovered by Robert Gallo in 1981 (U.S.A).
2. In India first case recorded in chennai (1986).
3. African / sub - sahara
   Nigeria   } Largest AIDS patients
   India
²4. A.I.D.S. is caused by Retro virus.
5. H.I.V is a first stage
   A.I.D.S is a final stage
6. In India 1. Mumbai
             2. Kolkata   } More A.I.D.S patients
             3. Banglore
7. Largest A.I.D.S. patient ~~district~~ state United Andhra pradesh / next Maharastra.
8. Largest A.I.D.S. patient district "Gulburga".
9. H.I.V. is caused due to
   → Un safe sex
   → Blood transfussion
   → Mother to child. ("Mamatha plus" is introduced to save child from mother)

H·I·V· Tests:-

1. ELISA — Enzyme Linked Surbhant Assey (I - standards) ^Indian

2. Western blot (W·H·O· standards) · National Institute of Virology (pune)

3. P·C·R — polymer chain Reaction (Accurate test for H·I·V

→ H·I·V· disease effected to loss of Immune system·

Cancer disease:-

1. Abnormal increasing of cells leads to cancer.

2. cancer cells are two types:
   a. Beningn cells (good cells)
   b. Malignent cells (bad cells)

3. cancer cell- is caused due to "Malignent cells"

Cancer causes:-

1. Human papilo virus (H·P·V)

2. cancer is caused due to virus discovered in 1911.

3. cancer is caused due to Alcohol / smoking (65%.)

4. cancer is caused by Radiation, Mercury·

→ In 1998 U·S·A banned using Mercury in Thermometers

→ chemotheraphy is given to cancer patients·

→ "cobalt - 60" treatment given to cancer patients·

→ study of cancer is called oncology·

→ "Biopsy blood test" conducting to detect cancer disea

Chicken Guniya:-

1. Chicken Guniya first discovered at Tanzania (kenya) in 1953.

2. It is a Alfa virus

3. In 2006-07 it spread in India.

Dengue:-

1. Dengue caused due to Mosquitoes

2. It is a Flavi virus.

Sars:-

1. SARS - Severe Accute Respiratory syndrome.

2. Sars is a Air born disease.

3. Sars comes from Karona disease

4. Sars first discovered in at south china in 2002.

Bird flu:-

1. It is a $H_5 N_1$ virus

2. It was discovered in France (1951)

3. In 1997 it was discovered in "Hong kong"

4. In 2007 → India.

Swine flu:-

1. It is a $H_1 N_1$ virus.

Useful virus:-

**
** 1. Bacterio phase :

→ It is a virus not bacteria.

→ It acts on bacterious disease.

2. Nucleo poly Hydrosis virus (NPV):-

→ It is called "Friend of the farmer".

→ It acts as a "Germicide"

Useful
Bacterial:- ~~disease~~ :-

1. It was discovered by "Leevan - Hoeak".

2. "Robert Koch" is called "Father of Bacteriology"

3. "E-coli" bacteria widely used in Biotechnology

4. "Lacto bacillous" is used Milk to curd.

5. Azito bactor } fixation the Nitrogen in the soil.
6. Rhizobium

"Oesophagous" is a
mouth throat
(food pipe)

Bacterial disease:-

1. Septic sore caused by→ Streptho coccus bacteria

2. Diptheria → corny bacteria

3. pneumonia → Diplo coccus pneumonia

4. Typhoid → Enteric feaver (name) → salmonella thypi bacter

5. cholera → ~~Strepto coccus~~ w/b Vibreo cholera bacteria.

6. Tetanous (Lock Jaw) → Tetanous clostridium → It occurs to musd

7. T.B → Micro bacterium Tuberclusos bacteria

8. Leprosy → Myco bacterium Leprey bacteria

9. Botulism → Myco bacterium Botulism bacteria

10. plague → Yersinia pestis bacteria → Due to Rats plague disease cause

11. Anthrox → Anthro Bacillous

12. Syphills } sexually transmitted disease
13. Gonnohrhea

14. peritusis (whooping cough)

** Thyphoid :-

1. It is also called Enteric feaver.

2. Typhoid caused due to salmonella Typhi bacteria.

3. "Widal test" conducted to determine the Typhoid.

4. Due to municipal water pipe lines leaks typhoid occur when that water drinks.

5. Thyphoid occur due to polluted water and food.

6. Typhoid - Jaundice are sisters.

T. B :-

1. It is a Air born disease and communicable disease.

2. World wide largest deaths caused by T.B.

3. T.B. caused by "Micro bacterium Tuberclusis".

Plague :-

1. First vaccine introduced by Y. subbarao. He is a Indian (A.P). "Tetracycline" is a vaccine name.

2. "wizard of wonder drug" also called "Y. subbarao".

Anthrox :-

1. It caused by Anthro Bacillous.

2. It is a dangerous disease.

Disease caused by protozoa :-

1. Malaria :

→ It is caused by plasmodium protozoa.

→ plasmodium invented by Ronald Raoss and declared plasmodium caused by Malaria.

→ world Malaria day is Aug-20. Aug-20 his birthday.

2. Sleeping sickness

3. kalazar

   It is also called Black fever.

4. Amoebia sis

Disease caused by fungi :-

1. Ring worm

2. Athlet's foot

3. Mathura foot

Disease caused by worms :-

1. Filaria

   → It is caused by "Woucheria Bancrafti"

10 V.V.
*** Cell divison and cell theory :-

1. study of cells is called Cytology

2. First cell discovered by Robert Hook (1665)

3. Ostrich bird have a largest egg cell (25 kgs)

4. Single cellular ∅ — Amoeba, bacteria

5. Multi cellular — Human, plants

6. study of Tissues is called Histology

7. Cell theory introduced by Sheilden (1938) and Swan (1839)

8. In 1855 "Virchov" a German scientist says cell given birth to another cell later it death. This is a complete cell theory

Types of cells :-

** 1. pro- karyolic cells → Algae, bacteria

2. Eukaryotic cells → Humans, plants, Animals.

Cell is a structural functional unit of the life.

Cell structure :-
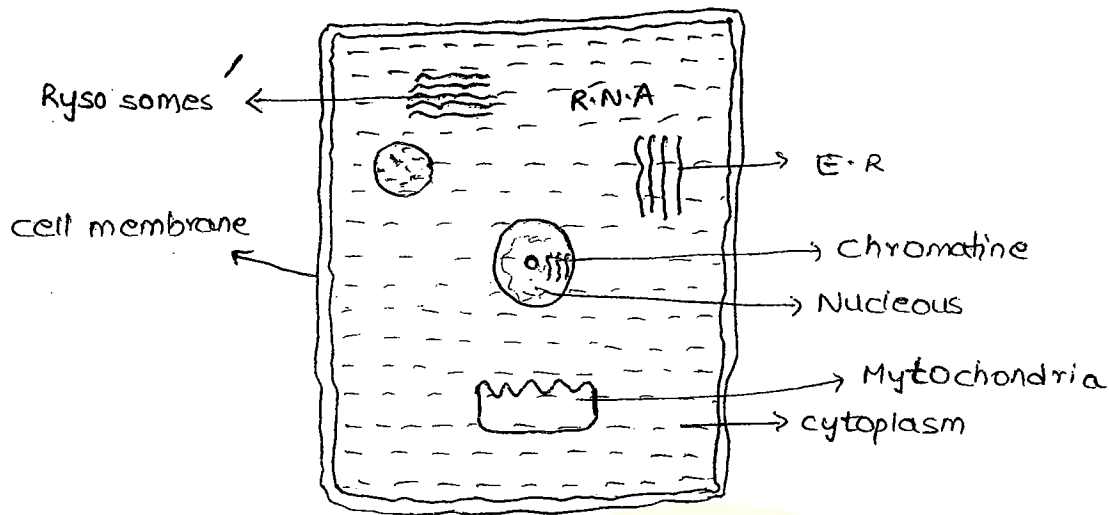
Cell membrane:-

1. A cell is covered by cell membrane.

2. All the nutrients into the blood enter into the cell through cell membrane.

Cytoplasm:-

1. It occupies large area in the cell.

2. It is a liquid part in the cell.

** Lyso somes :-

1. waste can be digested by Ryso somes.

2. It is called suicide bags.

** Ryso somes :-

3. It consists of RNA.

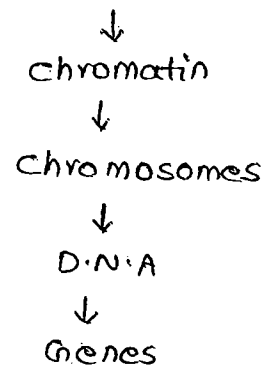4. proteins, are synthesized, these are called protein factories.

Endo plastiemic Reticulum:- (E.R).

1. It supports for movement of nutrients in the cell.

Nucleous :-

1. It was discovered by "Robert broun".

Universe ⟶ Human ⟶ cell ⟶ Nucleous
↓
chromatin
↓
Chromosomes
↓
D.N.A
↓
Genes

Chromatin:-

It is thread like Genetic material in the nucleus.

Chromosomes:-

1. there is a 23 pairs of chromosomes are there in our bod

    22 pairs — Autosomes

    1 pair — Sex chromosomes

Male   Female

X Y   X X

Girl child   boy child.
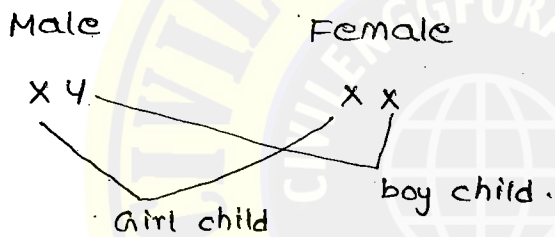
✳ Child sex determination:-

It depends on only Male (or) Father chromosomes.

D.N.A :-

1. D.N.A — De-Oxy ribo Nucleic Acid, discovered by Wattson and Crick in 1953.

2. D.N.A present inside the Nucleous

3. R.N.A present outside the Nucleous

4. It is a double helix genetic material.

5. D.N.A is made by Nitrogen based nucleoids and sugars

    a. Adenine

    b. Thymine   D.N.A is made by this 4 nitrogen based

    c. Guanine   substance.

    d. Cytosine

v.v.
** 6. D.N.A is a genetic material which as "ability of Replication"
*

Genes :-

1. Genes are segment of D.N.A.

2. Genes discovered by "Hoff Meister". The name given by "Waldayor".

3. Genes are a genetic material stored in the form of coding

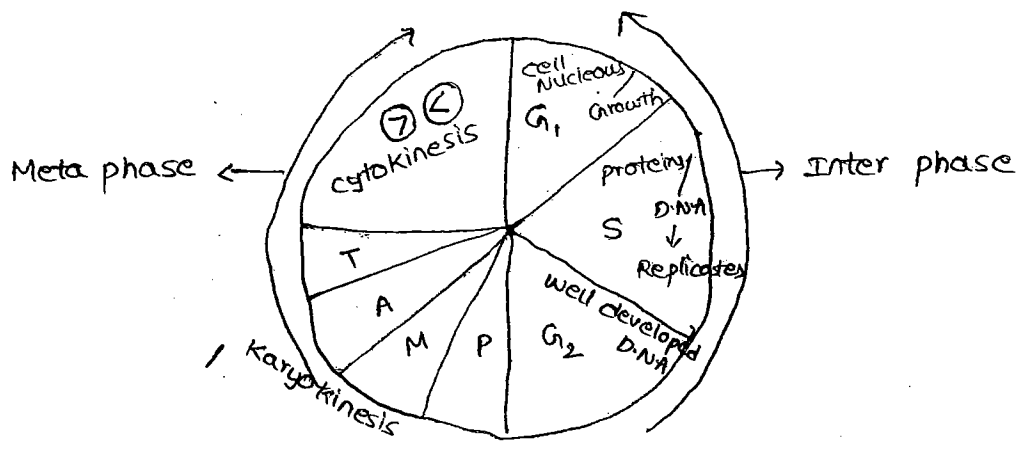4. Genetic coding developed by "Hara Gouind khurana" (Indian)
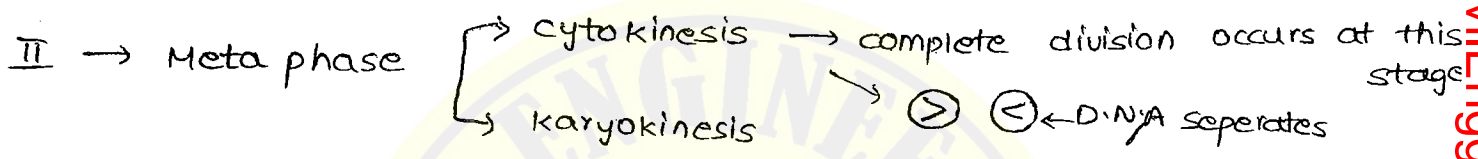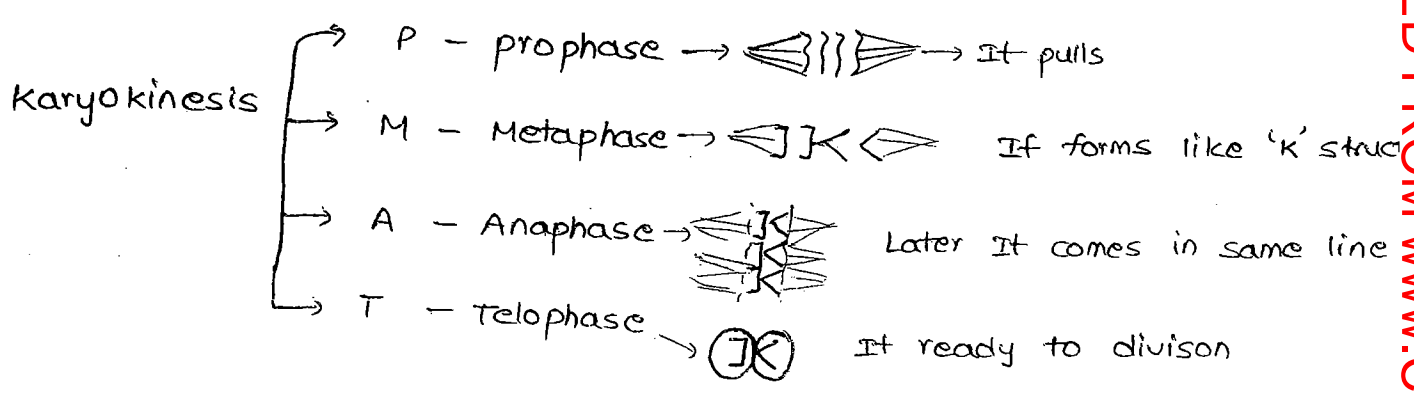
Jumping Genes :-

1. Jumping Genes discovered by Barbara Mc-clinton.

2. In 1990 "Human Genome" project started by America.

Myto chondria :-

1. It converts food into energy.

2. Energy stored at Mytochondria in the form of A.T.P (Adenine Tri phosphate).

3. It is called power house of the cell.

Cell cycle :-

(21)

I → Inter phase
- → G_1 (Gap-1) → cell growth, Nucleous growth
- → S → proteins and D.N.A. Replication (Synthesized)
- → G_2 → well developed D.N.A. (Gap-2)

Karyokinesis
- → P - prophase → → It pulls
- → M - Metaphase → → If forms like 'k' struc
- → A - Anaphase → Later It comes in same line
- → T - Telophase → It ready to divison

II → Meta phase
- → Cytokinesis → complete division occurs at this stage
- → Karyokinesis → ← D.N.A seperates
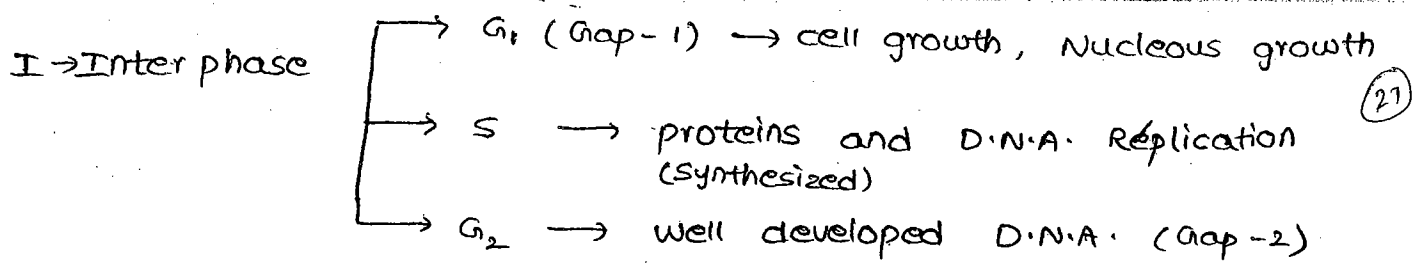
Cell divison :-

Mitosis	Meiosis
1. It generates stomatic cells. (Except reproductive cells (spermatova, ovum) all are called stomatic cells).	1. Half loid process Sexuall reproductive cells are generated. Fertilization occurs through Meiosis.
2. Duplicate (or) diploid cells which equally generated. (In our body some cells are dead, that cells only developed)	2. Mixture of cells generated.

∴ $2n$ cells $= 2n$ cells
(Mitosis)

$2n$ ← $2n$
      ← $2n$

46 cells / 46 cells
Male   Female
XY   XX
   \   /
46 cells (baby)

$2n$ ← n
      ← n
      ← n

$2n$ cells $\neq$ n cells
(Meiosis)
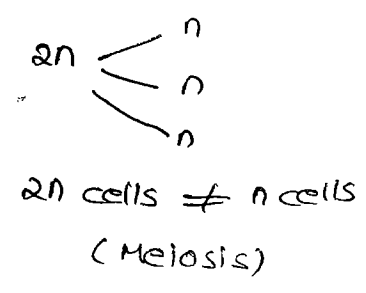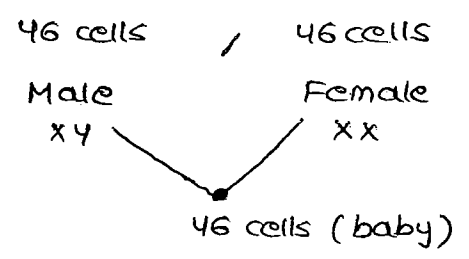
R.N.A. (Ribo Nucleic Acid) :-

1. It was also discovered by "wattson" and "crick"

2. It is located outside the Nucleus.

3. It is used for protein synthesis in the cells

* 4. Genetic material not found in R.N.A.

Reproductive system :

Reproductive system $\begin{cases} \text{Male} \\ \text{Female} \end{cases}$

Male $\longrightarrow$ Testis, covered by scortum, prostate glands

Semen
(or) $\Big\}$ life span 72 hours
Spermatova   120 million cells

A "puberty" comes in male due to sexual intercourse in 13-14 years.

Female $\longrightarrow$ 10 to 12 years

"puberty" comes in female which is called "Menarchy" (12 yrs)

Menaphose (50 years)

$\longrightarrow$ women reproductive capacity 12-50 yrs.

$\longrightarrow$ Each women produce 400 ovums or eggs.

Fertilization :-

2 – ovaries

2 – ovary duct (or) Fallopian tube

1 – Uterous

1 – cervics

1 – Sphinstor

1 – vagina

Ovary ⟶ follicles ⟶ Ovum (or) eggs produced. (26)

⟶ Leutinizing Harmone which is used to produced ovum.
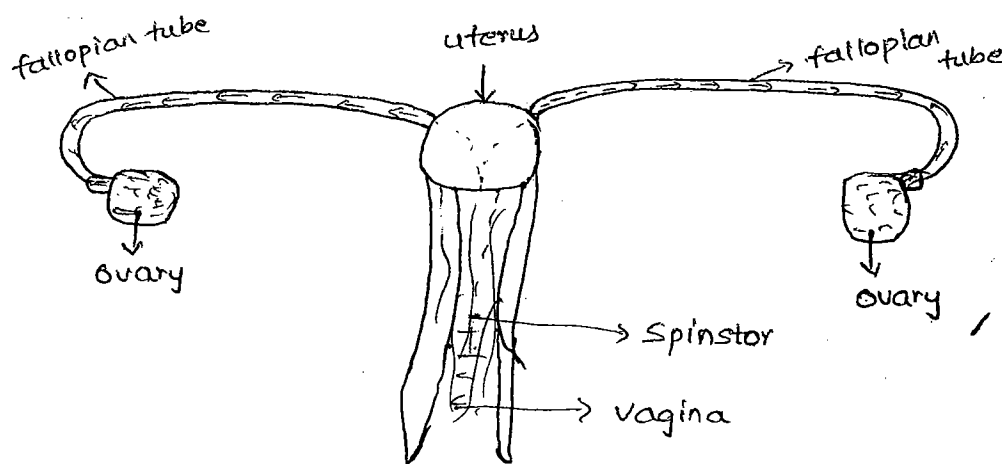
⟶ Fertilization takes place at "Fallopian tube"

⟶ Embry. After fertilization "zygote" forms in uterus.

zygote ⟶ Embryo ⟶ feotus. } all done in uterus

⟶ Menstrual cycle is 28 to 30 days.

⟶ After menstrual cycle (12 - 17) days ovum (or) egg produced

Twins:-

Identical twins:-⟶ when one ova release in women then

These are produced by Mono zygote. This type of twins maximum Male - Male (50%) (or) Female - Female (50%)

Non identical twins:-

These are produced by two ovums. Two ovums are get separately in fallopian tube. This type of twins M-M(as possible, F-F (25% chance), M-F (or) F-M (50% possible)

⟶ Few childrens -females after separation of zygotes in uterus few parts are added in b/w two children. /such type of twins are called Siameese twins. First discovered in China.

UNIT-9

ANIMAL KINGDOM

1. Father of Biology and zoology — Aristotle
2. Father of Botony — Theostratus
3. Father of Taxonomy — Linneous.

Based on spinal chord animals are bifurcated into two groups.

1. Non-chordata animal (No spinal chord)
2. Chordata animal (spinal chord)

Non Chordata	Chordata	
1. protozoa	1. Fish	
2. porifera	2. Amphibions	Cold blood animal
3. Coelendrata	3. Reptiles	
4. Platty Helmenthys	4. Mammals	Warm blood animal
5. Nimatty	5. Birds	
6. Annelida	6.	
7. Arthopoda		
8. Mullasca		
9. Echinoderma		

protozoa :-

1. Oldest animals on the earth in Non-chordata group
2. proto means First, zoa means animal.
3. First unicellular organs on the earth.
4. Always they can exists in salt (or) sea water and Fresh water.

Eg:- Uglena, paramisium, plasmodium, Amoeba.

porifera :-

1. pori means Holes, fera means have.

2. These are all sedentary animals. /

3. These animals can exists salt water and Fresh water

Eg:- Bath sponges.

**✳✳✳ Colendrata :-

1. Always they exist salt water or saline water.

2. They produced $CaCO_3$ silicons from their bodies.

Eg:- Jelly fish (false fish), Hydra, Sea pen, Sea fan, Corals

→ corals produced more $CaCO_3$ and silicon in sea. /

platty Helmenthys :-

1. platty means "flat shaped", Helmenthys means organs

2. Tape worm (or) Tinea soleum.

Nimatty :-

1. Round shaped organs

2. Ascaries (Hook worms)

Annelida :-

1. Ring structure animal comes under Annelida.

2. Earthworms → Friend of the farmer. /

3. Morrai sect. eats earthworms in Newzeland.

4. Leech → "Hirudine" (Anti coagulation agent) (blood sucking animal
   protein

✶.

Arthopoda:-

1. Largest animal group on the earth.
   Ex:- Mosquitoes, silk worm, ants, silver fish (book worms).

2. By birth deaf animals.

3. Ants produces "Formic acid".

**4. Silver fish never take water by birth to death.

Mullasca:-

1. soft skin animals covered by Hard shell
   - Eg:- Octophous (Devil fish)

          pinctodavulgaris (pearls are produced)

Echinoderma:-

1. Echino means Thorny, derma means skln.

2. Eg:- Star fish, Sea cucumber

Jelly fish ⎫
Star fish   ⎬ All these are not real fishes.
Devil fish ⎬ All are false fishes.
Silver fish ⎭

Chordata Animals:-

Fish:-

1. study of fish is called Icthiology

2. cultivation of fish is called pisciculture

3. All fishes comes under Oviparous except shark comes
   under Viviparous.

          Oviparous → eggs
          Viviparous → given birth directly like human

4. Fish meat is good for health, it is covered with scales.

5. Cat fish is banned in India because these fish doesn't have scales on her body.

Types of fishes:-

1. Mumbai Duck

2. Meckerol

3. Tuna

4. Torpeda (It produce electric rays)

Amphibion :-

1. Amphibion is a frog.

* 2. "Blue dart Mundukam" is a poisionous frog.

* 3. "Raccoforous" is a flying frog.

Reptiles :-

1. Study of snakes is called Sarpentology

2. All snakes comes under Oviparous except "Russle vaiper" comes under Viviparous.

3. All bite snakes medicine is there except "Russle vaiper" (there is no medicine for this bite)

4. Snake research institute is located in Mumbai (Maharaustra

5. "King Cobra" is the largest longest poisionous snake.

6. "Anaconda" is the longest less poisionous snake, south America native.

7. American phyton is the largest snake.

Birds :-

1. In birds No urinal bladder.
2. study of birds "Ornythology". Salim Ali is a Ornytho- logist
3. "Arctic Tern" is a bird, travells longest journey bird (Arctic to Antarctic it travells) (N-s it travells) in world.
4. "Wood coack", it travels longest journey in India (Himalayas to Nilagiri)
5. "Albetros" longest wings bird which can only fly over the oceans.
6. "Dow - Dow" bird is a Maritious country National bird.
7. "Swift bird" is a A. Japan National bird. It is a fastest bird.
8. Ostrich, Kiwi, Emu, penguin all are flight less birds.

Mammals :-

1. Apes comes under Mammals.
2. "Gibbon" is a smallest Ape
3. "chimpanze" is a wisest Ape.
4. "Gorilla" is a largest Ape. Native central Africa.
5. "Hallock Gibbon" is a Indian Ape
6. "Oranguton" is a Indonesia Ape. Asia's largest ape.
7. Toba lake is a Honey moon lake (Indonesia)

Blue whale :-

1. It is largest animal in Ocean (150 tonnes)
2. In land African Elephant is the largest animal.

Gestation period:-

1. Elephant — 600 days (Highest)

2. Goat and sheap — 149 days

3. Cat and dog — 60 days.

4. Horse — 336 days

5. Apozan — 12 days (least)

6. Ass — 340 days

7. women — 40 weeks (or) 280 days

8. Buffalo — 340 days

9. cow — 280 days.

UNIT - 10

PLANT ANIMAL KINGDOM

plant kingdom

- Cryptogamme (No flowers)
- phenerogamme (flowers) bearing

Under Cryptogamme:
- Thallophyta (soft bark) (No stems)
- Brayophyta
- pteridophyta

Under Thallophyta:
- Algae
- Fungi
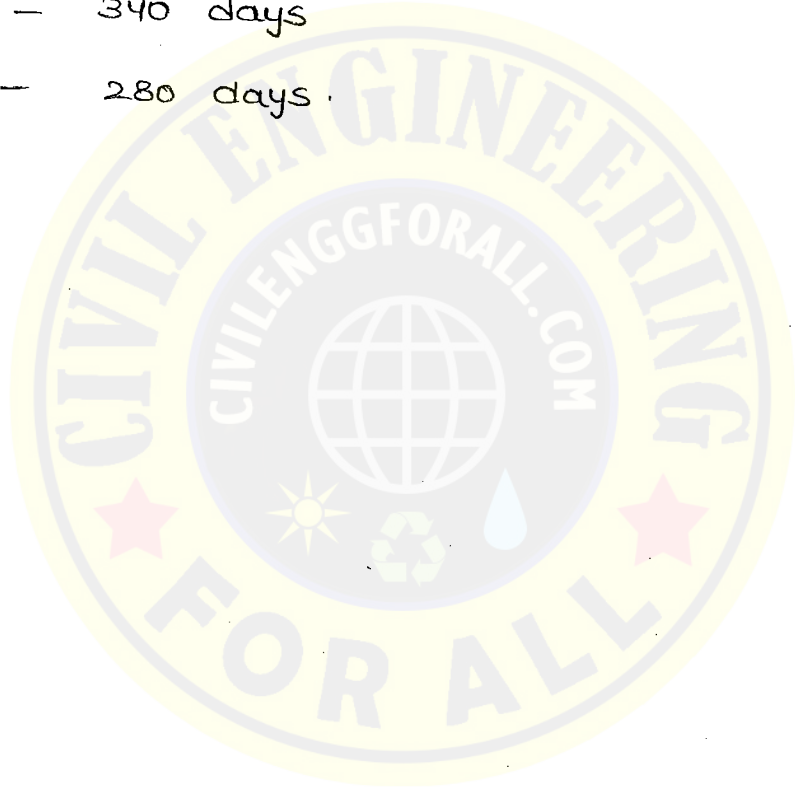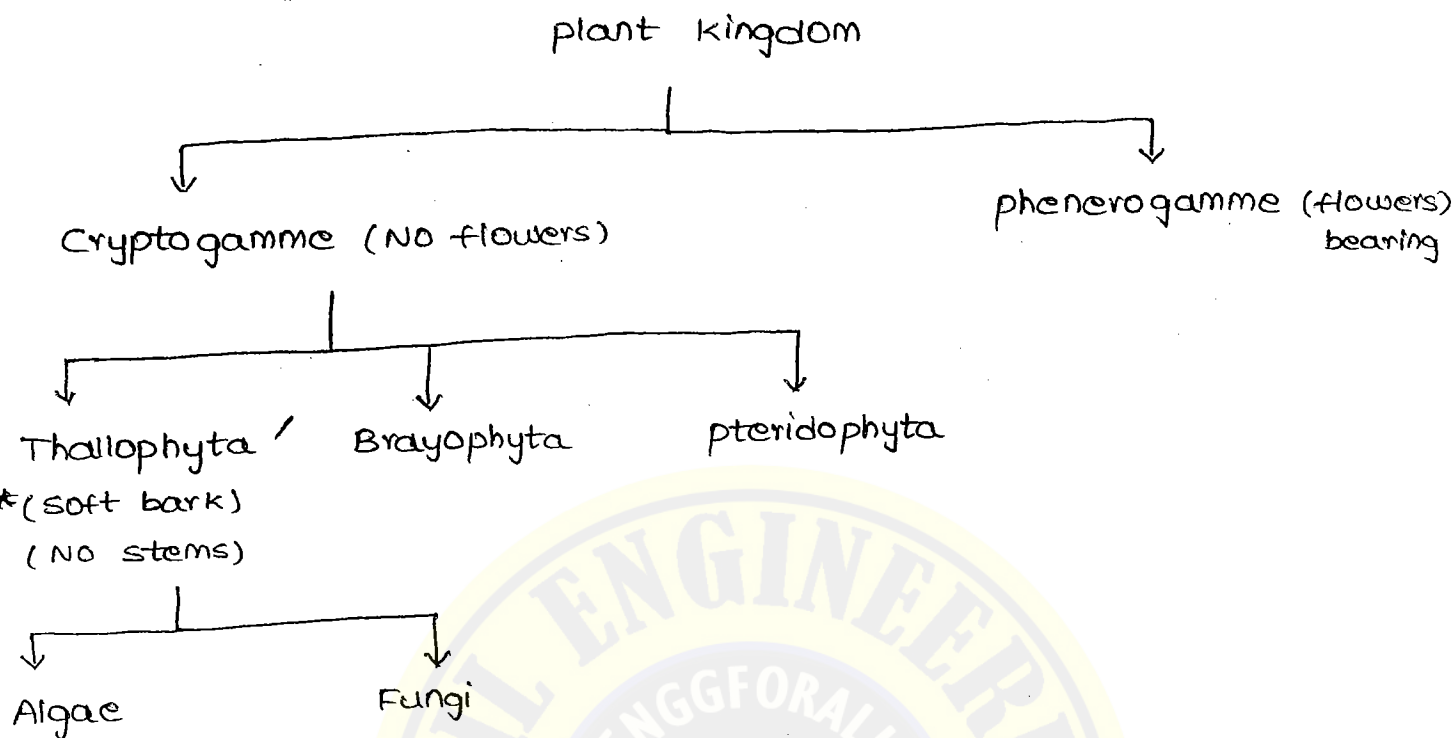
Algae :-

1. Study of Algae is called phycology

2. M.O.P. Ayangar is the father of Algae in the world.

3. It is a Autotrophs (they can make own food through Chlorphyll pigment).

* Types of Algae :-

1. Chlorilla ⎫ Mostly used Japan people
2. Spyrogyra ⎭

3. Sea Lettuce → U·K· people in used in making of Jelleys.

4. Blue - green - Algae (cyno bacteria) → Used in Bio-fertilizers.

** Fungi :-

1. Study of fungi "Mycology"

2. Mycology means "No chlorophyll" and "No photosynthesis".

3. Eg. of fungi is yeast

4. pencillin is comes from "pencillium Notatum fungi". It is invented by Alexander Flemming in 1927. It is a powerful anti biotic drug.

5. Button and penny Mushrooms are eatable mushrooms. It is in white color.

6. Toadstool (brown color), it is a poisionous mushroom.

7. 1 Algae + 1 Fungi symbiosis comes "Lichens". "Lichens" are produced for 1 Algae and 1 Fungi through symbiosis

8. "Lichens" used in medicine.

Bryophyta :-

1. Brayophyta is a "plant Amphibian".

2. Liver wrots Moses comes under Brayophyta.

Pteridophyta :-

1. pteridophyta comes "plant snakes" group.

EX :- Fern.

Gymnosperms :-

1. Well grown at Humid and cold.

2. It is a naked seeds

3. plant height is more.

4. Red wood forest (california) is a highest plant on the earth.

5. Devdhar plant comes under Gymnosperms.

Angiosperms :-

1. This plant are well grown in tropical and temparate region.

2. Seeds are covered by fruits.

Plant parts :-

*** 1. Root :-

a. xylem —— organic food
          —— water

b. phloem —— In organic food
           —— Other nutrients

→ Xylem supplies Organic food to plant.

```
                          Root
        |                  |                    |
        ↓                  ↓                    ↓
    Tap root           Fiberous            Adventious
    EX:- carrot        Ex:- Rice           Ex:- Sugarcane
        beet root          wheat
        radish             maize
        Turnip
        sweet potato
```
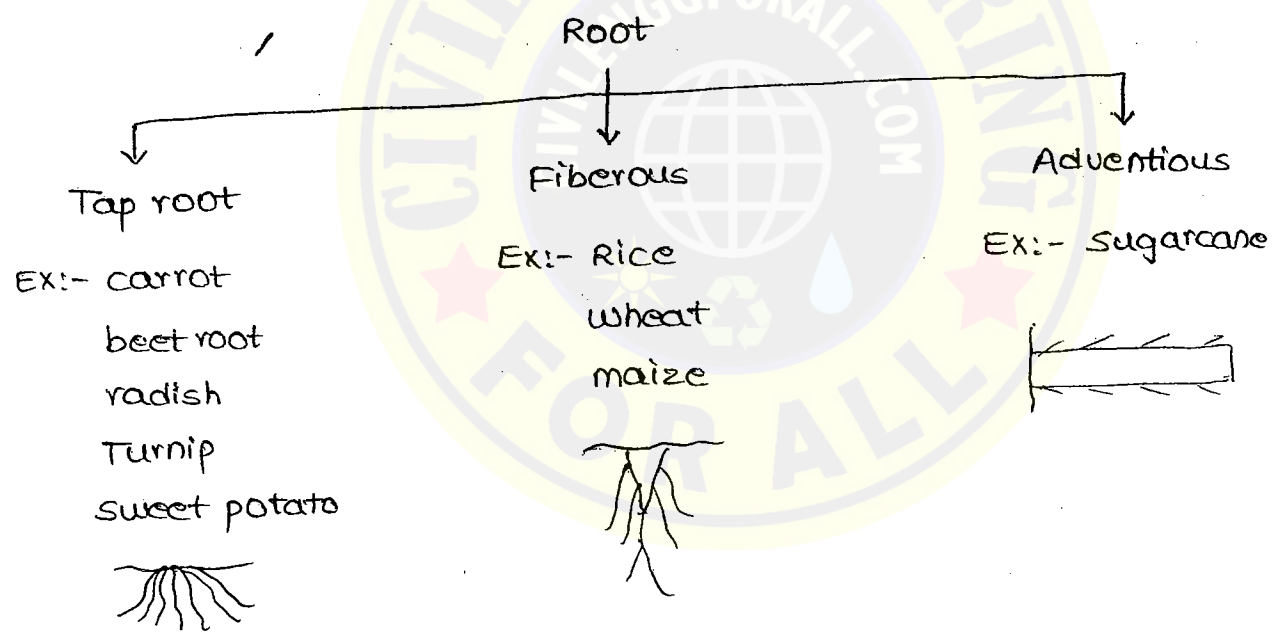
→ Banian tree comes under "Adventious root system" but it is a "prop root system".

2. Stem :-

```
                          Stem
    |              |               |                |
    ↓              ↓               ↓                ↓
 Rhizome         corm          Stem bulb        Stem Tuber
  It helps
  ↑ yellow
    color
Eg:- Turmeric   Eg:- khanda    Eg:- Onions       Eg:- potato
  (Curcumin)                       Garlic
Ginger
```

(33)
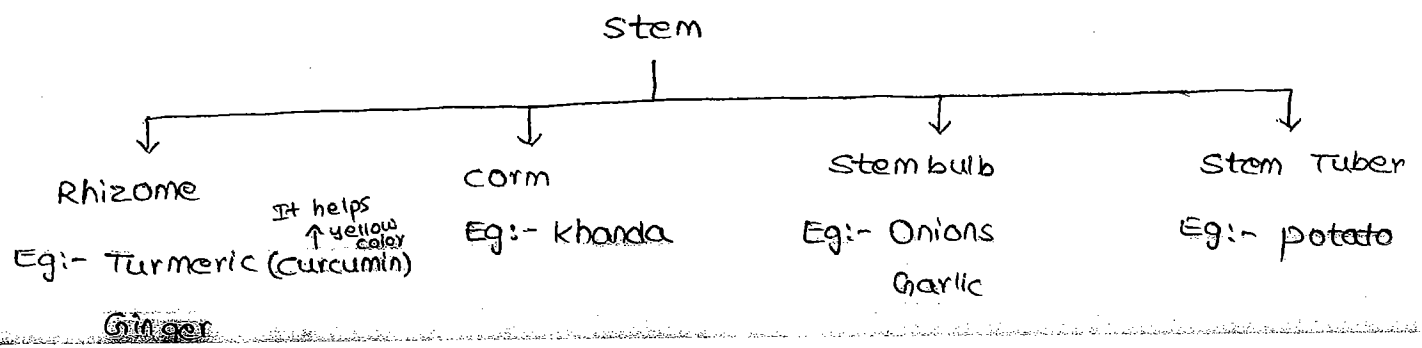
→ Tumeric largest producer in world is India (Bodhan Nizamabad)

3. Leaf :—
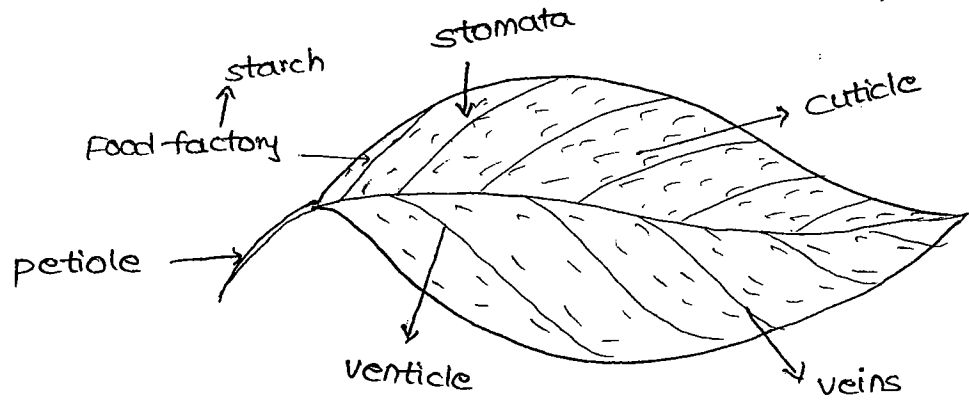
1. All leaves are called "Food factories" (starch)

2. Transpiration occurs in leaf.

    Stomata —— 75 - 80 % (More water evapouration)

    Cuticle —— 10 - 15 %

    Venticle —— 5 - 10 %

Flowers :—
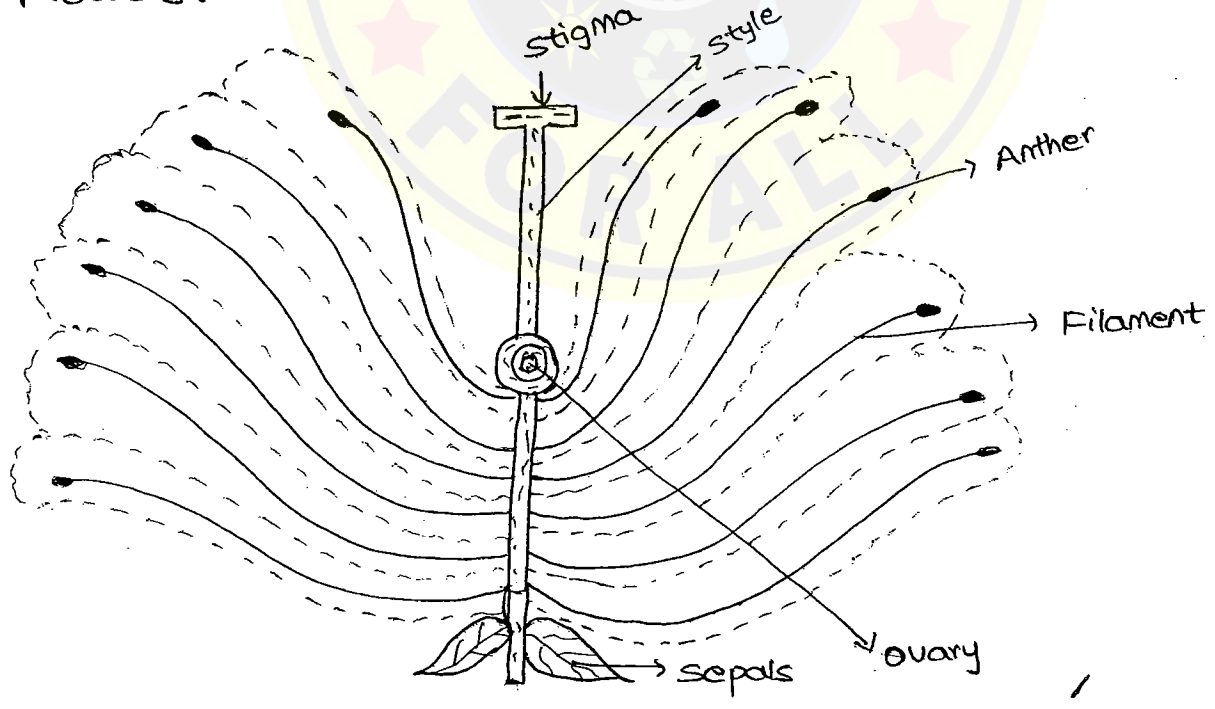
1. pollination grains are produced at Anther.

2. Anther → stigma → style → Ovary → seed → flow fruit
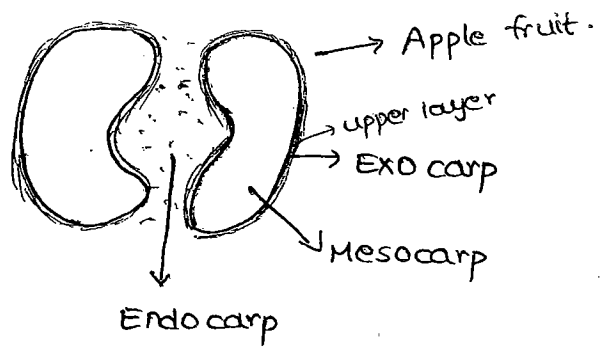
Fruit :-

→ In apple, Mesocarp is a eatable part.

Fruits are two types:-

1. False fruits:-

   Those fruits are fertilized outside the ovary.

   EX:- Apple.

2. True fruits:-

   Those fruits are fertilized with in the ovary.

   EX:- Brinjal, cocunut, Lady finger, Guava, Grapes, Date fruits, Tomatoes.

Plant Harmones:-

1. Oxytocins
2. Cyto kineins   } (+) { crop growth
3. Gibberlins   { plant growth
                           { fruit growth
                           { Leaf growth

                                                          "yallow"
                                                             ↑
4. Ascisic acids ———→ (-) { plants drop their leaves → Dormacy → drop
5. Ethalene   ———→   { "Fruit Ripenor"

/

UNIT – 11

BIO- TECHNOLOGY

1. Father of Bio-technology is "paul berg".

2. Bio-technology is also called "Genetic Engineering".

$$D.N.A = r.D.N.A \ (recombinent)$$

Ex:- Tomato + potato = pomato

Horse + Ass = Mule

3. "E-coli" bacteria is used in Bio-technology

Applications :–

1. clonning

2. A.R.T (I.V.F)

3. stem cells

4. G.M. crops

5. Bio-fertilizers

6. Bio pesticides

7. Bio fuels

8. Interferons

9. Insulin

10. D.N.A finger printing

Clonning :-

1. First clonning technology developed by "Ianwelmet" scotland (U.K) scientist in 1997.

2. First clonning animal in world is Dolly (sheep). "Asexual technology" is used.

3. clonning means xerox. creation of identical animals (or) Offsprings.

4. First clonning baby "Eve" in the world (2002, Dec)

5. physically Genetically same person can be created by using this clonning technology.

6. Us government banned this technology because of crime rate will increase.

7. First clonning animals in India (Hyderabad) are "Blocky and spotty" means Deer created by Central Cellular Molecular Biology (C.C.M.D). in 2009.

8. First clonning buffalo in India "Garima" and gave birth to "Mahima" created by "National Dairy Research Institute (N.D.R.I) karnal".

A.R.T

1. A.R.T — Asisted Reproductive Treatment (In vitro Fertilization (I.V.F))

2. First test tube baby in the world "Louis Brown". (1978)

**3. "Strepto Edwards" is invented Test tube technology.

4. Father of test tube is "Strepto Edwards".

5. A.R.T. (I.V.F) is a sexual technology, clonning is a Asexual technology (means men sperm is not used here)

6. First test tube baby in India "Baby Harsha".

**7. "Sargotting technology" means somebody "Uterus" given to lease for 9 months.

Stem cells :-

1. Regenerative cell technology

2.
→ This embryo taken for cell technology.

35
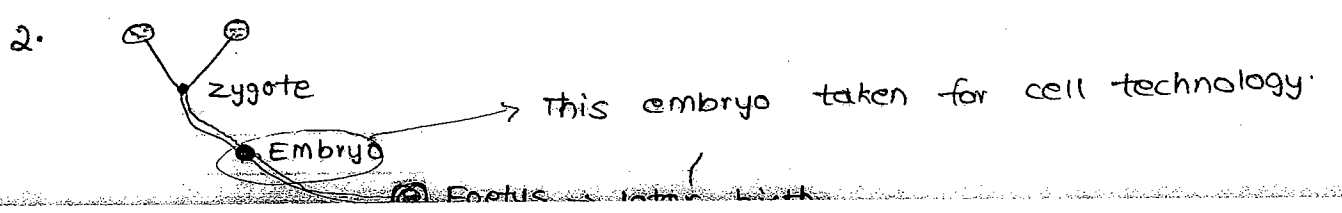
3. Embryo is taken out from womens womb and kept it in laboratory and make a heart, lungs, kidneys whatever by using embryo.

4. Cord blood bank is located in chennai.

5. cord blood means at the time of delievery the women there is a connection (thread) in b/w mother and child. By cutting that thread blood comes out. That blood is a cord blood. By using this blood, we can create body parts in laboratory.

G.M. Crops :-

1. Genetically Modified Crops

2. B.T. cotton — Bacillous Thurengenis cotton.

3. B.T. Brinjal is a pest resist. Bacillous Thurengenis is a poision. So B.T. Brinjal is ban in India.

4. B.T. seeds are Terminated seeds (these seeds are not use again). But without B.T. cultivation like tomatoes, these seeds are natural seeds it can use many again and again.

5. Normal brinjal seeds also used many times.

6. B.T. potato introduced in Europe, not for humans it is used for animals.

Bio-fertilizers :-

1. Blue-Green Algae (or) Cyno bacteria is used in Bio-fertilizers.

2. Rhizobium, Asphirillum both are used in Bio-fertilizers.

3. Bio-fertilizers are friendly eco fertilizers.

4. vermi compost — Earth worms is used

Bio - pesticides :-

1. 2, 4 D - Dichloro phenyl Acetic acid is a dangerous pesticides which is also called "Weedicide".

2. Chemicals in pesticides.

    a. D.D.T

    b. Endrin → Recently in south India "kerala" govt. ban this.

    c. Aldrin

    d. Malathion → It is used in Fish/poultry as a food. It is dangerous

    e. parathion

3. Bio- pesticides are friendly pesticides

    a. Canola Oil

    b. Mustard oil

    c. Neem Oil

Bio - fuels :-

1. ~~Bio~~ After 2030 due to ~~fossil fuels~~, every year 10 Lakh people died (in world wide)

2. Bio fuels in plants

    a. Jatropa

    b. pongamia

3. In Brazil sugarcane is converted into Bio - Ethanoil used in Fuel.

Interferons :-

1. "Interferons" can fight against "cancer disease". They kill the cancer cells.

Insulin :-

1. In past days Insulin is made by Horse, Ass, pig cells.

ENVIRONMENTAL TECHNOLOGY

Environmental
- Biotic (living)
  - plants
  - animals
- Abiotic (Non-living)
  - Temp.
  - Rainfall
  - Humidity
  - Pressu
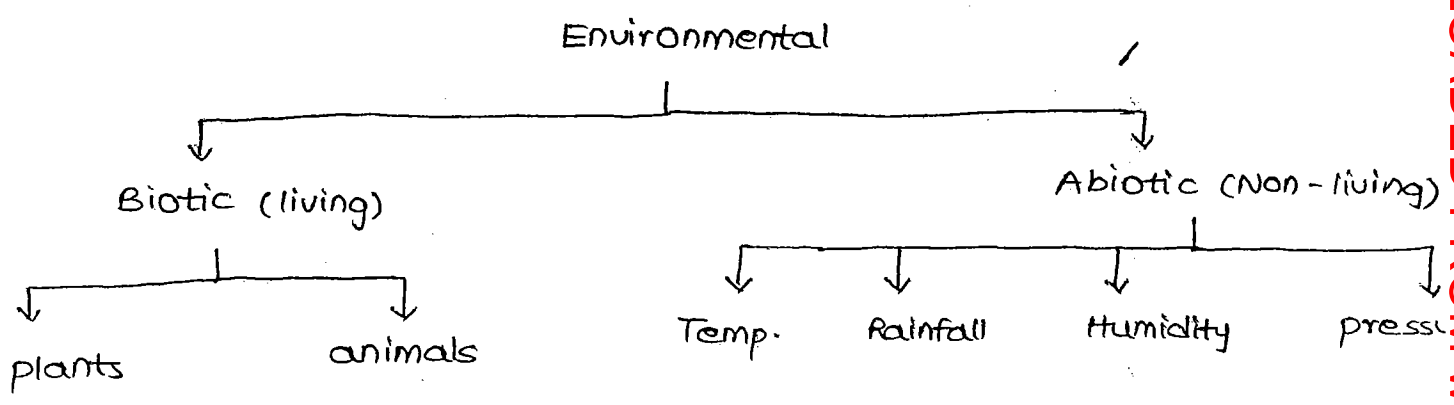
→ Ecology is a combination of both Biotic and Abiotic.

Sun ⟹ Energy → producers → consumers → Detrivores (o Decomposer ↓ Scavenger

consumers → P.C.   S.C.   T.C
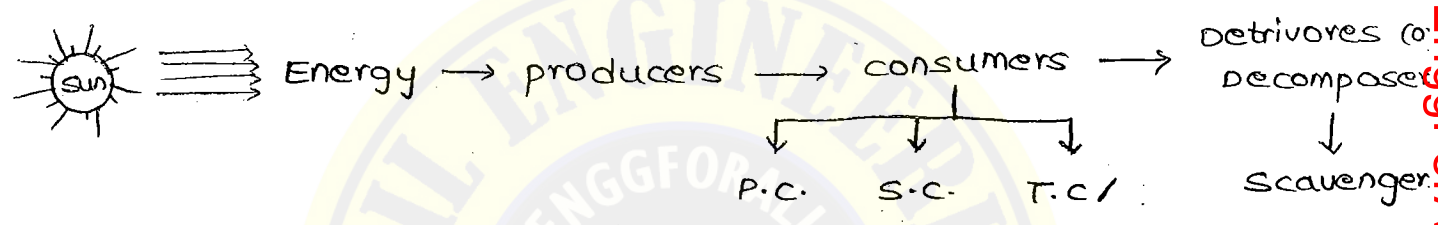
*** V.V.IMP

1. Cloud seeding
2. Acid Rains
3. Eutrification
4. Desertification
5. Wetlands
6. Green house effect

Cloud seeding:-

1. It means change of weather conditions, temporarily. These process is also called Artificial Rain.

2. Silver Iodide, potassium Iodide, Dry Ice (solid CO_2), are used in cloud seeding. These all are chemicals.

3. M.S.T. radar (Mesosphere, Stratosphere, Troposphere) is used for cloud seeding. M.S.T. Radar located in "Gadar" only one in India.

Acid Rains :-

1. NO_2 and SO_2 are responsible for Acid rains.

$$SO_2 \quad \overset{air}{\underset{pollutant}{\times}} \quad \overset{React}{\quad} \quad H_2SO_4$$
$$NO_2 \qquad\qquad\qquad HNO_3$$

$\Big]$ Acid rain.
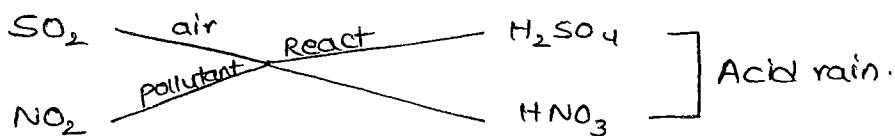
Eutrification :-

1. It is a Negative Environmental effect.

2. It is caused by phosphate added to water through detergents, fertilizers, sewage waste.

3. Due to' more phosphate in water Algae is formed. Algae means "phytoplanktons" (floating Grasslands) (pachi) increases.

4. phytoplanktons is a organic matter when it dead it converts to inorganic matter

5. Inorganic matter $\Rightarrow$ De-composition $\xrightarrow{\text{it absorb oxygen}}$ Oxygen is evaporated
   (Biologically O_2 demand) Hypoxia $\Longleftarrow$ loss of O_2 $\hookleftarrow$

6. Loss of oxygen in water "acquatic life animals" is effected.

Desertification :-

1. It means Degradation of soil ability (or) loss of water bodies.

2. In India desertification occur more in Rajasthan state

3. It is also Negative Environmental effect.

4. To control desertification Modi government brought "pradhan Mantri Deendayal Sinchayye yojana" scheme

5. Desertification leads to loss of vegetation and crops effect.

Green house effect :-

Albedo :-

1. Earth receives sun rays or radiation in the form of short wave length (s.w.L) and radiates in the form of (L.W.L) Long wave Length (or) Terrestrial wavelength.

Heat balance on earth :-

cloud + earth = 20% recei

only earth = 51 receiv
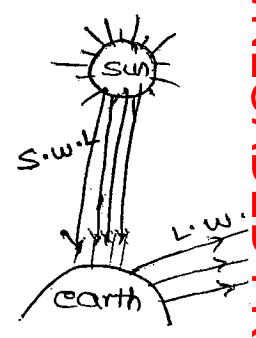
51 - 4 = 47% rays only received earth
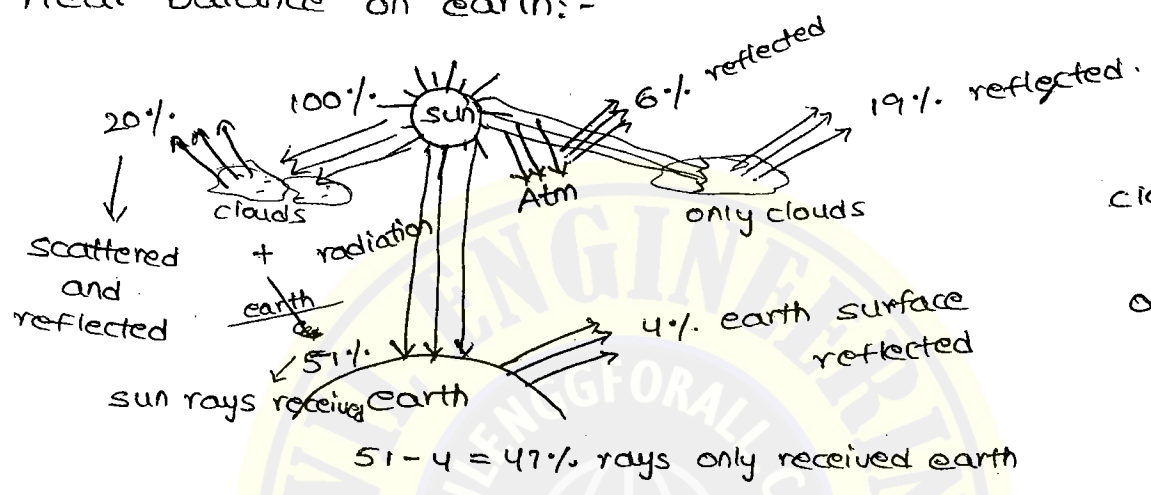
1. Water vapour hold more heat in the atmosphere.

2. CO_2 hold more heat in the atmosphere

3. Methane ⎫
4. NO_2 ⎬ Due to modern cultivation of agricultural method this gases produced more.
5. SO_2 ⎭

6. C.F.C.

Major pollutants :-

1. CO_2 :-

1. It is produced by incomplete burning fossil fuels.

2. It is produced by coal industries, steel industries an motor vehicles.

3. It is in black color.

4. If one part of CO_2 mix with 500 parts of O_2 then it is called "Corboxy H^b". It is a dangerous toxin to the human body.

2. Arsenic :-

   1. It is found in Industrial effluents and seewage water.

   2. It is responsible for cancer disease.

3. Lead :-

   1. It is produced by Motor vehicles and fossil fuels.

   2. It causes Anemia. Neurological problems occur.

   3. Lung disease may occur.

4. Mercury :-

   1. Mercury is derived from "chinnabar".

   2. It causes "Minimata disease" (brama padatam)

   3. At cold areas "Alcohol" type of thermometer is used

water	0° C evaporate
Mercury	−40° C (or) F
Alcohol	−115° C

5. SO_2 :-

   1. Building color changes

     Ex:- Taj Mahal.

   2. It produced by thermal power station.

   3. It causes Lung problems.

SPACE TECHNOLOGY (1Q)

1. First space father "Russians".

2. October - 4 is a world space day.

3. First man made space ship "sputnik - I", launced by Russia in 1957, Oct - 4th.

4. In 1957, Nov - 3, Russia sent first life (lika dog) in Space.

5. October 4 - 10 is a world space week.

6. In 1961, April - 12 "yuri -gagarin" a man went to space sent by Russia.

7. In 1962, J.L. Nehru appointed a comittee on "Indian National comittee on space Research" under the "vikram Sarabhai".

8. Father of Indian space "vikram sarabhai".

9. In 1963, First rocket launching station in India "Kerala".

10. Thumba Equitorial launching station (T.E.L.S) kerala.

11. First rocket in India is "Apachie".

12. I.S.R.O (banglore) established on Aug - 15, 1969, success rate is 87

13. N.A.S.A. established on 1956. success rate is 96%.

14. Russia "COSMODROME" success rate is 94%.

15. After formation of I.S.R.O, In 1972 two departments
    a. space commission
    b. Department of Science (D.O.S)

16. Now I.S.R.O working under D.O.S (Department of Science)

17. India's first space satellite "Arya bhatta" launching on April - 19, 1975. with the help of U.S.S.R.

18. IN 1979, Baskara is launching.

** 19. IN 1980, "Rohini" is launching. This is first India's Indigenously satellite. (without helping other countries)

20. IN 1984, first Indian went on to space "Rakesh sharma".

21. IN 1982 (INSAT) International satellite is launching with the help of U.S. but it fails.

* 22. IN 2002, METSAT (Meterological satellite) is launching

* 23. First Indian Meterological satellite is "Kalpana-I". in 2003.

24. IN 2004, Nov-20 First educational satellite "EDUSAT" is launching by I.S.R.O.

25. World largest Open University is "IGNO" (Indira Gandhi National Open University)

26. IN 2005, May-5 ISRO launching two satellites

   a. HAMSAT → Radio programming satellite.

   b. CARTOSAT → First Topographial satellite. (first)

27. IN 2008 Oct-22, "Chandrayan-I" PSLV C11 launched vehicle launching in "satish Dhawan space centre" (A.P)

28. Director is "Anna durai" (Lunar mission)

** 29. IN 2011 Oct-12, I.S.R.O. launching two satellites

   a. Mega tropics →(Joint venture of India and France)

   b. 3 nano satellites

     → S.R.M → Gives information abt Earthquake, Tsuenami, cyclong

     → ZUGNU → information abt Natural resources (Reservoir and River water)

     → VESSLESAT → Navigation purpose (Luxumberg venture)

→ In world First "Earth observation Satellite" "Mega tropics" launched India successfully. (Joint venture of India and France)

IQ **30.** 2013 July - 1 → Indian Reasonal Navigation satellite system (PSLV C₂₃)

        2014 April - 4 → I.R.N.S.S - 1B (PSLV C₂₄)

        2014 Oct - 15 → I.R.N.S.S. - 1C (PSLV C₂₆)

              ↓   ↓

          (Satellite name)   (launched vehicle)

31. Satish Dhavan space centre, Nellore (A.P).

32. In 2013 NOV - 5, "Mars Orbitor Mission (M.O.M)", Mangalya launched vehicle is (PSLV C₂₅)

IQ **33.** In 2014 Jan - 5, <u>"G-SAT-14"</u> through launched vehicle
                    satellite name

<u>GSLV - D₀₅</u>

34. G-SAT means "Geo Synchronous Satellite" which is similar to "IN-SAT Satellite"

35. Crayogenic technology having only few countries

    → U.S.A

    → FRANCE

    → Japan

    → china

    → Russia.

36. Crayogenic technology is a engine. Crayogenic means "study of low temperature".

37. Crayogenic engine success

every country seperately 90 crores invested for crayogenic engine {

U.S.A - 2 (First attempt fail, second time success)

France - 1 (first time success)

Japan - 2

China - 2

38. IN 2014, Jan-5 India invented crayogenic engine without any help. IN first attempt India got success. After France, India only attain first time success. /

$$INDIA - 1 \text{ (First attempt success)}$$

→ 6th country having a crayogenic engine with low cost of 40 crores.

39. IN 2014 ~~Jan~~ June 30 (PSLU C_{23}) by Satish Dhavan space centre.

$$\left.\begin{array}{l} \text{Canada} - 2 \\ \text{Germany} - 1 \\ \text{Singapore} - 1 \\ \text{Belgium} - 1 \end{array}\right\} \text{5 foreign satellites at a time}$$

India is launching only two ~~tin~~ type of satellites :-

INSAT (or) satellite   G-SAT

uses
1. Tele communication ~~satellite~~
2. Telemetry
3. Radio programming
4. Television
5. Tele education ~~satellite~~

I·R·S satellite

uses
1. physical Resources estimation
2. Fisheries wealth in ocean
3. Water, crop estimation
4. Cyclones warning

→ INSAT (or) G-SAT Largest network satellite in Asia
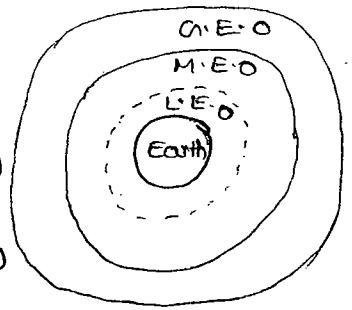
→ IN 2005 "INSAT 4A" D·T·H service (T·V·channels) ISRO tie up with TATA.

Satellite Orbits :-

L·E·O — Low Earth Orbit (below 2000 km)

M·E·O — Medium Earth Orbit (2000-35786 km)

G·E·O — Geosynchronous Earth Orbit

(35786 km above)

→ G·E·O· satellites are presentig at very height on earth.

Navigation System :-

1. U·S·A — G·P·S· (It is a combination of 24 satellites)

2. Russia — GLONAS (Global Navigation system) (~~24 sateu~~

3. Europe — GALELEO

4. India — I·R·N·S·S· (It is a combination of 7 satellites)

** → G·SAT (or) INSAT satellite revolves around the earth every "24 hours"

International space station :-

1. Salyut (Russia)

2. Skylab (U·S·A)

**3. Mir (Russia)

4. I·S·S → present working space station

5. Space tourists

→ "Denis Tito" is a first space tourist. He is a man (2001)

→ "Mark shuttle worth" is a second space tourist → 2005

→ First women space tourist "Anousha Ansari" → 2006

→ First women space scientist "valentina Terishkova" → 1963.

Launch vehicles:-

1. S.L.V → Satellite launch vehicle. It carries only 40 kgs.

2. A.S.L.V → Augment Satellite launch vehicle → 150 kg carried

3. P.S.L.V → polar satellite launch vehicle → 1500 kg carried

4. G.S.L.V → Geo synchronous satellite launch vehicle → 3000 kgs.

**5. MARK-III (It works on 2017)

   → Mark III is developed by India recently.

ISRO branches:-

1. VSSC → Vikram Sarabhai Space Centre (Thiruvananthapuram)
                    ↓
2.   1. U.R. Rao
            2. Vikram Satish Dhavan
            3. Madaunair
            4. Radha krishna → present ISRO director.

2. S.A.C → Space Application Centre (Ahmedabad, Gujarat)

3. I.S.A.C → Indian space Application centre (Banglore)

4. ANTHRAIX Corporation → Banglore

5. M.C.F → Master control facility (Hassan (karnataka), Bhopal (M.P))

6. Liquid propulsion centre → Mahendragiri (Tamilnadu).

   → "Crayogenic engines" are made in "Mahendragiri (Tamilnadu)

7. Deep space Network → Bylalu (karnataka)

   → It is only one centre in Asia.

8. N.R.S.A → National Remote sensing Agent (Hyderabad).

Nuclear technology :-

1. The first person who suggested for Nuclear technology is "C.V. Raman" (1932)

2. In 1945, Tata Institute of Fundamental Research (T.I.F.R) established in Mumbai. Director is H.J. Baba

3. Father of Nuclear technology in India "H.J. Baba"

4. May – 11   Technology day

   Sep – 15   Engineers day

   Feb – 28   "World science day".

5. 1948 ⟶ A.E.C.

✱6. 1954 ⟶ D.A.E (Department of Atomic Energy) is directly under the control of "P.M" (Modi). He is a chairman of D.A.E. "P.M" only chairman of D.A.E.

   ⟶ First chairman of "D.A.E" is Jawaharlal Nehru.

   "D.A.E" ⟶ (under the control of "P.M")

1. A.M.D (Hyderabad)	1. Heavy water board (Mumbai)	1. Nuclear power corporation of India Limited (Mumbai)
2. Indira Gandhi centre for Advance research (Kalpakam, Tamilnadu)	2. Indian Rear earth (Mumbai)	2. Uranium corporation of India limited (Jaduguda, Jharkhand)
3. Variable Energy cyclotron centre (Kolkata)	3. Board of Radio Isotrop technology (Mumbai)	3. Electronic corporation of India limited (Hyderabad)
4. Central administrative Tribunal (C.A.─	4. Nuclear fuel complex (Hyd)	
4. Centre for Advance Technology (Indore, M.P)		

Nuclear Energy:-

1. ~~present~~ Nuclear energy is 2.8% → 4800 M.W

2. present India installed ~~Nuclear~~ power capacity is 2.32 Lakh M.W
   $\downarrow$ paper statement

      2020 → 20,000 M.W

      2032 → 63,000 M.W

      2050 → $\frac{1}{4}$th of total power

3. As per records India's installed power capacity is 2.18 Lakh M.W

Nuclear Test:-

1. First Nuclear test conducted in May-18, 1974 - at "Phokron" (Rajasthan).

2. Missile testing conducting at Weelar Balasore] (odisha)

3. "Buddha smiling" is a First nuclear test name. At that time Indira Gandhi is a P.M.

4. Second Nuclear test 1998 May-11 — Vajpayee is a P.M. This test name is "Operation shakthi".

5. Raja-Ramanna is a Nuclear scientist

6. In 1998 May-13 Vajpayee govt. conducting two minor nuclear tests.

Heavy water plant:-

1. In 1962, First heavy water plant in India "Nangal (punjab)" It use in Nuclear Reactor as a moderator.

2. Rawatbhatta → Rajasthan

3. Hazeera } Gujarat.
   Baroda]

4. Tuticorn $\longrightarrow$ Tamilnadu.

5. Manuguru $\longrightarrow$ Telangana (First heavy commercial water plant in India)

Nuclear reactors in India :-

1. Apsara $\longrightarrow$ First swimming pool reactor in India

2. zerlina $\longrightarrow$ Decommissioned Recently.

3. Purnima

4. Dhruva $\longrightarrow$ Largest reactor in India

5. kamini $\longrightarrow$ ~~Only~~ mixed Oxides (MOX) reactor in India. It is only one in world.

Types of Reactors :-

1. pressurised heavy water reactor (P.H.W.R) ⎫ It works
2. Advance Heavy water reactor (A.H.W.R) ⎬ Uranium and plutonium
* 3. Fast Breedor Test reactor $\longrightarrow$ It works on "Thorium".

Advantages of Nuclear technology :-

1. Radio Isotopes

$\longrightarrow$ It use in chemotherapy

$\longrightarrow$ C14 dating (living organism (fossiles))

$\longrightarrow$ Uranium dating (Non living $\longrightarrow$ Earth, Mountains, Rivers

$\longrightarrow$ G.M. process (Gregar Muller) used in Agriculture.

$\longrightarrow$ "kerato Milleusis" treatment used for Eye Operation.

DEFENCE TECHNOLOGY

Missile technology:-

1. In 1958 D.R.D.O (Defence Research Development Organisation) established.

2. D.R.D/L (Defence Research Development Laboratory) A.P.J. Abdul Kalam is a director.

3. I.G.M.D.P (Integrated guided Missile development program) given to Abdul kalam for development of Missiles.

4. Abdul kalam developed 5 Missiles. So he is called Father of Indian Missiles.

   a. Prithvi Missile :-

      → India's first Indigenously built Missile.

      → prithvi Missile range   I - 150 KM   "Surface to Surface" purpose

                                  II - 250 KM

                                  III - 350 KM

   b. Trishool Missile :-

      → India's first short range Missile (0.5 KM ~ 9 KM)

      → Surface to air purpose.

   c. Akash missile:-

      → It is a medium range Missile (25 KM)

      → surface to air purpose.

  **d. Ngag Missile :-

      → "Anti-tank ballastic Missile"

      → It range is 6 KM

      → Fire and Forget Missile.

e. Agni Missile:-

→ It is a Intermediate Ballastic Range Missile.

→ surface to surface purpose.

→ Agni - I (700 KM) ⎧ All five
Agni - II (1500 KM) ⎩ First version's developed by Abdul Kalam

Agni - III (2500 KM)

Agni - IV (3500 KM)

Agni - V (5000 km)

Agni - VI (8000 KM)

⁎ → "Avinash Chander" is the father of "Agni Missile".

New missiles:-

1. Brahmos missile

→ Sivadanu pillai is a father of this missile.

→ It is a first Super sonic cruise missile, in India

→ Brah | mos
Brahma- | Moscow
putra | (Russia)
(India) |

→ Sonic → 332 m/s (or) 1 Mac ⎤
→ sub sonic → below 1 mac ⎥ India is having all
→ Super sonic → 2-4 Mac ⎥ these three
→ Hyper sonic → 4 mac → (America) ⎦

2. Sagarika missile :-

→ India's first under water missile . It is also called K₁₅ missile.

3. Astra missile:-

→ India's first Air to Air missile.

→ Range 25-43 KM.

4. Dhanush missile } visual range Ballastic missile
   Sourya missile } (V·R·B·M)

5. Surya missile — Inter continental Ballastic Missile (I·C·B·M)

   I – 5000 KM range

   II – 10,000 KM range

   III – 15,000 KM range

   IV – 20,000 KM range.

6. Tejas Missile — Light combat Aircraft (India's first light combat Aircraft)

7. Sarus Missile — Light Transport Aircraft (L·T·A)

8. Dhruva Missile — Advanced Light Helicopter (A·L·H)

9. Airavat — It is a warship (Kolkata)

10. Arihant — India's Nuclear sub-marine warship (Vishakapatnam)

11. Vikramaditya — It is a largest warship in India In Russia "Vikramaditya" also called "Gorsh kov".

War tanks :-

1. Tunkuska

2. Bhima

3. Arjun — Largest sophisticated war tank in India. It is built in Avadi (chennai)

4. T-72

5. T-90

Stealth war ships :-

1. I·N·S sahyadri

2. I·N·S Sathpura

3. Raniabbakka — It is a India's largest "Off shore patrol vessel".

4. I.N.S. kadamba — It is a advanced Naval base located at "Karwar (karnataka)".

→ It is inagurated by Sonia Gandhi

→ It is a Asia's largest "Naval base".

→ It is also called "project sea bird".

5.

Army	Navy	Airforce
6 + 1 = 7	3 + 1 = 4	5 + 2 = 7

6 – operational commands

1 – traning command

→ All these three Head quater is "Delhi".

1. National Institute of Oceonography — Goa.

2. National Defence Acadamy (N.D.A) — Khadakwasla (Maharastr)

3. National Defence college (N.D.C) — Delhi

4. Indian Naval service (I.N.S) — Sathavahana (vishakapatnam)

5. I.N.S — Lonavala ⎤
6. I.N.S — kunjali │ Maharashtra
7. I.N.S — Aswini │
8. I.N.S — Sivaji ⎦

9. I.N.S — Agrani (Tamilnadu (coimbatore))

Miscellaeneous :-

1. In Internet users :

   First china

   Second U.S.A

   Third India

2. Mobile users

   1. China

   2. India

3. Mobile density 74.5 % (2012) (or) 79 % (2014)

4. World Fastest computer introduced by china named "Tianhe - 2"

5. In India fastest computer "param yuva - II"

6. Facebook founder "Mark zuckerberg" introduced in 2004. Young billionire in the world.

7. W.W.W introduced in 1989. Founder "Timberners - Lee"

DISASTER MANAGEMENT (10 Q)

1. Free universe physically, biologically, chemically, socially and culturally changes.

2. Change is a continuous process in the universe.

3. Due to natural disasters 4% death, 2% global financial loss occuring in the world.

4. In India 27 states out of 36 offenly affected to Natural disasters.

5. Disaster is a combination of two french words.

  Des — bad

      (bad star or Evil star)

  Aester — star

6. Disasters are divided into two types.

  1. Natural disasters

  2. Manmade disasters

Natural disasters	Man made disasters
1. Earthquake } 59%	1. Road accidents
2. Tsunami	2. Train accidents
3. Cyclones — 8%	3. Flight accidents
4. Floods — 12%	4. Boat accidents
5. Droughts — 68%	5. Industrial accidents
6. Land slides — 1%	6. Nuclear accidents
7. Volcanic Erruptions — 1%	7. Electrical fire
8. Heat wave } below 1%	8. Epidermic disease.
9. Cloud burst	
10. Mine fire	
11. Forest fire } below 1%	
12. Snow Avalankies	

7. Disaster is a combination of Hazard and (low intensity) Vulnerability. (High intensity).

Types of Hazards:-

1. Geological Hazard:

   a. Earthquakes and Tsunami

   2 b. Volcanic Erruptions ;

      a. Land slides

      b. Dam burst

   3 c. Mining fire

2. Meteorological Hazards :-

   1. Cyclones

   2. & floods

   3. cloud burst

   4. Hurricanes and Tornadoes

   5. Drought

3. Environmental Hazard:-

   1. Deforestation

   2. pollutants

** 4. Bilogical Hazards:-

   1. Epidermis disease like Ebola

   * 2. Destruction of Mass weapons

   3. pest infection.

5. Industrial Hazards:-

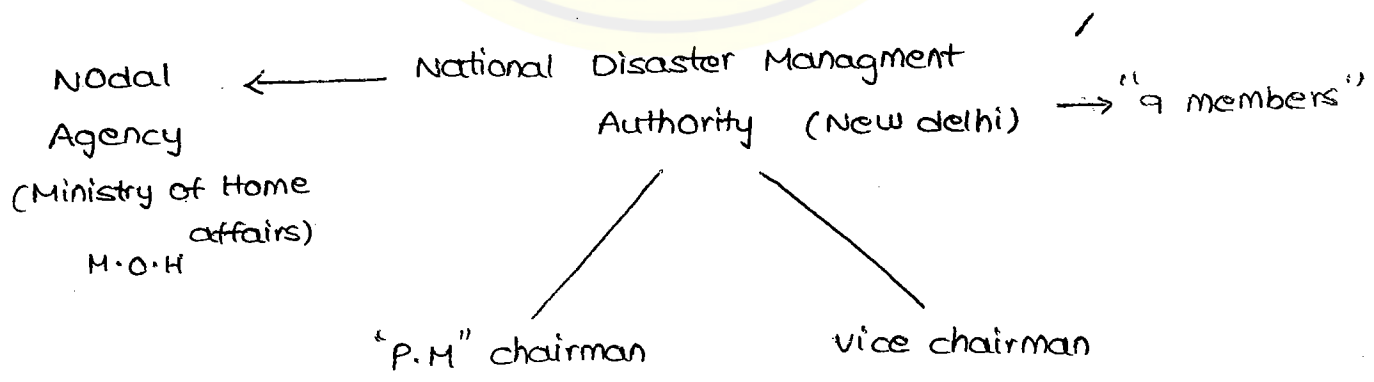   1. Bhopal tragedy (Methyl Isocynate M.I.C)

Vulnerability :-

It depends on sect, tribe, literacy, area, sex, Age.

→ 29th October is called National Disaster day.

→ 8th October is National Disaster Reduction day

→ (1990 - 1991) is International Disaster Decade of Reduc declared by U·N·O.

Disaster Management Cycle :-

1. In 1999, A Hy high power comittee was setup under the chaimanship of "J·C· panth" on disasters in India.

2. After 'Buj Earthquakes" Gujarat state govt· and Damar Diu brought first Disaster Management Act in 2003.

3. Indian parliament brought National Disaster Manageme Act in 2005.

4. According to N·D·M·A, National Disaster Management Authority was setup in central level.

**Central level structure :-

Nodal ←——— National Disaster Managment "9 members"
Agency Authority (New delhi) →
(Ministry of Home
affairs)
M·O·H

"P·M" chairman   Vice chairman

National Disaster Response force (N·D·R·F) :-

1. At present 8 battaleons are there·

a. South India (chennai and Mangalagiri)

b. For all North Eastern states only one battaleon is

3. Each battalian 1000 members soldiers.

National Institute of Disaster Management (N.I.D.M):-

1. At present it is a Deemed University (Delhi).

2. President is Home Minister, Vice president is vice chairman of N.D.M. Authority.

3. It releases Ø Journals on National disasters.

4. IIT Delhi, kharakpur, Geo physical research Institute, Hyd. IIM Mumbai are official members of NIDM.

**** 5. A cabinet comittee on natural calamities, a cabinet comittee on security are part of the N.D.M. Authority.

National Crisis Management council :- (N.C.M.C)

1. It works under N.D.M. Authority at National level.

N.D.M. Authority

planning comission   N.I.D.M   N.C.M.C   C.C.S   C.C.C   N.D.R.F
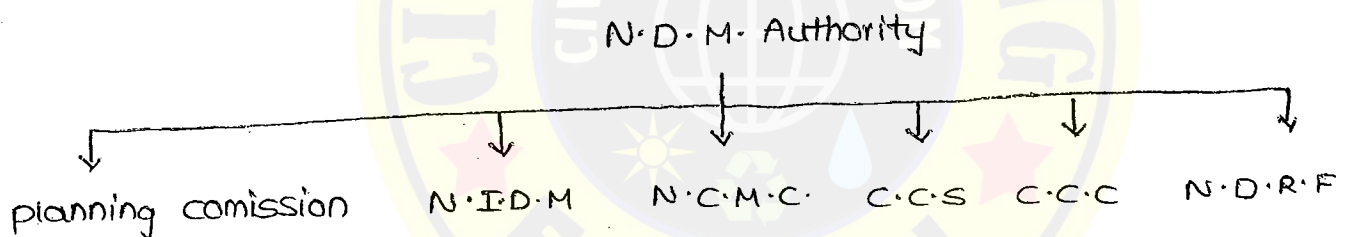
2. N.C.M.C works under cabinet secretary

State structure:-

1. S.D.M.A — State Disaster Management Authority

2. S.D.M.A works under "Chairman C.M" (chief Minister)

3. S.R.R.D.M — State Relief and Rehabitation Disaster Management. It works under chief secretory
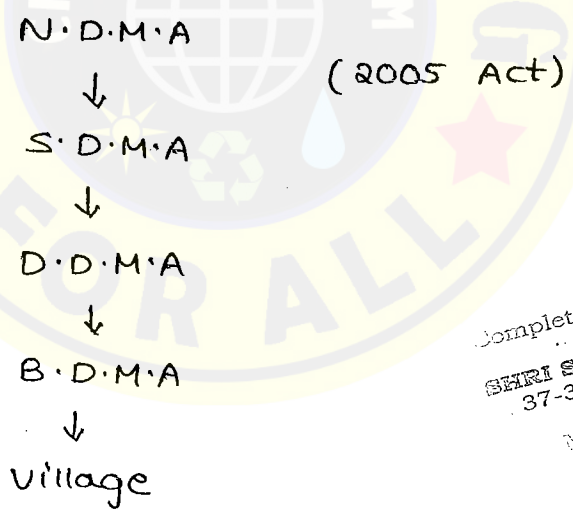
4. S.D.R.F — State Disaster Response Force.

→ At present in India 15 states setup their own Disaster Response Force.

D.D.M.A — District Disaster Management Authority

1. It works under District collectors.

2. A few committes under D.D.M.A.

   a. Health department

   b. Irrigation

   c. sanitation and water

   d. vetornary department

   e. Fire and saftey

   f. police department.

B.D.M.A :-

1. Block disaster Management Authority (B.D.M.A).

2. It works under Block development officer.

3. Village works under Surpanch.

$$N.D.M.A \\ \downarrow \qquad (2005 \text{ Act}) \\ S.D.M.A \\ \downarrow \\ D.D.M.A \\ \downarrow \\ B.D.M.A \\ \downarrow \\ Village$$

Disaster cycles:-

1. pre - disaster — planning

2. During - disaster — Respond

3. post - disaster — Relief and Rehabilitation Recovery.

Risk:-

Risk is a combination of "Preparedness" and "Mitigation".

"Mitigation".
↓
"Reduce the risk"

"Preparedness"
↓
Evacuation
planning
warning system
Shelters

Few Organisations :-

1. United Nation Disaster Management Team (U·N·D·M·T):-

    1. It is/ sponsored by General Assembly of U·N·O·

2. Indian National Army (I·N·A):-

    It is setup in 1942.

3. N·C·C :-

    It is setup in 1948.

4. Homeguards :-

    It is setup in 1946. It is a orderly system.

5. Nehru vikas yojna kendras :-

    It is, setup in 1972.

**6. National Civil defence college :-

    It was setup on 29th April 1957 at Nagpur (Maharashtra)

    It is also called "Central Emergency Relief training Institute".

7. South Asian disaster Management Institute :-

    It is located in Delhi.

8. C·R·F - Central calamity Relief Fund :-

    central : state

    / 75 : 25

9. Central Relief calamity comission Fund (C.R.C.C.F):-

It is completely under the control of central govt

Disaster Intensity Division :-

I → Small disaster → 10 people died → 1 km²

II → Medium disaster → 10-100 people died → 1-10 km²

III → Large disaster → 100-1000 people died → 10-100 km²

IV → Hazard → 1000-100000 → 100-1000 km²

V → Vulnerability → above 1 lakh → above 1000 km²

Disaster and Nodal Agency :-

Disaster	Nodal Agency
1. Cyclone	1. Indian Meteorological organi-sation (I.M.O). It works under Ministry of earth scienc
2. Flood	2. Ministry of water Resources
3. Land slides	3. Ministry of Mines and Resources
4. Forest fire	4. Ministry of environment and fores
5. Drought	5. Ministry of agriculture and cooperation.
6. Bio pesticides	6. Ministry of health and family welfare.
7. Road accidents	7. Ministry of Road transport and highways.
8. Nuclear accidents	8. Department of atomic energy
9. Flight accidents	9. Ministry of civil aviation.

Forest fire: -
* 5.

Drought :-

1. It is, a absence or deficiency of rainfall from its normal pattern in a region for an extended period of time, living to general suffering in a society.

2. Drought means "No rainfall, crops failure, low income level, Ill health, Starvation".

3. 99 districts, 315 Talukas in India are every year affected to drought.

4. 68% land mass in India prone to drought.

5. 15 million people suffering every year in India due to drought conditions.

6. Types of drought :-

   1. **Meteorological drought :-**

      1. Deficiency of rainfall from its normal level

         EX:- Rajasthan, west part of punjab,- Haryana, Telangana Raichur, anantapur, kadapa

   NOte:-

   Telangana state government introduced recently "Aasara scheme" in semi arid areas of telangana region.

   purpose is provide food facilities and pension facilities for the poorest of the poor.

   2. Indian government introduced "Mahatma Gandhi National rural employment guarantee scheme". (M.G.N.R.E). It is the world largest unemployement scheme.

   Hydrological drought :-

      1. Reducing of ground level water leads to Hydrological drought.

**2. Hydrological drought is a very dangerous drought and main impact on society.

   i. On set drought — (Normal level) to below 25%.

   ii. Medium drought — 25 to 50% below

   iii) Severe drought — above 50%.

Agriculture drought:-

1. If the moisture level goes down in the soil leads to drought.

Drought areas:-

1. Rajasthan — Arid area (57.31%)
           — Semi arid area (35.39%)

2. Gujarat — Arid area (31.72%)
         — semi arid area (46.18%)

3. Maharastra — Arid area (0.42%)
           — semi arid area (61.61%)

4. Madhya pradesh — Semi arid (13.41%)

5. Telangana state — Semi arid (40%)

6. Andhra pradesh — semi arid (22%)

     Tirunelveli (Tamilnadu)

     Coimbatore (Tamilnadu)

     Sourastra (Kutch)

     Palamaov (Jharkhand)

     Mahaboobnagar (Telangana)

     Kalahandi (Odisha)

     Anantapur (A.P)

Drought Historical background :-

1. In 1951 — 33.2%
2. In 1965 — 42.9%
3. In 1972 — 44.4%
4. In 1987 — 49.2%
5. 2014 is a "year of drought" because of "EL-Nino"
6. 1770 — Bengal drought
7. 1876 — South India drought
8. 1972 — Large part of the country
9. 1987 — Haryana drought
10. 2009 — United A.P
11. 2014 — All over the country.

Water conservation methods :-

1. Construction of check dams
2. Desalination of water.
3. Cloud seeding
4. Gulls conservation water method — Himalayan Region
5. Khunds — Thar desert.
6. Bamboo pipes — Meghalaya
7. Sorangam — Malabar region

Flood in India :-

- Flood is a High state of water level along the river channel.

Causes for floods :-

1. Clouds burst
2. Heavy Siltation

3. Land slides

4. Blockage of drainage

Note:- Flood is a natural disaster as well as man made disaster.

Types of floods:-

1. Flash floods:-

   1. It occurs within in the 6 hours of the begining the rainfall.

2. Riverine floods:-

   It is caused by heavy siltation.

3. Urban floods:-

   1. It is caused by Human activites /

   EX:- Mumbai - 2007

   2. Central water comission and water resources department are responsible for floods in India.

3. National flood control programme started in India 1951

4. North India, North eastern India maximum affected to floods in India.

5. Upper Ganga, Brahmaputra, kosi, suvarna Rekha Go-65% responsible for floods in India.

6. In south India odisha, A-P, Tamilnadu, A·P(Nellore) areas are offenly affected to maximum flood.

Flood Mitigation:-

1. Water resources management

2. Land use control

3. Natural water retention basins

4. Building construction on elevated areas.

Historical flood data:-

1. 2005 — Maharastra
2. 2005 — Gujarat
3. 2007 — Maharastra / Mumbai
** 4. 2008 — Bihar / Kosi.
5. 2010 — Ladak (J & K)
6. 2012 — Assam (Brahmaputra)
** 7. 2013 June — Chardham (U·khand) → 5378 people died
8. 2013 — Assam, North India.
9. 2014 — J & K floods

Cyclones :-

Cyclones are caused by temperature variation and pressure variation over the sea or ocean.

1. Cyclone is a french word which means Round snake.
2. Indian ocean is the sixth largest cyclone $\overset{z}{\text{drone}}$ area in the world.
3. Most of the cyclones in India generated in Bay of Bengal (odisha, A·P, T·N, W·B).
4. Maximum cyclones in the world originated in between 5 to 20° North and south Hemisphere.
5. Centre part of the cyclone is called "Eye of the cyclone".

Wall of the cyclone:-

It is a thick and black cloudy like outer surface area of the cyclone.

cyclone diameter 20-50 km

→ Eye of cyclone
→ wall of cyclone.
20-50 km
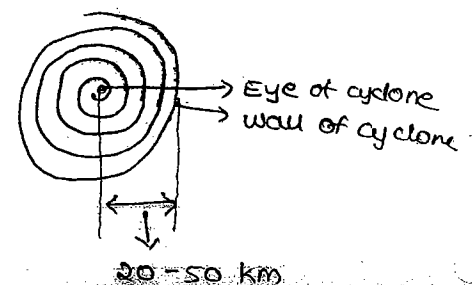
Cyclones list :-

1. Katrina — 2005 — U.S.A.
2. Ongi — 2006 — North Indian ocean
3. Nargis — 2008 — Myanmar
4. Nisha — 2008 — Tamilnadu
5. Laila — 2010 — Pakistan
6. Thane — 2011 — Indonesia
7. Neelam — 2012 — Pakistan
8. Lehar — 2013 — Bangladesh
9. Phyallin — 2013 — Thailand
10. Hellen — 2014 — Madagaskar
* 11. Hud-Hud — 2014 Oct-12 (43 people died)
12. Nailofar — Nov-2, 2014
13. Asoba —

Mitigation process :-

1. Integral & Coastal Management project
2. Indian meteorological department should be strengthened and should give warning day to day.
3. Multipurpose cyclone shelters should be provided.
4. Engineering structures should be strengthened.

Historical data of cyclones :-

1. 1882 — Mumbai (1 lakh people died)
* 2. 1971 — East coast cyclone (9658 died)
* 3. 1972 — A.P/Odisha (100 died)
* 4. 1977 — A.P (10,000 died)
5. 1985 — A.P (5,000 died)
6. 1990 — Odisha (10,000 died) — Super cyclone

Earthquakes and Tsunami :-

Historical data :-

1. 1556 — China (5 lakh people died)

2. 1762 — Arakaon coast (Myanmar)

3. 1819 — Rann of Kutch (Gujarat)

4. 1847 — Greater Nicobar Islands.

* 5. 1883 — Krakatova (Indonesia)

6. 1941 — Andaman

7. 1945 — Karachi (Pakistan)

* 8. 2001 — Bhuj (Gujarat)

* 9. 1967 — Koyana ⎫
                    ⎬ Maharastra
* 10. 1993 — Lathur ⎭

* 11. 2004 — Banda Aceh (Indonesia)

* 12. 2010 — Sikkim

13. 2011 March -11 — Japan

* 14. 2014 — Andaman

Land slides :-

1. It means "Land slip"

2. It is caused by Geological movement.

Causes for Land slide :-

1. Ground water pressure

2. Erossion

3. Snow / melt

4. Valconic erruption

5. Unscientific mining

6. Human activities

Historical data for Land slides:-

1. 2001 — Amburi (Kerala)

2. 2004 — Indonesia

3. 2005 — California (U.S.A)

4. 2006 — Philliphines

5. 2007 — Chittoagang (Bangladesh)

6. 2008 — Cairo (Egypt)

7. 2010 — Balistan (Pakistan)

8. 2013 — Salt lake city (U.S.A)

✱✱ 9. 2013 — Uttarakhand (June-16)

10. 2014 — Afganisthan

11. 2014 Aug-2 — Zincoshi (Nepal)

✱✱ 12. 2014 July-30 — Pune (30 members died)

13. 2014 Nov — Srilanka (168 died)

Manmade disasters:-

Road accidents:-

1. As per latest crime records 461 people died per day and 1301 people are injured per day in India.

2. Latest financial year road accidents death in India is 1,38,258.

3. Highest road accidents country in world is India next China.

4. Highest road accidents city in India is Delhi.

5. Road accident percentage in India 18.9%.

6. Highest road accident state in India is

    1. U.P
    2. United A.P
    3. Tamilnadu

Train accidents :-

1. World highest train accidents country is India (15 %)

2. 2007 - 2011 → 1019 died, 2118 injured.

3. 2014 March - 20, Tituara station accident (Maharastra)
   (10 people died)

4. 2014 May - 4 — Maharastra (20 people died)

5. 2014 July - 20 — Nanded passenger (26 children died)
   Kakatiya Techno school (Telangana)

6. Dec - 28, 2013 — Kothacheruu (Anantapur) - 24 died.

7. Aug - 19, 2013 — Rajadhani Express (Bihar) - 35 died

8. Nov - 3, 2013 — Vijayanagaram (Totlam) - 8 died.

9. In world total train accidents are "177" (last financial year report).

Flight accidents :-

1. Flight - 17 (Malasiyan flight) July - 17, 2014 - 298 died.

2. Air Algeria - 5017 Near mali - 116 died.

3. Flight - 370 (Malasiyan flight) — not yet traced out.

Epidemic disaster :-

Ebola virus — 10000 people effected. (syiorvallium, Guinea, Tanzania)

→ To control Ebola virus Indian govt. tie up with U.S.A.

Nuclear disaster :-

1. Treemile accident (U.S.A)

2. Chernobyl (Russia) in 1986 — 4000 died

3. 2011 → Fukushima, Daichi (Japan)

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