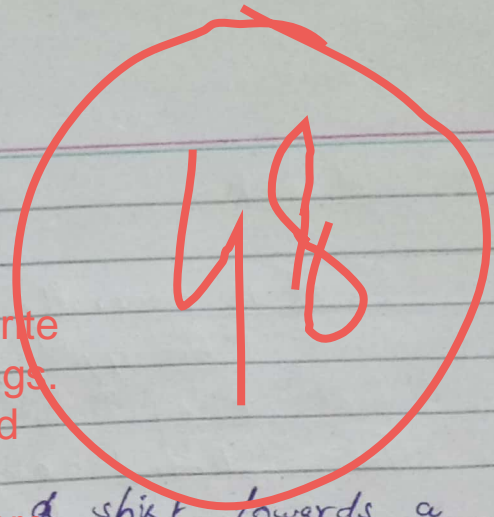


General Instructions

Part II



Q3-

1. Give numbering to headings
2. Do not write lengthy paragraphs. Write medium sized paragraphs with headings.
3. Do not use table for comparison and contrast questions.

Ans

The statement suggests a shift towards a more preventive and holistic approach of disease cure. It suggests that in future, doctors may focus on nutrition rather than relying heavily on pharmaceutical drugs. The perspective aligns with growing recognition of significant impact that balanced and healthy diet have on overall health.

4. Draw figures/diagram/flowchart where needed.
5. Start new question from fresh page.
6. Write unit of the answer in ability section.
7. Explain mathematical steps and the reasoning for better score.
8. Change colour scheme for references to give them more visibility.
9. Manage time well.
10. Wide page borders are discouraged. Should be reasonable.
11. Avoid writing wrong references.
12. Give more weightage to expressedly asked parts of the question.

Shift to Pre-emptive Approach: Healthy Diet

Researches have shown that balanced diet helps in preventing various chronic diseases like heart diseases, diabetes and cancers. Additionally, advancement in nutritional sciences may lead to more targeted dietary recommendations based on individual genetic make-up, life style and specific health conditions. It could be achieved in following ways:

1- Moving to Preventive Healthcare:

It is a well-known saying,
"Prevention is better than cure."

A time may come and it has already arrived upto some extent where emphasis would be given to prevention rather than treatment.

2. Nutrition as Primary Intervention:

It is generally said,

"An apple a day keeps a doctor away."

The statement emphasize the importance of healthy diet on the human health. It involves recognizing the impact of diet on health and disease prevention.

3. Advancement in Nutritional Sciences:

With the advancement in nutritional sciences, people have realized the negative impacts of eating unhealthy food and diet. This is also leading in alteration of drugs by healthy diet. Doctors prefer to focus or direct their patients on eating healthy.

4. Complementary Role of Pharmaceuticals:

Pharmaceutical companies have crucial role in field of medical sciences as they prepare, supply medicines to acute and chronic drugs. A change in this perspective will be observed, if they integrate nutrition for comprehensive health care.

Conclusion :

It is important to note that while nutrition can be a powerful tool in maintaining good health, it may not entirely replace the pharmaceutical interventions especially in case of acute or severe medical conditions.

(b)

Introduction :

Incineration, composting and pyrolysis are methods for reduction of volume of solid waste. Composting focus on organic waste, incineration involved controlled burning and pyrolysis is a thermal process. Each method has its own advantages and disadvantages in context of sustainable solid waste management.

Comparison Among Composting, Incineration and Pyrolysis :

1. Process :

a- Composting : It is a natural biological process where organic waste is converted in nutrients rich compost through action of microorganisms.

b- Incineration :

It involves the controlled burning of solid waste at high temperature. usually in large incinerator in the industries. The heat is produced during the process could be used for generating electricity.

c- Pyrolysis :

Pyrolysis is a thermal process that occurs in the absence of oxygen. It involves the breaking of waste into organic compounds at high temperature.

2. End Products :

a- Composting :

The end product of composting is nutrient rich humus or compost, which could be used as a

fertilizers.

- b. Incineration: The residue left after incineration needs proper disposal. Some modern incineration plants have pollution control technologies to reduce harmful emissions.
- c. Pyrolysis: End product of pyrolysis are gases, liquid bio-oil and solid ^{carbon rich} residue called biochar. They are used for energy applications.

3. Environmental Impacts:

- a. Composting: Composting leaves ~~making~~ environmental impacts on environment by reducing size of solid waste, as well leaving ~~no~~ harmful residue.
- b. Incineration: Process of incineration though could reduce the volume of solid waste however, it emit green house gases and pollutants in the environment that require treatments.
- c. Pyrolysis: Pyrolysis is an effective method for converting organic waste into valuable products like biofuels. However, it requires careful temperature control due to removal of gases.

Conclusion:

Every process involves a different approach and are helpful in removal or reduction in volume of solid waste with little or no modifications.

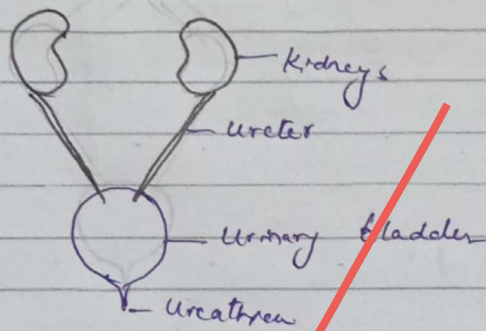
(c)

Introduction:

Kidneys are important part of excretory system. The formation of urine takes place in kidneys. and reabsorption of salts, water and vitamins also takes place in kidneys.

Kidneys :

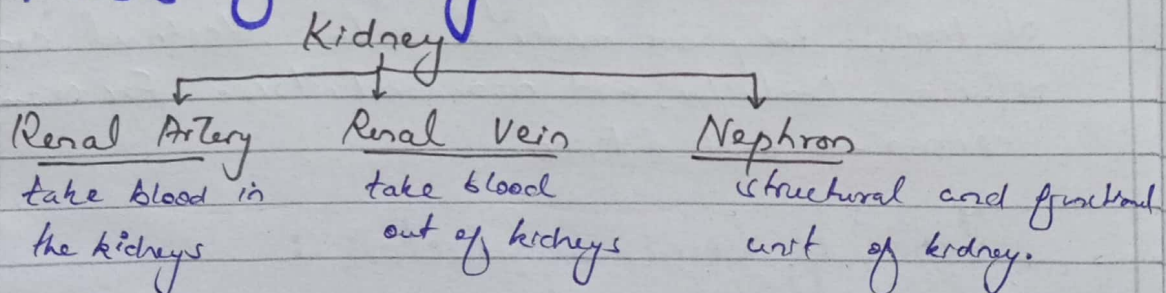
Kidneys are bean shaped organs and are two in number. They have important role in urine formation and reabsorption of nutrients from urine. Other organs related to kidneys are pair of ureters, urinary bladder and urethra.



Excretory system

Parts of Kidney :

How does it work?



Nephron plays important role in function of kidney as it is structural and functional unit of kidney.

Nephron :

A kidney have millions of nephron and they are actual involved in kidney functioning.

Parts of Nephron

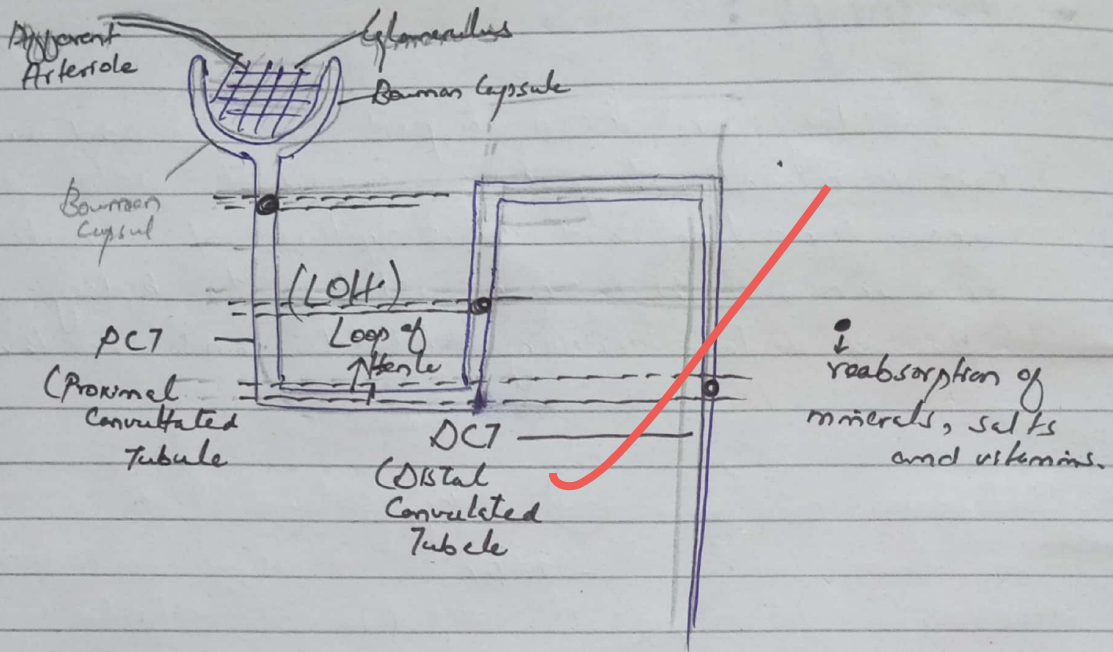
Afferent Arteriole

Bowman Capsule

Glomerulus
Actual filtration of urine

Efferent Arteriole

Tubule

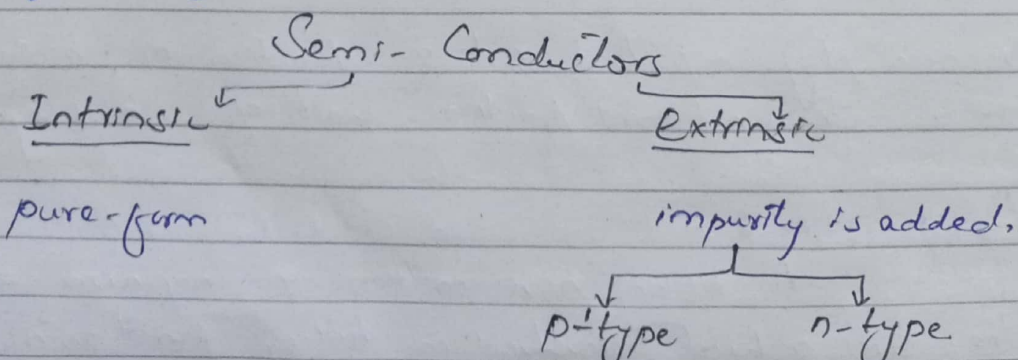


(d)

Semi-Conductors :

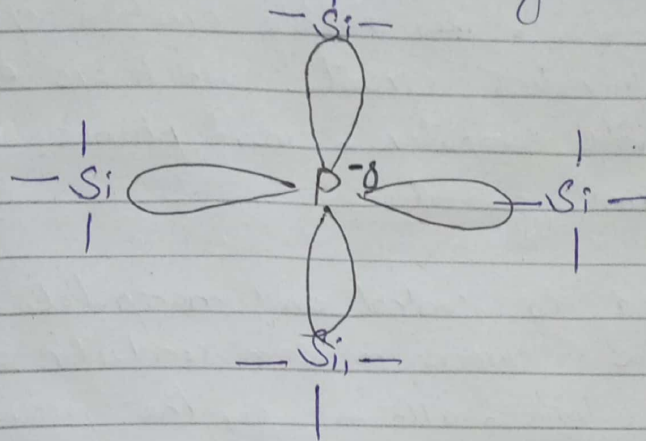
Semi-conductors play a pivotal role in modern electronics. They are materials with electrical conductivity between conductors and non-conductors. For example Germanium and Silicon.

Types of Semi-Conductors :



1. N-type Semi-conductor: (negative-type)

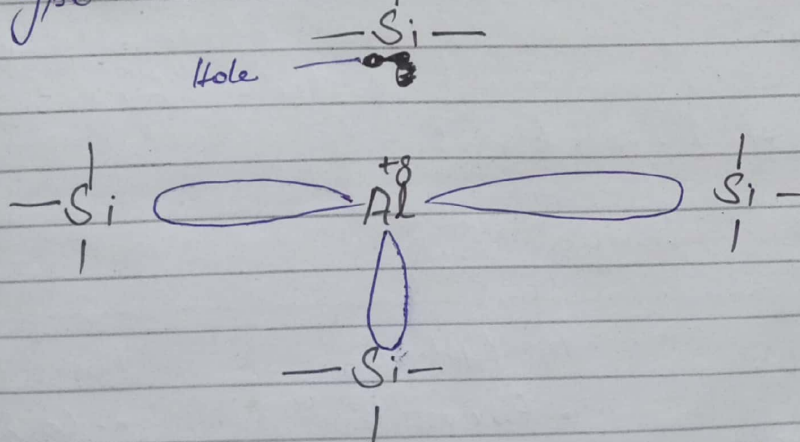
When an impurity is added from Group-3 (like phosphorus) of periodic table to semi-conductor, N-type semi-conductor is formed.



Phosphorus has 5 electrons in its outermost shell, so it make bonds with 4 other silicon atom and an electron is left making it negative, so ^{semi}conductor is N-type.

2. Positive or P-type Semi-conductor:

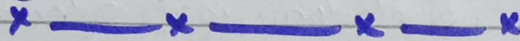
When an impurity is added from Group III of Periodic table, it make semi-conductor positive called P-type semi-conductor.



Al makes three bonds with Si in its outer most shell, leaving a hole in semi-conductor, making it positive type.

Semi-Conductors As Brain of Modern Electronics:

- 1- Semi-conductors are indeed the foundation of modern electronics. They enable creation of transistors, diodes and integrated circuits which are essential in devices like computers, smart phones and countless electronic gadgets.
- 2- They have ability to control and manipulate the flow of charge carriers in semi-conductors on the basis of digital logic, allowing for the processing and storage of information in electronic circuit.

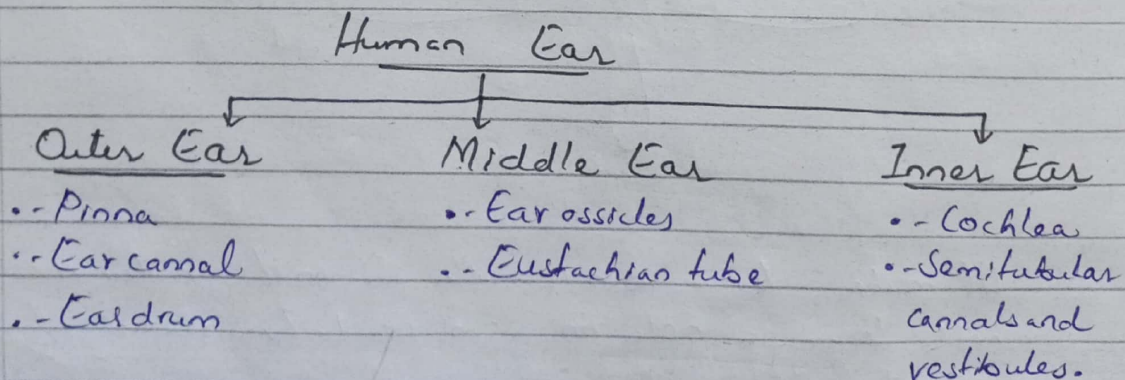


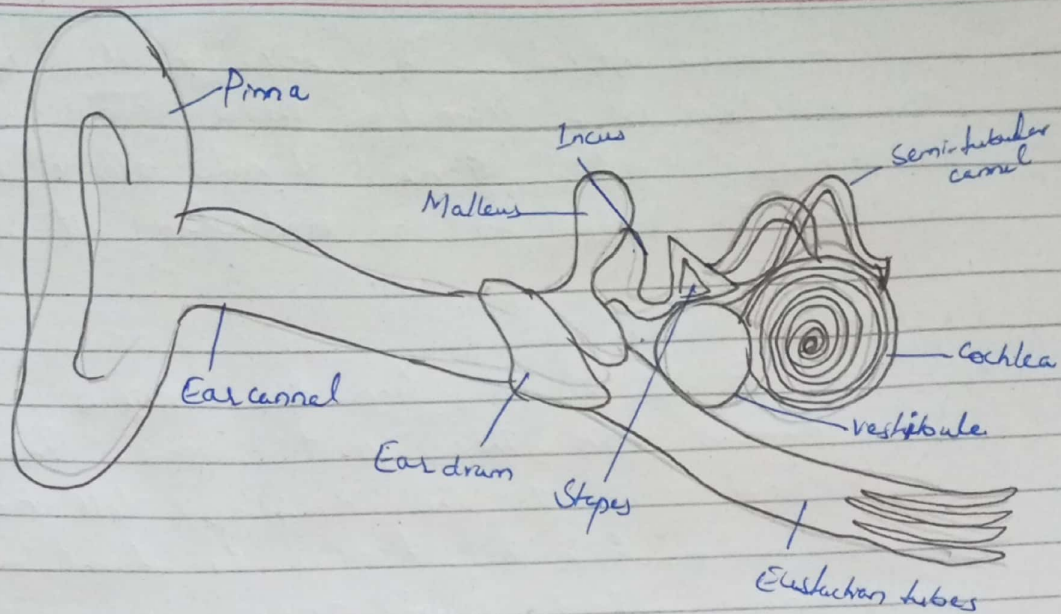
Q5

a) Human Ear:

Human ear are the organs associated with hearing and balancing functions. Ear catch sound waves and sent it into electrical waves to transport to brain.

Structure of Human Ear:





1- Outer Ear:

Outer Ear catches sound waves and transfers it through ear canal to ear drum which starts vibrating. It consists of pinna, ear canal and ear drum.

2- Middle Ear:

Middle Ear is associated with ~~transforming~~ sound waves to inner ear through ear ossicles which are Incus, Malleus and Stapes. Eustachian tube is responsible for pressure control.

3- Inner Ear:

Inner ear consists of three parts: Cochlea, Semi-circular canals and vestibule. Cochlea is responsible to convert sound waves to electrical ^{signals} ~~brain~~, for while vestibule and semi-circular canals are responsible for body balanced.

Functions of Ear:

1- Auditory Function:

Ear is responsible for auditory function, it catches sound waves and then these waves strike

ear drum cause vibration. This vibration also pass through ear ossicles which transfer these sound waves to cochlea. Cochlea convert it into electrical waves and sent to brain and one understand it as sound.

1- b- Function of balancing:

Inside the ear, there are otolith parts when human move, these parts sense. These parts sent signal to the brain and tell how one is positioned, which help humans to stand, walk, and move without falling over.

x — x — x — x

(b)

Digestive System :

a)

The system which is responsible for digestion of food is called digestive system. Digestion is a process which helps to break complex organic food into simpler substances.

Parts of Digestive system:

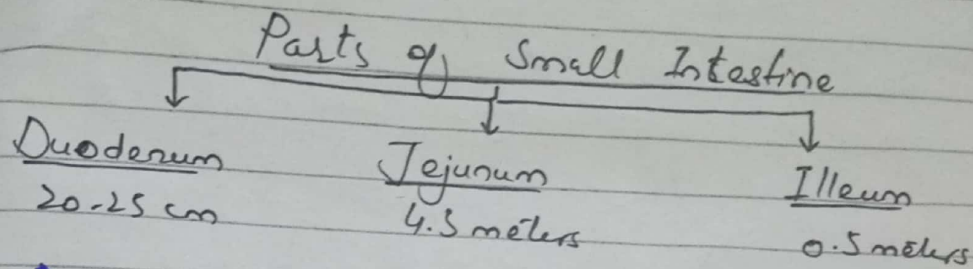
Digestive system have following parts:

- 1- Mouth or Oral cavity
- 2- Esophagus
- 3- Stomach
- 4- Small intestine
- 5- Large intestine.

Small Intestine :

Small intestine is the part of digestive system where maximum digestion takes place. 90% of the digestion of food takes place in small

intestine. It is largest part and is 6 meters long.



1- Duodenum :

Duodenum is the first part of small intestine. It release the following enzymes:

Amylase = starch into maltose

Sodium Bicarbonate = neutralizes the acidic nature of chyme

Lipase = Convert fats into fatty acids

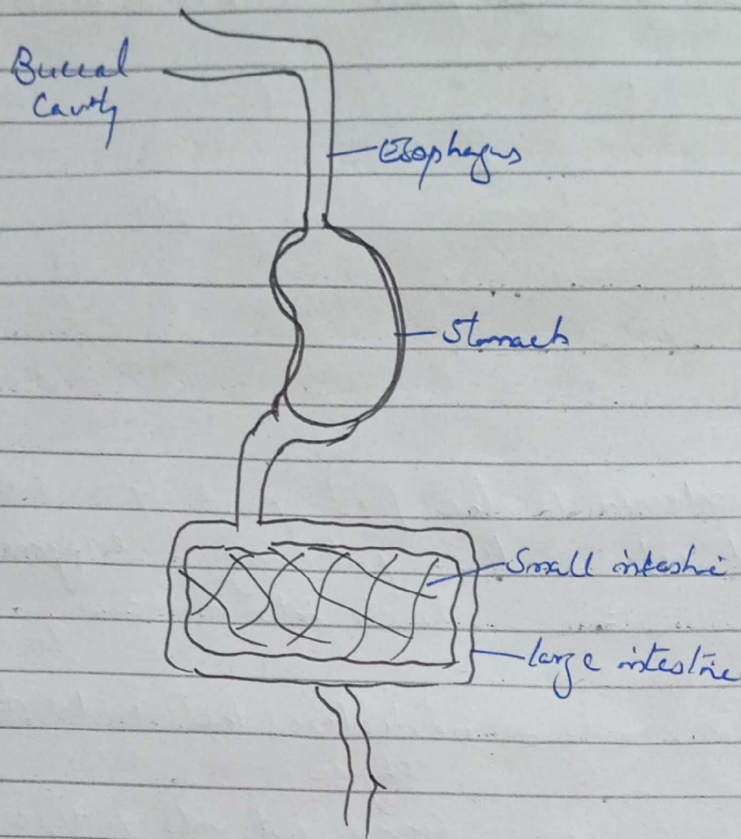
Trypsinogen = Convert protein into polypeptides.

All these secretion come from Pancreatic juice. Similarly bile secretions also enter duodenum to convert ^{into} fatty acids.

2. Jejunum : largest part of small intestine. It releases intestinal juice which has Trypsin, Maltase, Lipase, Aminopeptidase, Lactase etc. Digestion of food completes into jejunum.

3- Ileum :

Ileum is responsible for reabsorption of food including vitamins, minerals etc. It has fingers like projections called villi which help in absorption of important minerals.



Digestive system

Vitamins :

Vitamins are essential class of balanced diet which are responsible for normal growth and functioning of body. There are 13 essential vitamins required for the body to work properly.

Significance of Vitamins

1. Vitamins help in prevention of health problem.
2. They help in strengthening of bones and teeth.
3. They play important role in metabolism.
4. Vitamins help to maintain healthy nerve functioning.
5. Vitamins are good for healthy skin conditions and hair.

Vitamin's Types

Fat's Soluble

Water Soluble

e.g Vitamin A, D, E, K

e.g Vitamin B and C.

Fats Soluble Vitamins :

Fats soluble vitamins are classified into different categories and each with their own sources.

	Source ↓	Deficiency
Vitamin A	Carrots, Orange vegetables	Night blindness
Vitamin D	Sunlight, milk	Rickets
Vitamin E	Milk, Oil, Seeds	Skin problems and (Arenia)
Vitamin K	Green vegetables	Hemorrhagic conditions

Water Soluble Vitamins

Water soluble vitamins have been classified into Vitamin B and Vitamin C.

Vitamin B is further divided into B1 (Thiamin), B2 (Riboflavin), B3 (Niacin), B5 (Pantoic Acid), B6 (Pyridoxin), B7 (Biotin), B9 (Folic Acid), B12 (Cobalt Amin) and their deficiencies may leads to diseases like Beri-Beri, vitiligo, Chelosis, etc. Vitamin C is required for healthy nerves functioning and immune system. It is helpful in healing of wounds and its deficiency may leads to Scurvy.

x - x - x - x

Parts of this gland? Their functions? Diagram?

(d)

Functions of Pituitary Gland:

Pituitary Gland is called master gland of the body because it is required for stimulation of other hormones. Its main functions are as follows:

1- Stimulates Growth:

Stimulates growth of bones by stimulating GH (Growth Hormone) especially during childhood and adolescence.

2- Stimulates Milk Production:

After child birth, it produces prolactin in mothers which stimulates milk production in the mammary glands.

3- Controls Thyroid Gland:

It controls thyroid gland through stimulation of TSH (Thyroid Stimulating Hormone). So, it plays a role in activating metabolism and regulating energy levels.

4- Stimulates ACTH:

Pituitary Gland stimulates ACTH (Adreno Cortico Tropic Hormone) this produces cortisol to manage stress, metabolism and immune responses.

5- FSH production:

Pituitary gland secretes follicle stimulating hormone (FSH) which regulates reproduction in both males and females.

6. Melanocyte - Stimulating Hormone: (MSH)

Pituitary gland stimulates MSH which produces melanin, a pigmentation controller on the skin, hair and eyes.

7. Endorphins:

Pituitary gland secretes endorphins which act as natural painkillers thus contribute to the feeling of pleasure and well-being.

x — x — x — x

Q6.

i- 10, 100, 200, 310, 430

It is an addition series, starting from addition of 90 with addition of 90 on each step.

~~90~~

~~90 + 10~~ → 100

~~100 + 10~~

10

10 + 90 → 100

100 + 100 → 200

200 + 110 → 310

310 + 120 = 430

ii- 3, 7, 23, 95, 479

! Multiplication and addition series with increase in each step.

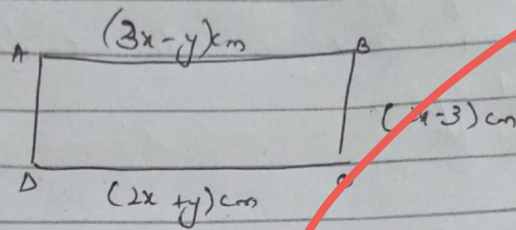
$3 \times 2 + 1 = 7$

$7 \times 3 + 2 = 23$

$23 \times 4 + 3 = 95$

$95 \times 5 + 4 = 479$

b. Perimeter of a rectangle = 114



Find area. • Area = $L \times W$

In rectangle

$$\text{side AB} = \text{side CD}$$

$$\text{side BC} = \text{side DA}$$

$$\text{So } 3x - y = 2x + y$$

$$3x - 2y = y + y$$

$$\boxed{x = 2y} \rightarrow \textcircled{1}$$

Now find value of y

$$\text{As } x = 2y$$

$$\begin{array}{|l} \text{If } |AB| = |CD| \\ 3x - y = 2x + y \\ \text{Put value of } x \\ \text{B } (2y) \end{array}$$

Perimeter = Sum of all sides

$$114 = AB + BC + CD + DA$$

$$114 = (3x - y) + (2x - 3) + (2x + y) + (2x - 3)$$

$$114 = 9x - 6$$

$$9x = 114 + 6$$

$$9x = 120$$

$$\boxed{x = 13.3} \rightarrow \textcircled{2}$$

find y by putting in eqn ①

$$x = 2y \Rightarrow y = \frac{x}{2} = \frac{13.3}{2}$$

$$\boxed{y = 6.65}$$

Now we have to find length.

$$|AB| = |CD|$$

$$\begin{aligned} |AB| &= 3x - y \\ &= 3(13.3) - 6.5 \end{aligned}$$

$$|AB| = 32.95$$

$$\begin{aligned} |CD| &= 2x + y \\ &= 2(13.3) + 6.5 \end{aligned}$$

$$|CD| = 32.95$$

$$|AB| = |CD| = \text{Length} = 32.95 \rightarrow A$$

$$|BC| = |AD| = \text{Width}$$

$$\begin{aligned} |BC| &= 2x - 3 \\ &= 2(13.3) - 3 \\ &= 26.4 - 3 \end{aligned}$$

$$|BC| = 23.4 = \text{Width} \rightarrow B$$

$$\begin{aligned} \text{As Area of rectangle} &= L \times W \\ &= 32.95 \times 23.4 \\ \text{Area} &= 868.56 \text{ cm}^2 \end{aligned}$$

x — x — x — x
(d)

$$\text{No. of oranges} = 210$$

$$\text{No. of apples} = 252$$

$$\text{No. of pears} = 294$$

Biggest possible number of cartons to equally divide fruit = H.C.F = ?

(H.C.F by division)

6.

$$\begin{array}{r} 1 \\ 252 \overline{) 294} \\ \underline{252} \\ \times 42 \overline{) 252} \quad (6) \\ \underline{252} \\ \times \times \end{array}$$

$$\begin{array}{r} 42 \overline{) 210} \quad (5) \\ \underline{210} \\ \times \times \times \end{array}$$

So biggest number of carten required = 42.



(c)

Let's Romi age = x

Nisha is 15 year older than Romi = $x + 15$.

5 years ago, Nisha was three times older than Romi

$$3 \underset{\text{Romi}}{(x-5)} = \underset{\text{Nisha}}{3(x+15-5)}$$

$$3(x-5) = 3(x+10)$$

$$3x - 15 = x + 10$$

$$3x - x = 15 + 10$$

$$\frac{2x}{2} = \frac{25}{2}$$

$$\boxed{x = 12.5}$$

Nisha present age = $x + 15$

by putting value of x

$$\text{Nisha} = 12.5 + 15$$

$$\boxed{\text{Nisha's age} = 27.5 \text{ years}}$$

Q8.

(i)

Sol.

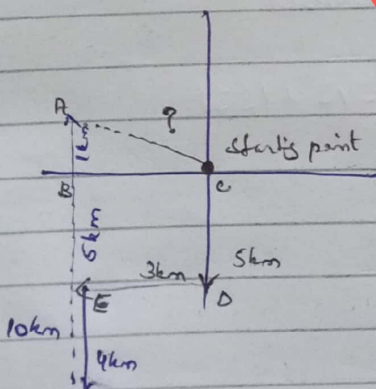
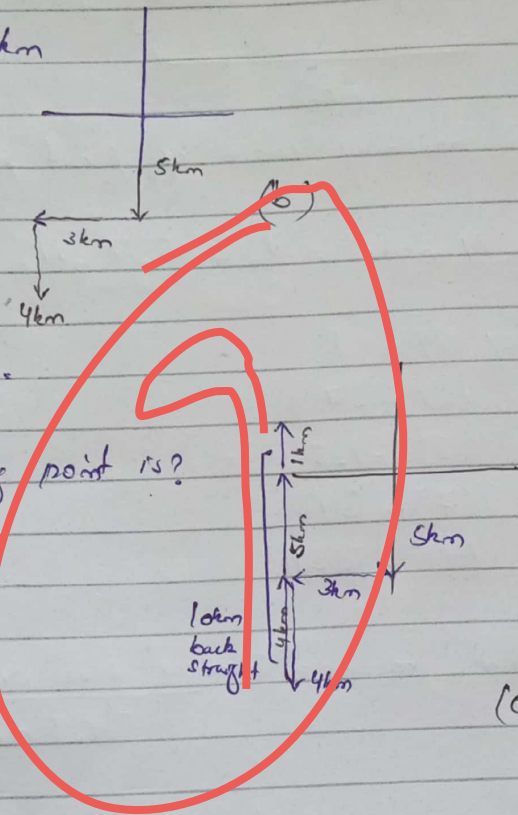
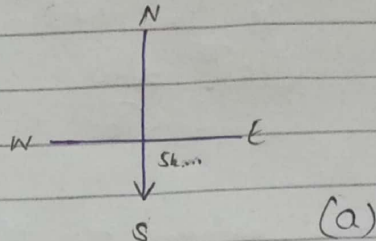
Man walks 5 km in South

Turns right and walk 3 km

Turns left and walk 4 km

Goes straight back 10 km.

Distance from his starting point is?



Distance b/w A and B = ?

In $\triangle ABC$,

$$(c)^2 = (b)^2 + (a)^2$$

$b = BC$ which is corresponding to DE

So $b = 3 \text{ km}$

Similarly $a = AB = 1 \text{ km}$
So

$$(c)^2 = (b)^2 + (a)^2$$

$$(c)^2 = (3)^2 + (1)^2$$

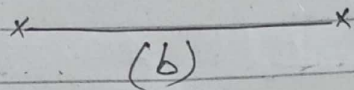
$$(c)^2 = 9 + 1$$

$$\sqrt{(c)^2} = \sqrt{10}$$

$$c = \sqrt{10}$$

What about his direction?

Distance between his starting point is $= \sqrt{10} \text{ Km}$



Arithmetic mean of cube of first five prime numbers = ?

1st five Prime Number = 2, 3, 5, 7, 11

$$\text{Cube of } (1)^2 = 1$$

$$(3)^3 = 27$$

$$(5)^3 = 125$$

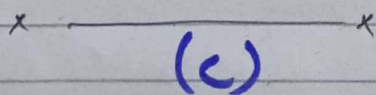
$$(7)^3 = 343$$

$$(11)^3 = 1331$$

Arithmetic mean = $\frac{\text{Sum of first five prime numbers}^3 \text{ cube}}{\text{Total number}}$

$$= \frac{1 + 27 + 125 + 343 + 1331}{5}$$

$$\boxed{\text{Arithmetic Mean} = 365.4}$$



Group of 5 men construct 20km in 40 days.
70 men construct 20km in x days

$$x = ?$$

Men : Road : Days

↓ 50 : 20 ↑ : 40 ↑
↓ 70 : 20 ↑ : x ↑

$$\frac{x}{40} = \frac{20 \times 50}{20 \times 70}$$

$$\frac{x}{40} = \frac{1000}{1400}$$

$$\frac{x}{40} = \frac{10}{14}$$

$$x = \frac{400}{14}$$

$$x = \frac{200}{7}$$

$$x = \frac{28.5 \text{ days}}$$

So, 70 men will complete the same road in 28.5 days.

x — x — x

(d)

Property left by Zahid = 1750,000.

Debt = 150,000

Remaining Money after debt = 1750,000 - 150,000
= 1600,000

Distribution between son and a daughter

Son : Daughter

2 : 1

3 parts

Share of son = $\frac{2}{3} \times 1600,000$ Rs = 1066,666

$$\text{Daughter's share} = \frac{1}{3} \times 1600,000$$

$$\text{Daughter's share} = \cancel{800,000} \text{ Rs } 533,333$$

x — x — x — x — x

3/

1st