SECTION - II

QUESTION # 02

36.5

(A) ANSWER:

INTRODUCTION:

It is to generally said that, balanced nutrition will become first line of management in curing and preventing disease in near future. Many believes that nutrition will overtake the pharmaceutical advances its diverse effects on body functions. Diseases alter normal body metabolic functions due to change in nutritive contents. Many diseases occur due to less immunological defense engendered by low nutrition in the body. Medical Sciences has advanced tremendously 9e past recent years, it has opened new ways of achieving immunity from balanced nutrition rather treating diseases from drugs. It provide safe opportunity to have positive implications on the body and avoid adverse effects of certain drugs.

HOW NUTRITION WILL OVETAKE DRUG IN FUTURE

Drugs are used to treat diseases by either decreasing the progression of disease or killing pathological organisms. However, the growth of pathogens in the body occurs due to lack of strong immunity. Due to which it is unable to defense the body against invaders. In contrast, nutrition will not only improve body metabolic function but also hampers favorable environment required for the growth of microorganisms. The balanced nutritions in the body will lessen the chances of attack by antigens and also provide immunity and prevention from invaders. ~~there~~ Nutritional components which will help doctors in future to cure and prevent diseases are mentioned below.

A
MACRONUTRIENTS
- Fats
- Protiens
- Carbohydrates

MICRONUTRIENTS
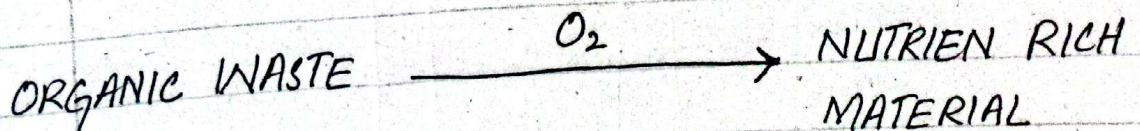- Zinc
- Magnesium
- Potassium e.t.c

ANSWER:

INTRODUCTION:

Solid Waste management is a process in which waste material is decomposed through various processes such as composting, incineration and pyrolysis. The solid waste, when left open is dangerous from the environment. Thus, the waste products are often decomposed and recycled by various means.

COMPOSTING:

It is process through which waste is decomposed to nutrient-rich material aerobically. This process involves converting organic material such as leaves, biological waste to nutrient-rich soil material in the presence of air.

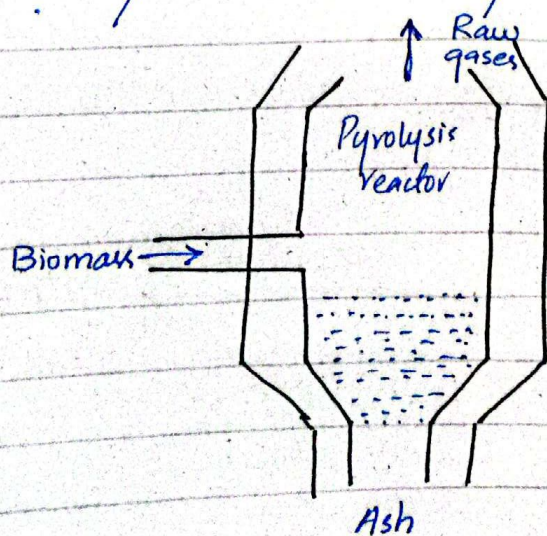$$ORGANIC \ WASTE \xrightarrow{O_2} NUTRIEN \ RICH \ MATERIAL$$

INCINERATION:

It is another method of solid waste management. It involves combustion of waste products resulting in emission of carbon gas.

It is considered harmful process due to green house gas emission and thus often degraded to pursue. However, recently several protective measures have been took to increase its efficiency and lower risks.

PYROLYSIS:

Pyrolysis is a process, which involves thermal decomposition of waste products at high temperatures. It requires separate containers for maintaining optimum temperature and lysis of organic waste.

Other differences? Output? Speed? Cost?

(c) **ANSWER**

i, **INTRODUCTION:**

Kidney plays an important role in the filteration of blood and formation of urine. It is an organ of homeostatis, which regulate the filteration of blood and removal of waste material from the body. Kidney contains fundamental units called nephrons, which filter the waste and regulate water content in the body.

ii, **ROLE OF KIDNEY:**

There are several functions of kidney in the body, among which some are explained below:

a, Glomerular filteration:

Kidney filter blood through bowmann's capsule and removes every waste products from the blood at the level of Glomerulus (a tuft of capillaries). Through this the filterate is carried to the loop of henle through proximal convoluted tubule.

(b) **REabsorbtion:**

At the level of Glomerular filteration many useful products such as protiens, amino acids, minerals, water are carried away from the blood. Thus, these nutrients are reabsorbed into the blood at proximal convoluted tubule.

(c) **Secretion:**

As the filtrate approaches distal convoluted tubule through loop of henle, many wastefull products are actively secreted into the ~~the~~ filtrate for excretion. This creates concentration gradient and maintains water content in the body.

(d) **Regulation of water Content:**

kidney regulates water content in the body by maintaining extretion of water. Anti-diuretic hormone acts on the distal convoluted part of nephron and collecting ducts to prevent water loss in the state of dehydration. This regulation of water balance is significantly role of kidney.
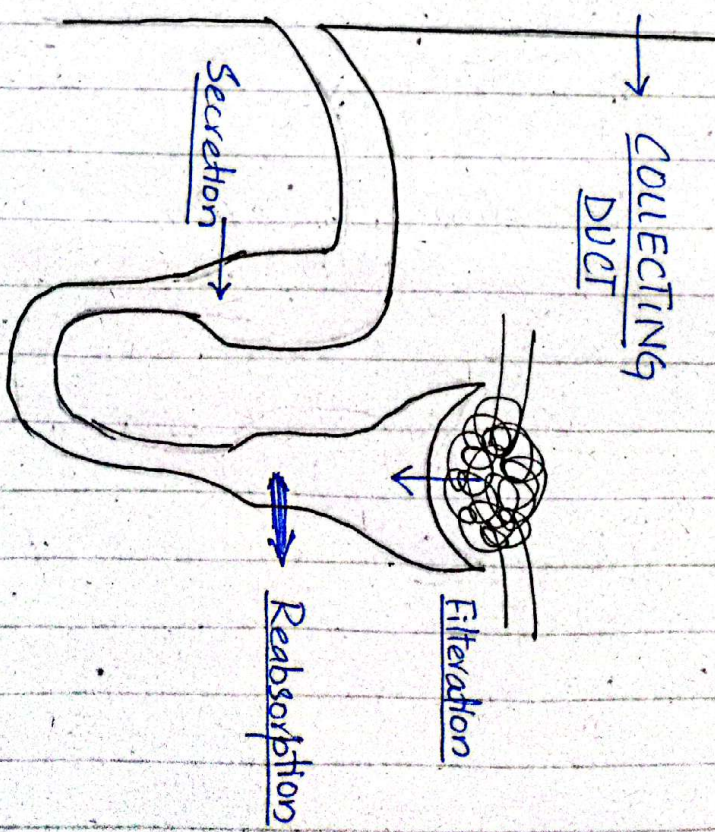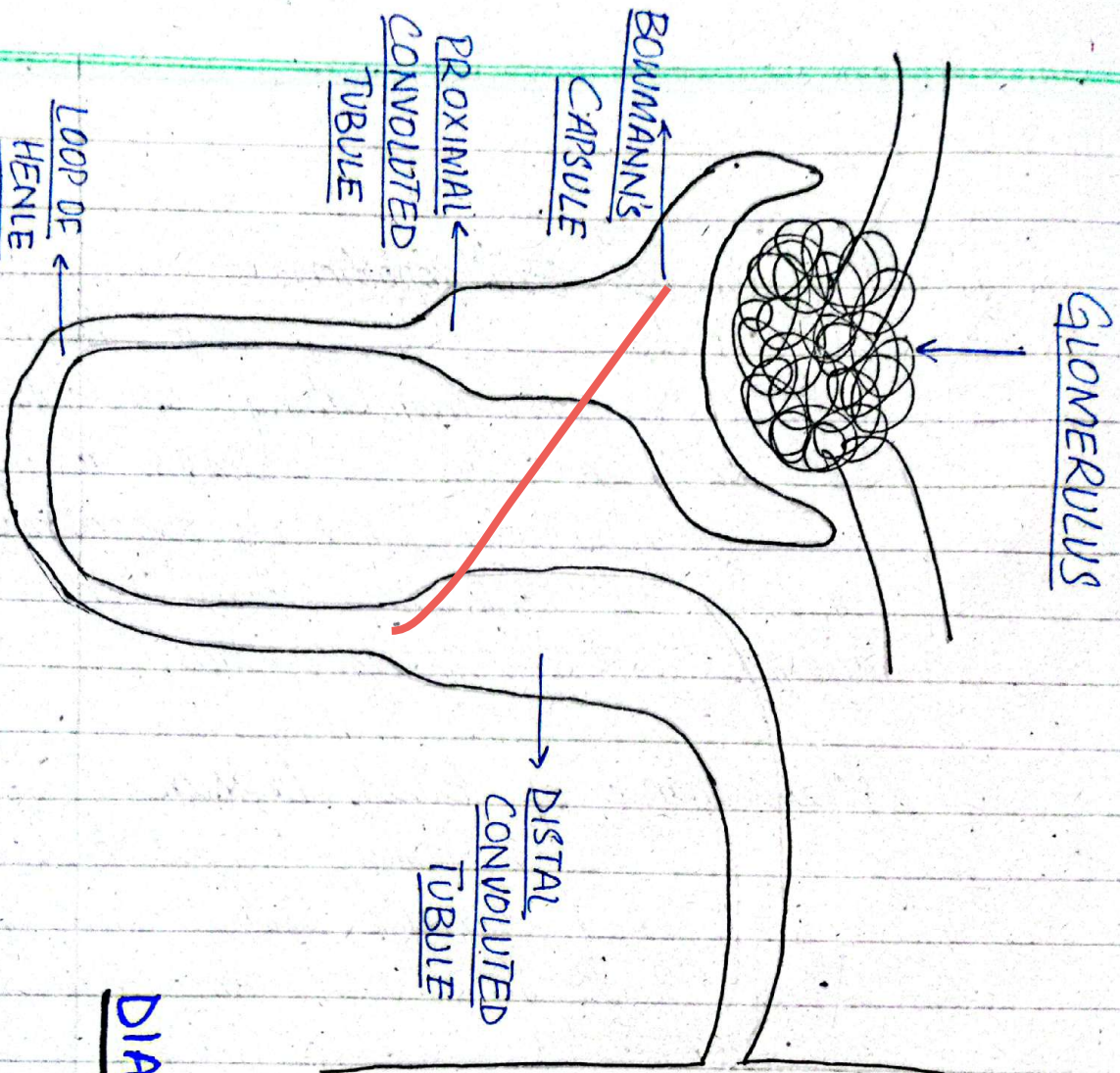
(e) Formation of Erythropoitin:

Kidney also plays an important role in maintaining red blood cells in oxygen crisis. It releases a hormone called erythropoetin, which is responsible for stimulation of erythropoesis from bone marrow and thus prevent oxygen crisis.

(f) Maintainance of Blood Pressure:

When the blood pressure is low, kidney secreates renin which further converts Angiotensinogen into Angiotensin-II, this constricts renal arteries and build pressure within vessels. The constriction causes blood volume and pressure to rise up.

(g) Regulation of Sodium Concentration:

Kidney excretes many wasteful products in the form of urine. When body blood pressure decreases or the sodium content is low, Aldosterone act on sodium channels present in the nephrons, to check further excretion of Na from the body.

BOWMANN'S CAPSULE

PROXIMAL CONVOLUTED TUBULE

LOOP OF HENLE

GLOMERULUS

DISTAL CONVOLUTED TUBULE

COLLECTING DUCT

Secretion

Filteration

Reabsorption

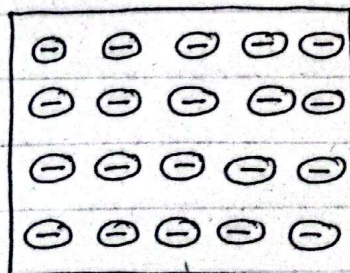**DIAGRAMATIC REPRESENTATION OF NEPHRON:**

ANSWER:

INTRODUCTION:

Semiconductors are materials which have conductivity between conductors and insulators (non-conductors). These materials are vastly used in modern technological instruments such as fiber optics, astrological instruments, computers and other electronic divices.
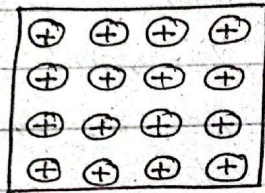
N-TYPE SEMICONDUCTOR:

It is type of semi-conductor which is negatively charged, due to a free electron. It is created by doping with Group-V elements such as phosphorus and Arsenic. The four electrons will make bond with the respective four electrons of the other element, which the remaining electron which plays part in conduction.

P-TYPE SEMICONDUCTOR:

It is type of semi-conductor which is positively charged due to the hole left over by the electron, when doped with Group-III elements such as Boron.

SEMI-CONDUCTORS AS A BRAIN OF MODENN ELECTRONICS:

Semi-conductors have been used in modern electronics due to its distinguished features of conductivity. The distinct feature makes them suitable for various conductors and reused electronic divices such as mobiles, computers, fiber optics, and other modern technological fields. Among the semi-conductors, gallium and germanium are widely used in modern electronics due to their abundant prexence in earth crust.

QUESTION # 05

ANSWER

HUMAN EAR:

Human ear is an auditary organ of the body, which also maintains balance of the body.

STRUCTURE:

Human ear is divided into three parts i.e external ear, middle ear and inner ear. Each of which plays a different function.

External Ear:

External Ear consists of an auricle which protects ear from outside harm. It consist of Pinna, tragus, anti-tragus, helix and external auditary canal. The hair folicles present in external auditary canal secretes wax, which protects ear from external pathogens.
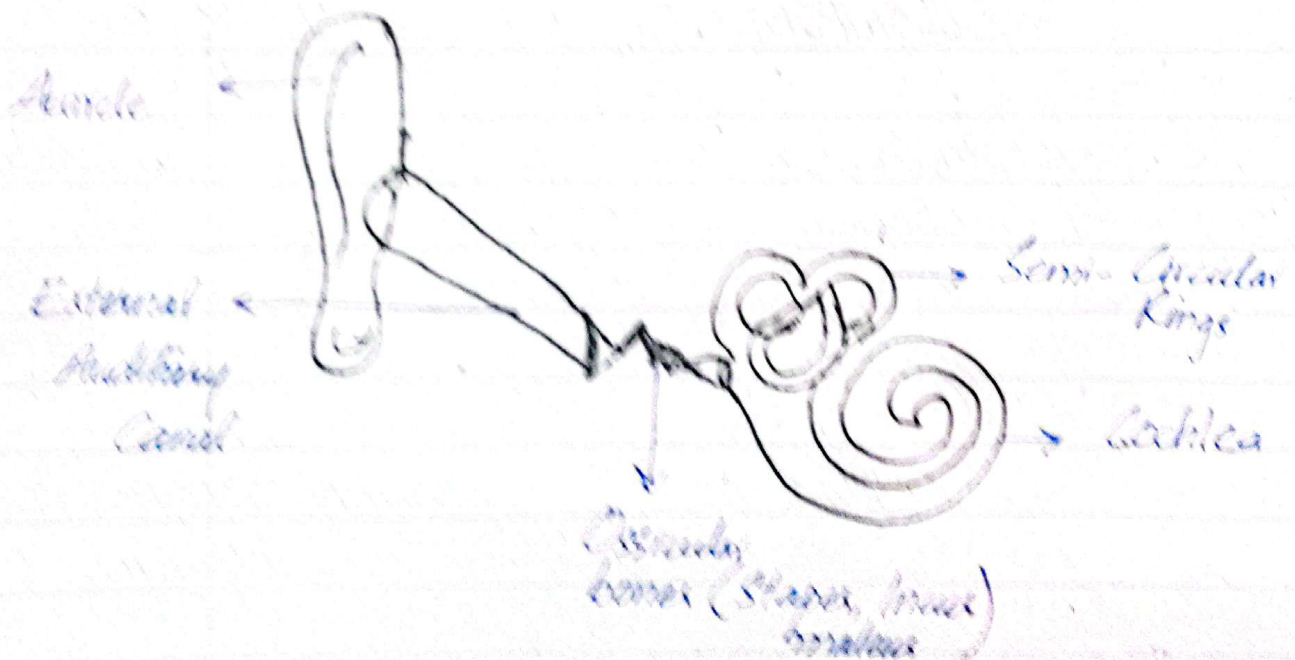
Middle Ear:

Middle ear is a compartment between external ear and internal ear and consists of ossicles i.e incus, stapes and malleus. It maintains air pressure with in ear for proper auditary stimulus. It extends from tympanic membrane and oval window of cochlea. It extends anteriorly to Eustachian tube. The frequency pushes the ossicles to give signals to the cochlea.

Inner Ear:

Inner ear consists of cochlear and semi-circular rings. Cochlear plays part in transmission of auditary stimulus while semi-circular canals participate in balance of the body. Cochlea is fluid-filled cavity in the inner ear, ~~which~~ any disturbance to the fluid creates stimulus for ear hair cells to transduct the signals to cranial nerve-VIII. This transmission of signals send message to human brain to process information and command respective orders.

FUNCTIONS OF HUMAN EAR

1. Protection from external pathogens
2. Transmission of auditory signals
3. Maintain balance of the body
4. Regulate air pressure in the temporal bone
5. Important auditory organ of the body

Auricle

External
Auditory
Canal

Ossicles
bones (Stapes, Incus)
Malleus

Semi Circular
Rings

Cochlea

Structure of Human Ear

ANSWER:

DIGESTIVE SYSTEM:

Digestive system is a process of break down of large macro-molecules into micro-molecules and involves absorption of required nutrients into the body.

COMPONENTS OF DIGESTION:

A, Mechanical breakdown of food (Ingestion)
B, Chemical breakdown of food (digestion)
C, Absorption of nutrents (Assimilation)
D, Indigestion of Waste material (Extretion)

COMPONENTS OF HUMAN DIGESTIVE SYSTEM:

A, Mouth
B, Esophagus
C, Stomach
d, Small Intestine
e, large Intestine
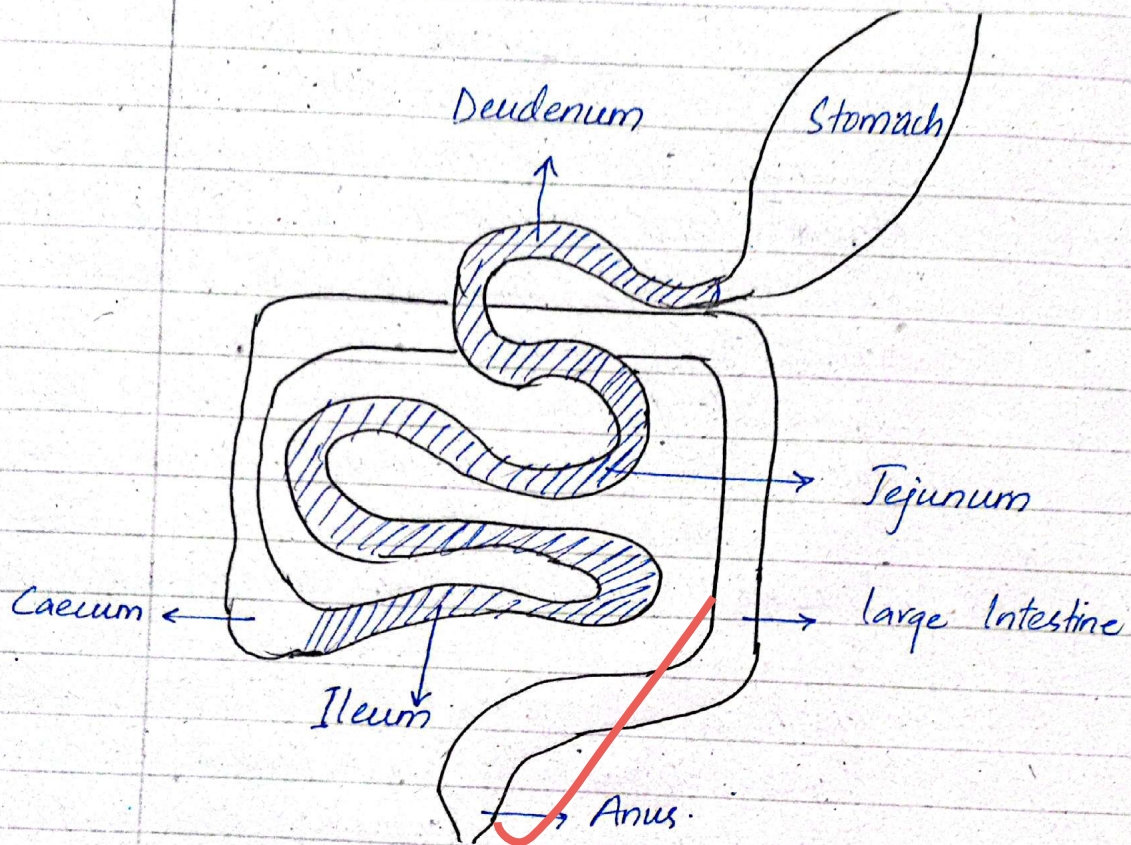f, liver, Gall bladder, Pancreas.
g, Anus.

ROLE OF SMALL INTESTINE.

Small Intestine is divided into deudenum, Jejunum and Ileum. Deudenum take chyme (food) from the stomach and process it by adding pancreatic juice and bile stored in gall bladder. The alkaline nature of bile helps chyme to emulsify fats and break down important fats. Furthermore, jejunum carries the food from deudenum to ileum and involves break down of macro-molecules. The ileum involves assimilation and absorption of food into the blood. The lacteals present in the small Intestine absorbs the fat from the food by diffusion and blood vessels carry other micronutrients into the body. Here, the process of digestion is completed, which is further carried by large intestine for the excretion of waste material. Moreover, payer patchers present in small intestine helps the body to protect it from pathogens and prevent it from disedier.

Deudenum

Stomach

Jejunum

large Intestine

Caecum

Ileum

Anus.

Diagramatic Representation of Small Intestine:

(c) ## VITAMINS:

INTRODUCTION:

Vitamins are important micro nutrients of the body, required for nourishment and proper functioning of the human body. It plays various roles in the body functions.

TYPES OF VITAMINS:

1. Water-Soluble Vitamins:
   Vitamin-B, Vitamin-C, ## e.t.c
2. Fat-Soluble Vitamins:
   Vitamin-A, Vitamin-E, Vitamin-D, and Vitamin-K.

FUNCTIONS OF VARIOUS VITAMINS:

Vitamin-A → Eyesight
Vitamin-D → Strengthening of Bones
Vitamin-K → Blood clotting
Vitamin-C → protect cells
Vitamin-B → Regular body functions
Vitamin-E → Immunity

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DISEASES DUE TO DEFICIENCY OF VITAMINS :-

1. Vitamin- A ⟶ Night Blindness
2. Vitamin- B ⟶ Pellagra (3D's)
   - Dellusion
   - Diarhea
   - Dementia
3. Vitamin- C ⟶ Scurvy (Bleeding of Gums).
4. Vitamin- D ⟶ Rickets (Erosion of Bones).
5. Vitamin- E ⟶ loss of Immunity (diseases).
6. Vitamin- K ⟶ Hemophillia (Blood disorder).

(D) <u>ANSWER</u>

<u>PITUATARY GLAND</u>:-

Pituitary Gland is called as master gland of the body. It secreates several regulatory hormones, along with hormones secreted from hypothalamus. It is an endocrine gland and thus secretes hormones into the blood.

<u>COMPONENTS OF THE GLAND</u>:

Anterior pituitary Gland-
- Growth hormone
- leutenizing hormone
- Adrenotropic hormone
- Thyroid stimulating hormone.
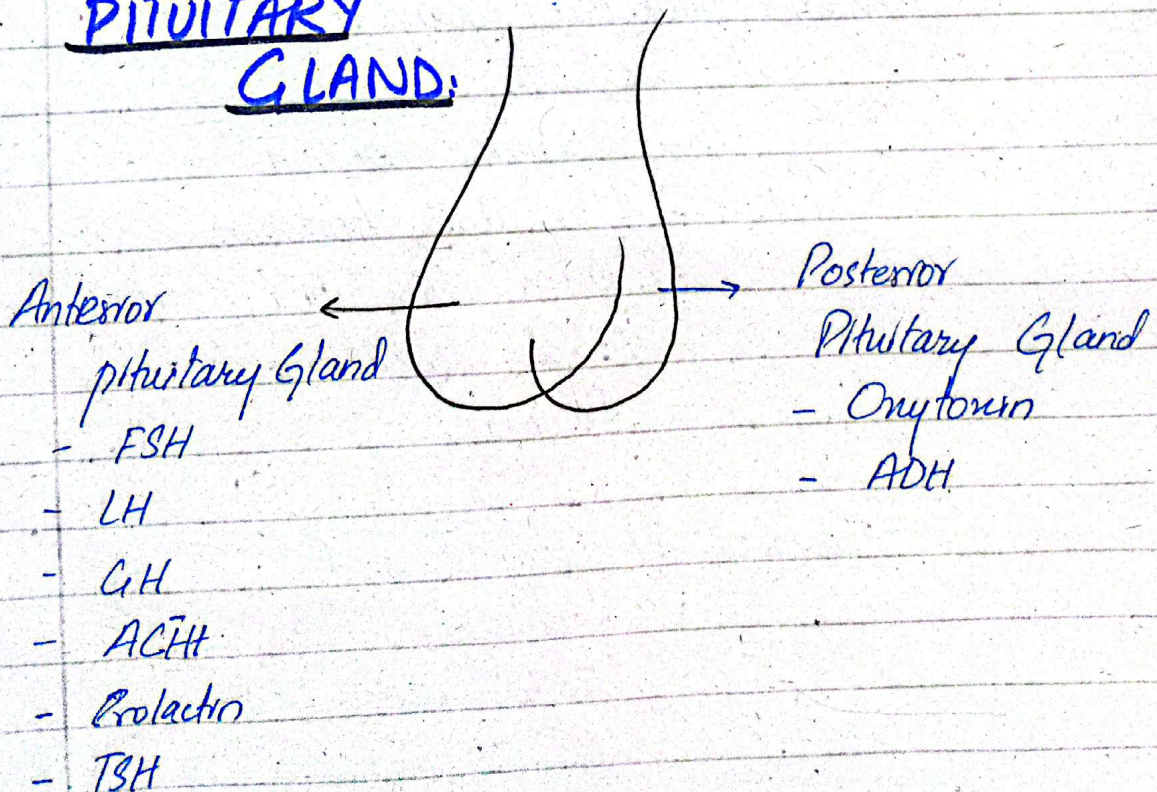- Follicle stimulating hormone.
- Prolactin

Posterior Pituitary Gland
- Oxytocin
- Anti-diuretic hormone.

Functions of Pituitary Gland:

1. Regulation of Body Growth
2. Regulation of thyroid hormones (T_3, T_4).
3. Stimulating ovarian follicles
4. Stimulation of seminiferous tubules.
5. Regulation of Adrenal and cortical hormones (Aldosterone, Adrenaline, nor-adrenaline, cortisol).
6. Ovulation in females through LH.
7. Production of milk (Prolactin)

PITUITARY GLAND:

Anterior
pituitary Gland
- FSH
- LH
- GH
- ACTH
- Prolactin
- TSH

Posterior
Pituitary Gland
- Oxytocin
- ADH

SECTION- II

QUESTION # 07

A. **ANSWER:-**

Data:-

Original Price $= x$

Raised Price $= 80$ rs.

Raised Percentage $= 20\%$

lowered Percentage $= 20\%$

Solution:-

Raised Price $=$ Original Price $\times$ Raised percentage

$$80 = x \times \frac{20}{100}$$

$$80 = x \times \frac{1}{5}$$

$$x = 80 \times 5$$

$$\boxed{x = 400 \text{ Answer}}$$

Original Price of the shirt is 400 rs.

(B)   Data:-

BROTHER = QDGSNQA

SISTER =   ??

Solution:-

Each letter in the word is precendent
of the code from backwards
i.e: B - A   (A → B)
         R - Q   (Q → R)
         O - N   (N → O)
         T - S   (S → T)
         H - G   (G → H)
         E - D   (D → E)
         R - Q   (Q → R)

Thus:-   S - R (R → S)
          I - H (H → I)
          S - R (R → S)
          T - S (S → T)
          E - D (D → E)
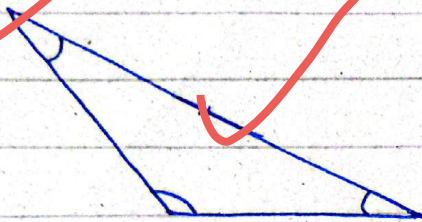   R - Q (Q → R)

Thus, SISTER = QDSRHR Answer

(c) Scalene triangle:

It is defined a type of triangle with unequal sides and unequal angles.
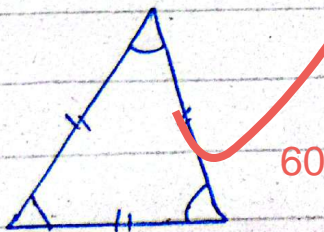i.e.

Scalene triangle:

Equilateral Triangle:

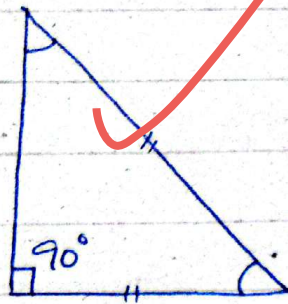It is type of triangle with equal sides and equal angles.
i.e.

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Equilateral triangle

Triangle which is Isosceles and Right at the same time:

It is a type of triangle, which has two equal sides and angles with one right angle (90°).

i.e.

Isosceles and Right triangle

(0) Data:-

Pizza is divided = 8 selices

Slices with raisin = 3 slices.

Brobability of raisin slice = ??

Solution:-

Probability = $\dfrac{\text{Probable number}}{\text{Total number}}$

Probability = $\dfrac{3}{8}$

Thus, probable outcome of raisin slice is three times out of total 8 slices.

Question # 08

(a) Data:

Man walks South = 5km

Man walks right = 3km

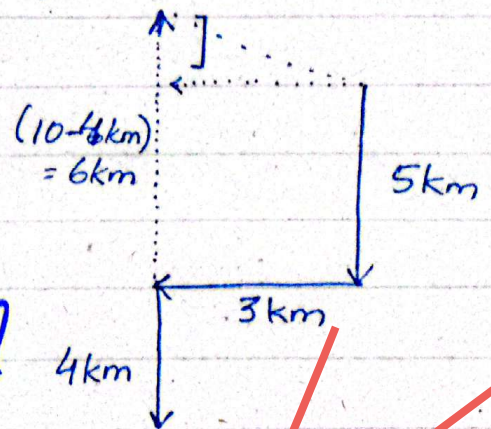Man walks left = 4km

Man walks backwards = 10km

Direction from starting point = ??

Distance from starting point = ??

Solution:

Illustration →

Direction = Man walks anti-parallel from the starting point in [North]

(10-4km) = 6km

5km

3km

4km

Distance = Distance travelled − Distance from Start.

6km − 5km

[1 km]

Thus, Man is 1km at the distance from starting point. Answer.

B) Data:-

1st Prime 5 Number-

$$1, 2, 3, 5, 7$$

Arthematic mean of their Cuber = ??

Solution:-

$$1^3 = 1$$
$$2^3 = 8$$
$$3^3 = 27$$
$$5^3 = 125$$
$$7^3 = 343$$

Mean $= \dfrac{1 + 8 + 27 + 125 + 343}{5}$

$$= \dfrac{506}{5}$$

$$\approx$$

$$= \boxed{101.5 \;\; Answer}$$

(6) Data:

Group of 50 men do work = 40 days
Group of 70 men do work = n days

Solution =>

let suppose n is number of days required for 70 men to do work.

$$\downarrow \frac{n}{40} = \frac{70}{50} \uparrow \qquad \downarrow \begin{array}{l} 50 \longrightarrow 40 \uparrow \\ 70 \longrightarrow n \end{array}$$

$$50 \times n = 40 \times 70$$
$$50n = 2800$$
$$n = \frac{2800}{50}$$

$$\boxed{n = 56 \text{ days}}$$