

## PART-II

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### SECTION-I

Great  
Perfect paper  
Work on time management

Q2.

(a)

## Lipids

Lipids are the organic compounds that play essential role in structure and function of living organism. They are commonly known as fats and oils. Lipids are widely known because of their hydrophobic (water-repellant) nature and insulation properties. They are mainly composed of <sup>Carbon</sup> <sup>Hydrogen</sup> and <sup>Oxygen</sup> atoms. They are important source of energy for human beings and function as energy reservoir in the body. They form an important component of cell-membrane and involved in cell signalling and hormone production.

### Characteristics of Lipids

- ① Lipids are insoluble in water and soluble in organic solvents such as alcohol, ether, chloroform etc.
- ② They are poor conductor of heat and electricity.



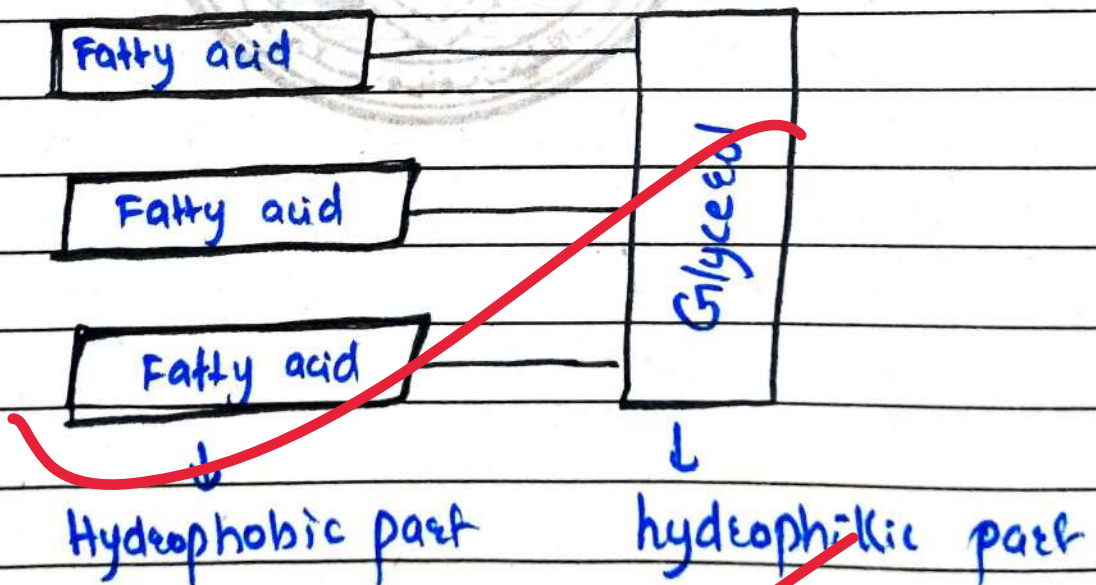
- (3) These are heterogenous group of substances
- (4) Fats, oil and steroids are some lipids found in nature
- (5) The basic building block of lipids is called fatty acid (F.A)
- (6) Lipids are an important component of human diet but they are also used widely in formation of paints, soaps, detergents, varishes, cosmetics and pharmaceuticals.

## Major types Of Lipids

### ① Simple Lipids

Simple lipids are mainly composed of fatty acids and glycerol.

eg For example fats and oil



Basic structure of lipid molecule

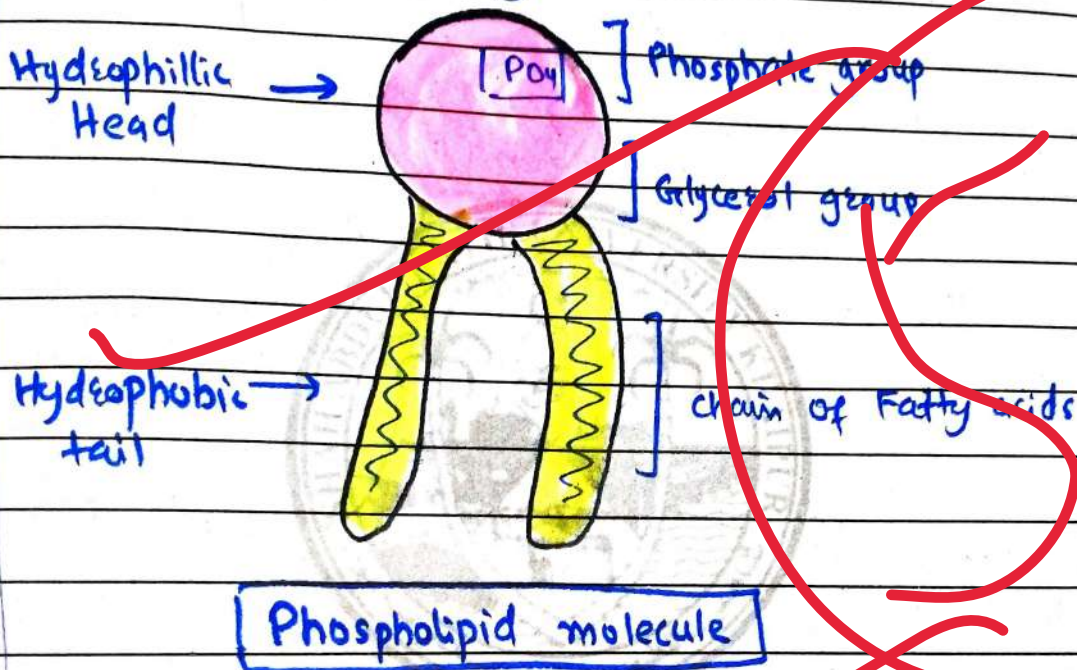


## ② Compound Lipids

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They are composed of fatty acids and glycerol and some additional groups.

example: Lipoprotein, glycolipid, Phospholipid contain protein, Carbohydrate and phosphate as additional components respectively.



## ③ Derived Lipids

These are derived from simple and compound lipids. For example vitamin D, sterols, Terpens.

## Functions Of Lipids

Lipids are best insulator for body that provide warmth to body. They form an important component of structure of cell membrane. Along with structural support they provide



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unique function of selective permeability. They function as reservoir of energy and significant part of hormones as well.

b.

## Conservation of energy

The mechanism of conservation of energy is crucial for sustainability of environment, climate change and energy security. The adoption of measures for conservation of energy are beneficial for planet earth. Some of the key measures for energy conservation are enlisted below:

### ① Awareness campaigns and education

Organize awareness campaigns to educate public regarding significance of energy conservation. Arrangement of training programs and encouraging organization to promote sustainable measures of energy usage will help in energy conservation.

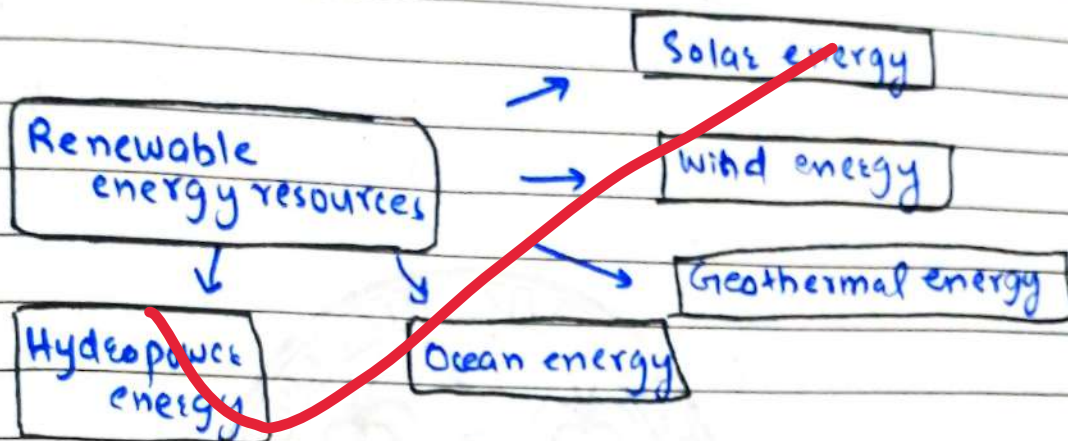
### ② Adoption of Renewable energy resources

The use of renewable resources that are reusable, replenishable, cost effective will help in conservation of environment as well as energy.



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These resources have no dangers of depletion or getting expired and helps us reduce greenhouse gases emissions. However, use of fossil fuels have risks of depletion and environmental degradation



### ③ Enhance energy efficiency

Energy conservation can be increased by banning old and heavy engines, shifting from incandescent bulbs to LED lights, upgrading old machinery in industrial sector and adoption of some behavioural changes. Encourage public transportation, prevent frequent use of private transport, reduce wastage of energy such as turning off bulbs and appliances when not in use can greatly help in energy conservation. Another measure in contemporary time is use of electric vehicles (EVs) that is beneficial for both energy and environment.



④ Energy conservation policies and their implementation  
 The government should take measures such as adoption of green incentives. It should provide subsidies for installation of renewable sources such as solar panels. It should offer tax benefits for adopting energy-efficient appliances. Another significant measure is Net metering. It is use of excess energy generated by renewable sources other than required. It allows consumer to sell that excess amount of energy and conserve this amount.

### Benefits Of energy conservation and its sustainable use

The sustainable energy is a form of energy that meet today's demands of energy. Overpopulation and uncontrolled burning of fossil fuels have produced risk of depletion. Instead transition towards renewable resources of great benefit. It should be widely encouraged as it doesn't cause harm to the environment, it is cost-effective, re-usable, and there is no risk of its depletion. However, world has started shifting towards sustainable energy and many countries are taking steps to make use of alternative energy resources to meet increasing demand of energy while being environment-friendly.

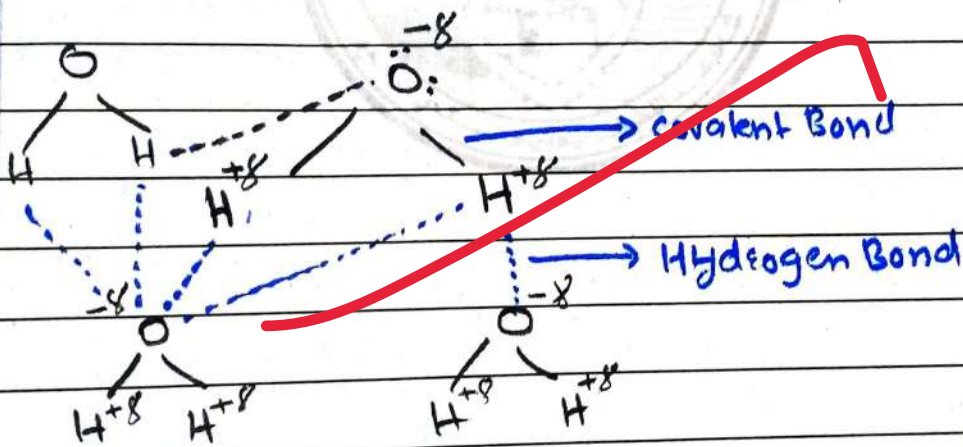


# Hydrogen Bonding

Hydrogen bonding is a interaction of hydrogen atom with other electronegative element such as oxygen, Nitrogen and fluorine. It is formation of bond from one molecule to another molecule. The positive pole of hydrogen atom of one molecule attracts negative pole of electronegative element of another molecule.

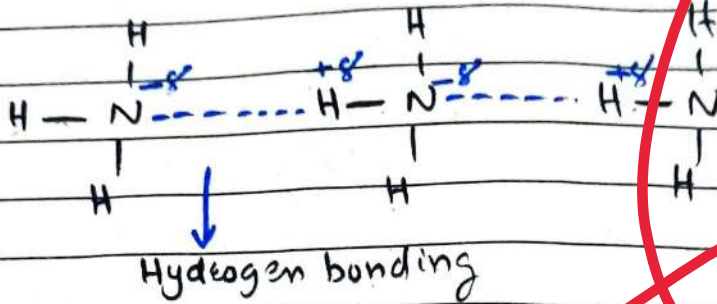
## Examples

①  $H_2O$



The above diagram illustrate Hydrogen-bonding between water molecules ( $H_2O$ ) as force of attraction between negative end of oxygen atom and positive end of hydrogen atom.

②

NH<sub>3</sub>

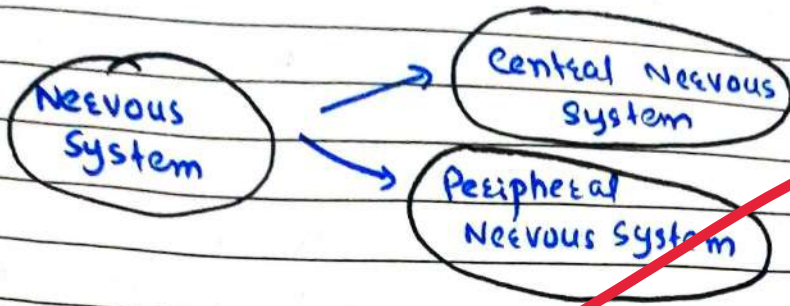
The above diagram shows hydrogen bond in dotted lines between nitrogen atom of one molecule and hydrogen atom of other molecule.

d.

## Nervous System Of Human Body

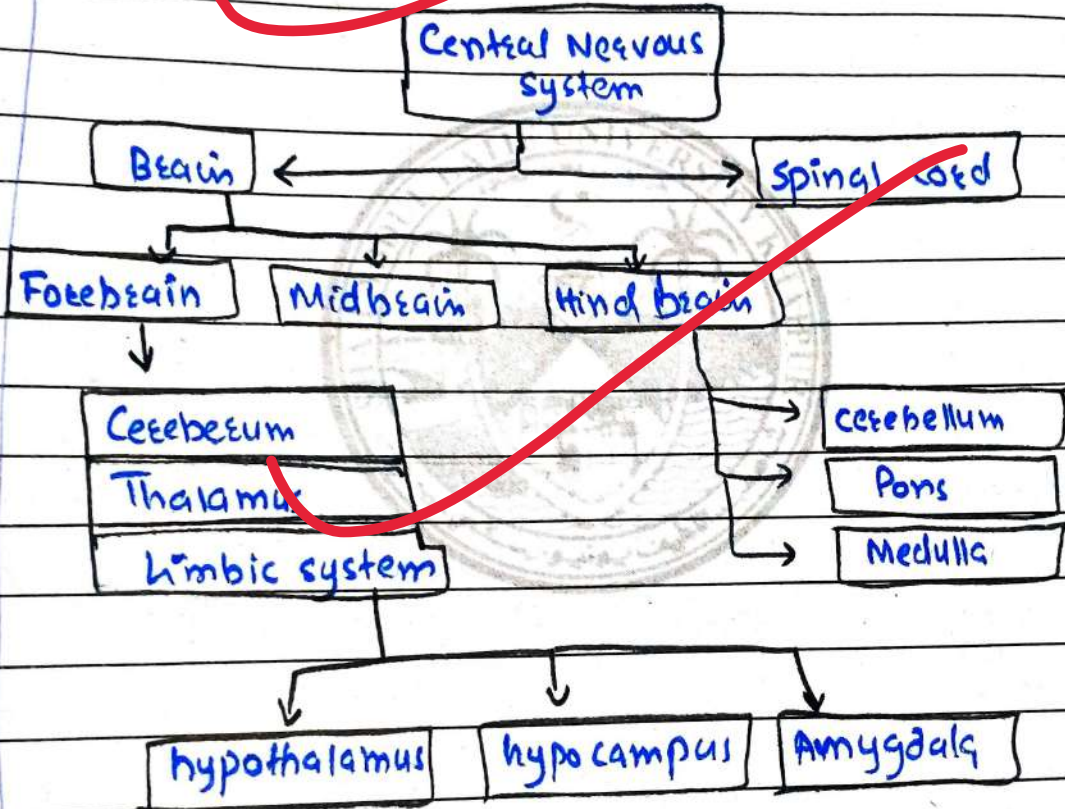
The functions such as sensation, vision, hearing, movement, balancing, thinking, reasoning and memory etc are due to collaborative function of human nervous system. It is responsible for sending and receiving signals to and from body and brain. The human nervous system receive signals from <sup>whole</sup> body, processes it and respond in nano-seconds. These are mainly two types of nervous system in human body





d by a)

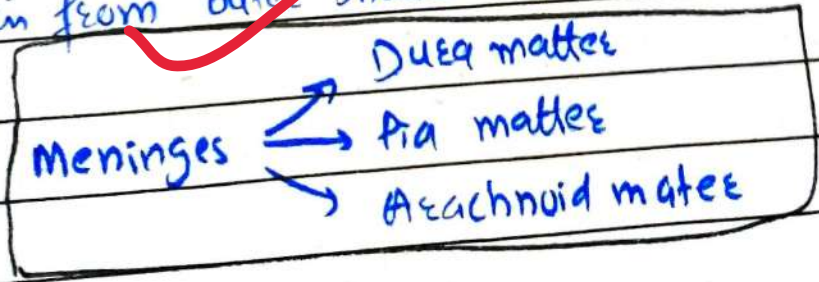
① Central Nervous system (CNS)



554.

A. Brain

Brain is protected by skull and meninges. The layers of meninges provide cushioning effect and protect brain from outer shocks. There are three layers of meninges.





These are mainly three parts of brain.

### i) Forebrain

It is divided into cerebrum, thalamus and limbic system. Cerebrum is concerned with analytical thinking, reasoning ability and intelligence. It receives sensory information, processes it and stores this information for future memory. The function of thalamus is to control sensory and visual information. Limbic system manages various activities of brain such as long-term and short-term memory, sensation of pleasure, punishment, sexual arousal and control of body temperature, hunger and menstrual cycle etc.

### ii) Midbrain

It connects forebrain with hindbrain. It contains relay centre for auditory information and control reflex movement of eyes.

### iii) Hindbrain

It consists of following structures;

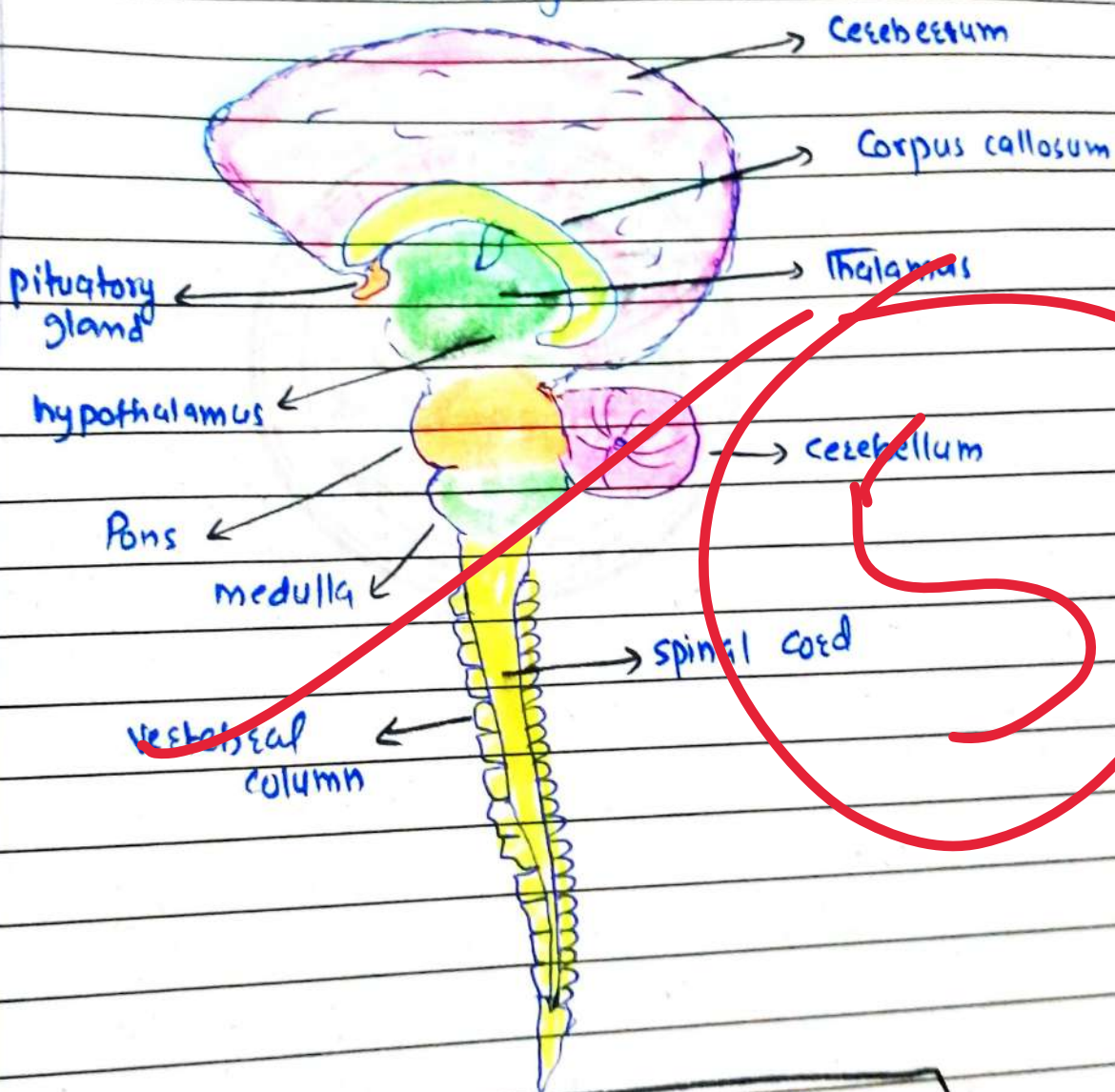
- Pons; controls transition between sleep and wakening.
- Medulla; controls breathing, respiration and heart beat.
- Cerebellum; concerned with coordinating movements, balance and position of body.



## B. Spinal Cord

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The spinal cord is continuity of brain through medulla oblongata. It passes through oval opening of cranium downwards. Spinal cord consist of central butterfly shaped grey matter and outer white matter. It consist of 31 pairs of nerves. It receive signals from brain and whole body.



The Central Nervous System



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## ② Peripheral Nervous System

It consists of nerves that branch out from the brain and spinal cord. These nerves form communication between the CNS and body parts. It is further sub-divided into somatic nervous system and autonomic nervous system.

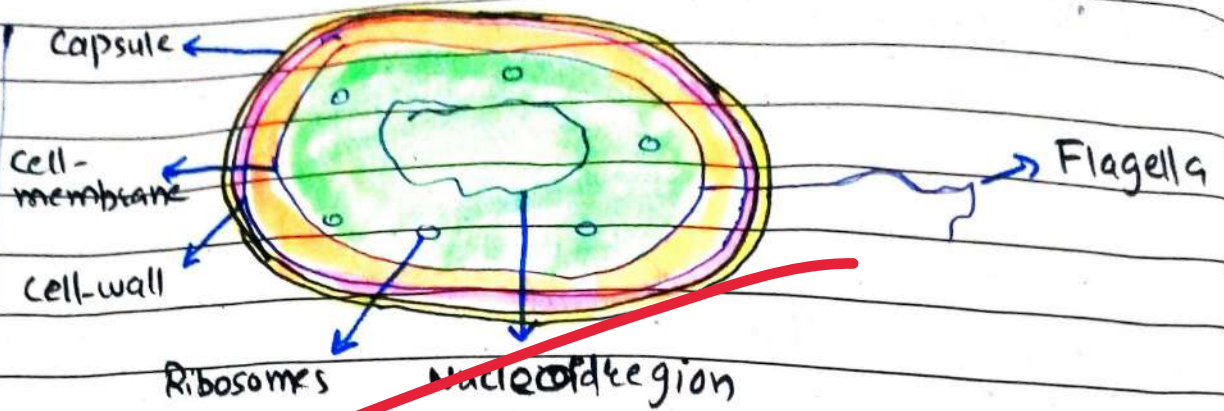




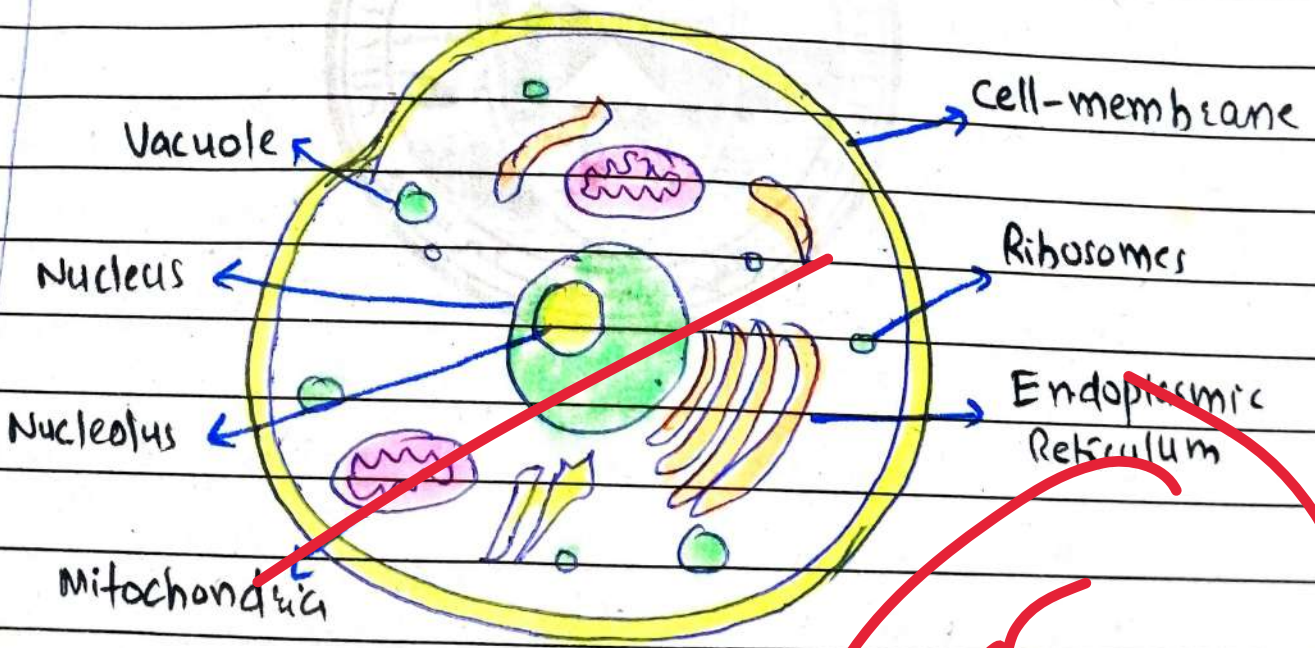
## Prokaryotic Cell Vs Eukaryotic cell

① Prokaryotic cell is unicellular	Eukaryotic cells may be unicellular or multicellular
② It contains circular DNA within cytoplasm	It contains DNA bounded within nuclear membrane.
③ Membrane bounded organelles are absent	Membrane bounded organelles are present such as endoplasmic reticulum, plastids, nucleus etc.
④ Replication is faster	Replication is slower and organized
⑤ Ribosomes are smaller in size	Ribosomes are larger in size
⑥ One single loop of DNA is present within cytoplasm	More than one chromosomes are present, highly organized within nucleus.
⑦ Nucleus is absent, only nucleoid region is present	Nucleus is present surrounded by double-membrane.
⑧ Examples include bacteria, fungi	Examples include animals, plants, fungi, <del>algae</del> algae.





PROKARYOTIC CELL



EUKARYOTIC CELL



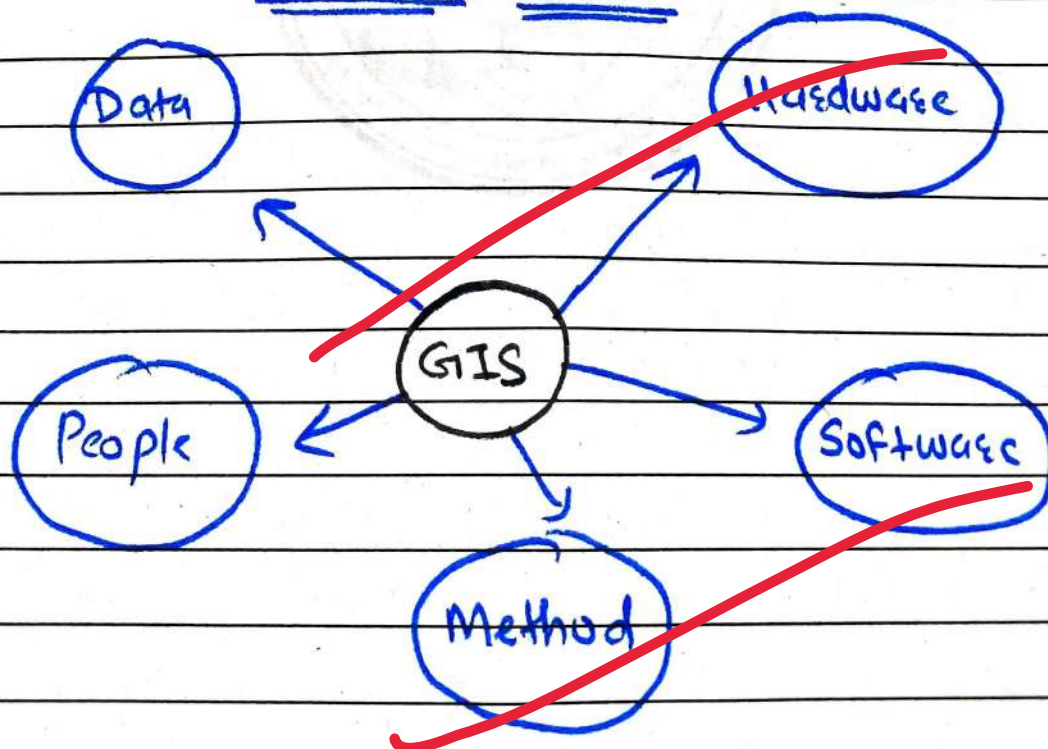


c.

## Global Information System (GIS)

Global information system is a complex framework used for collecting, managing, analyzing, coordinating and visualizing spatial and geographic data. It uses descriptive information and combine it with location data to better understand patterns, relationships and trends across various fields.

### components of GIS

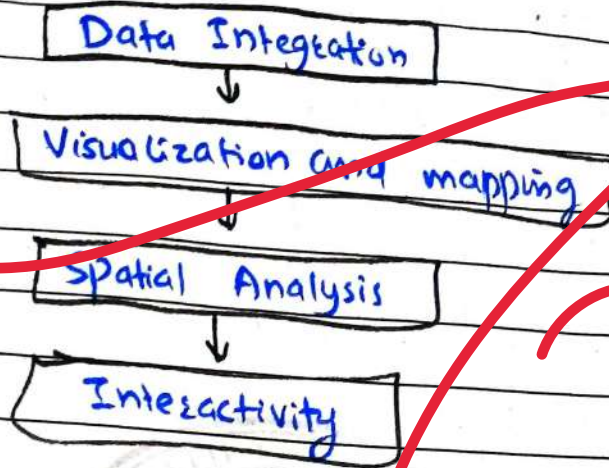


The geographic information system integrates location data with descriptive information to provide insights into patterns, relationship and trends across range of fields.



## Features of GIS

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## Functions of GIS

It includes data collection and input process of digitizing maps, importing GPS, and satellite imagery. Then organization of data, its analysis. After detailed analysis and integration, there is creation of maps, 3D models for communication. These frameworks provide information for better decision making in urban planning, disaster response and resource management. In addition to this, it is also beneficial for protecting biodiversity, infrastructure development, precision farming, traffic analysis and supply chain management. Hence, GIS is a transformative technology that empowers industries to understand and solve complex spatial challenges, making it essential tool for sustainable development and decision making.



b.

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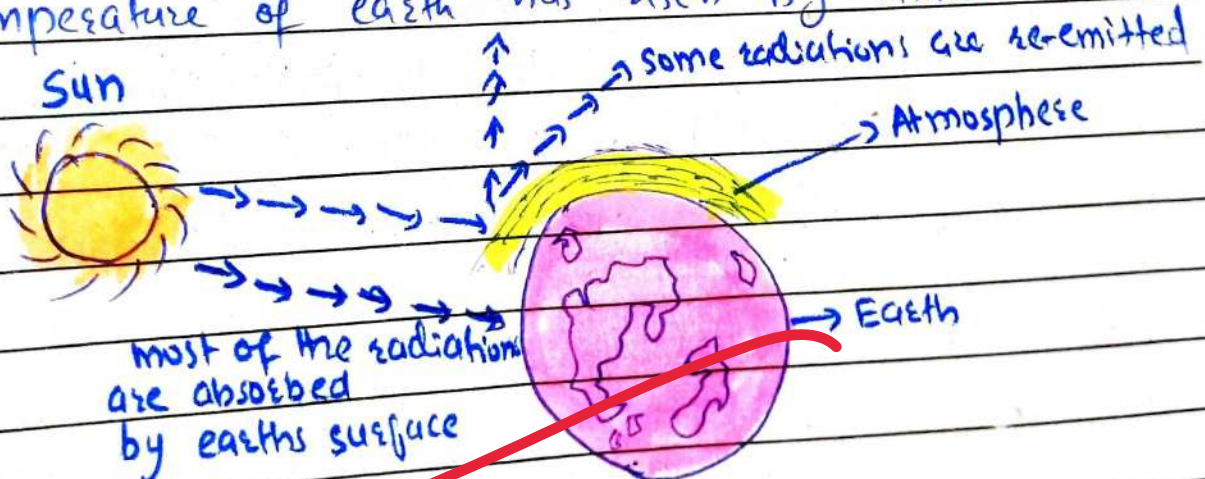
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# Global Warming

Global warming is a phenomenon of increased temperature of the globe. It is due to enhanced green-house effect. It is a natural process when ultraviolet radiation come from sun they are penetrated into atmosphere into gases to keep temperature of earth at optimum level.

Due to rapid industrialization, uncontrolled urbanization and excessive burning of fossil fuels, the greenhouse gases (GHGs) are increased rapidly. They absorb and trap more heat into earth's atmosphere. This long-term heating of earth is called global warming.

Due to human interferences with nature the temperature of earth has risen by almost  $1.5^{\circ}\text{C}$ .



Greenhouse effect



## Causes of Global Warming

- ① Greenhouse gases (GHGs)
- ② Enhanced greenhouse effect (GHE)
- ③ Rapid urbanization
- ④ Population explosion
- ⑤ Deforestation at massive level
- ⑥ Weaponries and warfare
- ⑦ Excessive burning of fossil fuel
- ⑧ Depletion of ozone layer (O<sub>3</sub>)

## Kyoto Protocol

Due to climate change and global warming, the international organization, United Nations Framework Convention on climate change (UNFCCC) signed an agreement. It was a step towards mitigation of greenhouse gases. Many nations signed Kyoto protocol and it was enforced on 16-Feb-2005. The aim was to reduce emission of greenhouse gases, transition from non-renewable to renewable resources and reduce dependency on fossil fuels.

However, Kyoto protocol has not been able to achieve its objectives effectively due to many reasons. Non-compliance by many nations, ~~and~~ controversial negotiations between developed and ~~and~~ developing countries, and withdrawal of Canada were some of the factors for failure. It requires compliance and pragmatic policies to effectively achieve the aims of Kyoto Protocol.



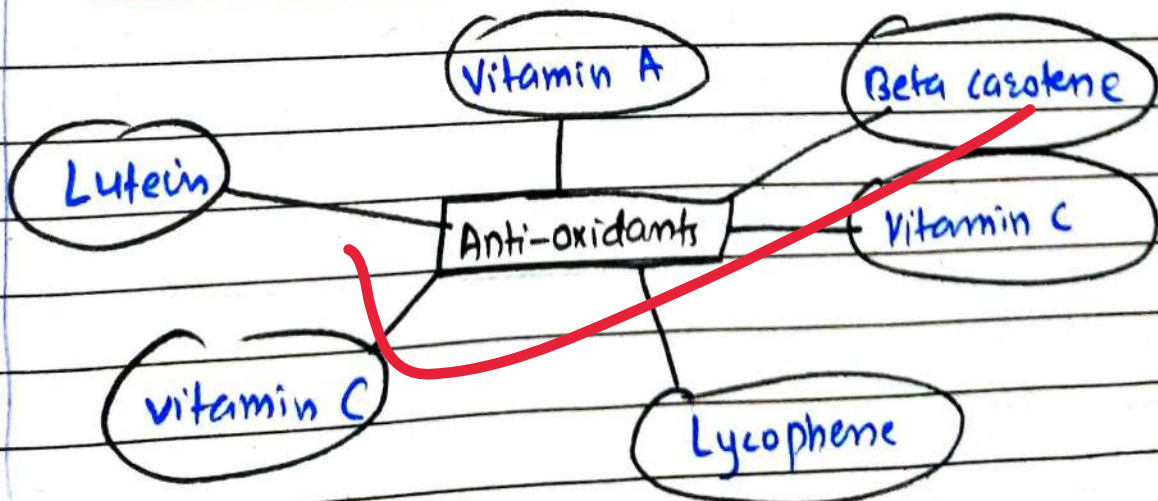
d.

## Antioxidants

Human body is open to oxygen. When oxygen enters body, it is responsible for oxidation. When free molecules are oxidized, they are converted into free radicals. Some of these free radicals are reduced back naturally but others require anti-oxidants for their reduction. For that purpose the human body requires anti-oxidants. Otherwise, these free radicals are responsible for faster aging process and various diseases such as lung cancer, diabetes and heart diseases through chain reaction.

Antioxidants are natural substances they may limit or stop the chain reaction of free radicals. They can protect and reverse the damage produced by free radicals.

### Sources of anti-oxidants





Above given diagram shows some of the natural antioxidants. The sources of these antioxidants are colourful fruits and vegetables such as carrot, papaya, mango, peaches, pumpkin, apricot, broccoli, cauliflower, tomatoes, spinach, milk, butler etc.

### Limitations of use of anti-oxidants

Anti-oxidants can also be used in supplement forms. But its usage have certain limitations. Such as people who smoke have high chances of lung cancer. When they ~~use~~ take anti-oxidant supplements, it increases risk of lung cancer. The only way to complete their body need of anti-oxidants is use consume lots of fruits, vegetables, and nuts.



## SECTION - II

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a.

As given in the question;

The sum of three digit numbers is 15

The sum of 10th and unit digit is 12

The difference of unit digit from 10th digit is 2

Let's suppose the digits are  $x, y, z$ , hence;

$$x + y + z = 15 \rightarrow \text{equation (1)}$$

$$y + z = 12 \rightarrow \text{equation (2)}$$

$$y - z = 2 \rightarrow \text{equation (3)}$$

From equation (2)

$$y - z = 2$$

$$y = 2 + z \rightarrow \text{equation (4)}$$

Substitute equation (4) in equation (2)

$$y + z = 12$$

$$2 + z + z = 12$$

$$2 + 2z = 12$$

$$2z = 12 - 2$$

$$z = \frac{10}{2}$$

$$\boxed{z = 5}$$

Now substitute value of "z" in equation (4) to find value of "y"



$$y = 2 + z$$

$$y = 2 + 5$$

$$\boxed{y = 7}$$

Using equation (1) put value of "y" and "z" to find value of "x"

$$x + y + z = 15$$

$$x + 7 + 5 = 15$$

$$x = 15 - 5 - 7$$

$$\boxed{x = 3}$$

Hence, the three digit number is 375

d.

(i) 13, 24, 46, 90, 178, \_\_\_\_\_

To find the missing number, we would find the pattern between given numbers.

Initially, find the difference between given terms.

$$24 - 13 = 11$$

$$46 - 24 = 22$$

$$90 - 46 = 44$$

$$178 - 90 = 88$$



The differences between consecutive ~~to~~ numbers are 11, 22, 44, 88. They follow a ~~is~~ pattern where each term doubles the previous one.

11, 22, 44, 88. (each ~~is~~ term multiplied by 2)

Hence, to find the missing number, the ~~the~~ last difference is multiplied by two as well.

$$88 \times 2 = 176.$$

To find next term, add the difference with last number.

$$178 + 176 = 354$$

So, the ~~next~~ term in the sequence is 354.

The complete sequence is :

13, 24, 46, 96, 178, 354.

(ii) 5, 6, 9, 14, 21, —

To analyze pattern of given terms, let's find differences between consecutive numbers.

$$6 - 5 = 1$$

$$9 - 6 = 3$$

$$14 - 9 = 6$$

$$21 - 14 = 7$$



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So, the differences are 1, 3, 5, 7.

At each step the difference is added by number 2  
Hence next difference should be 9.

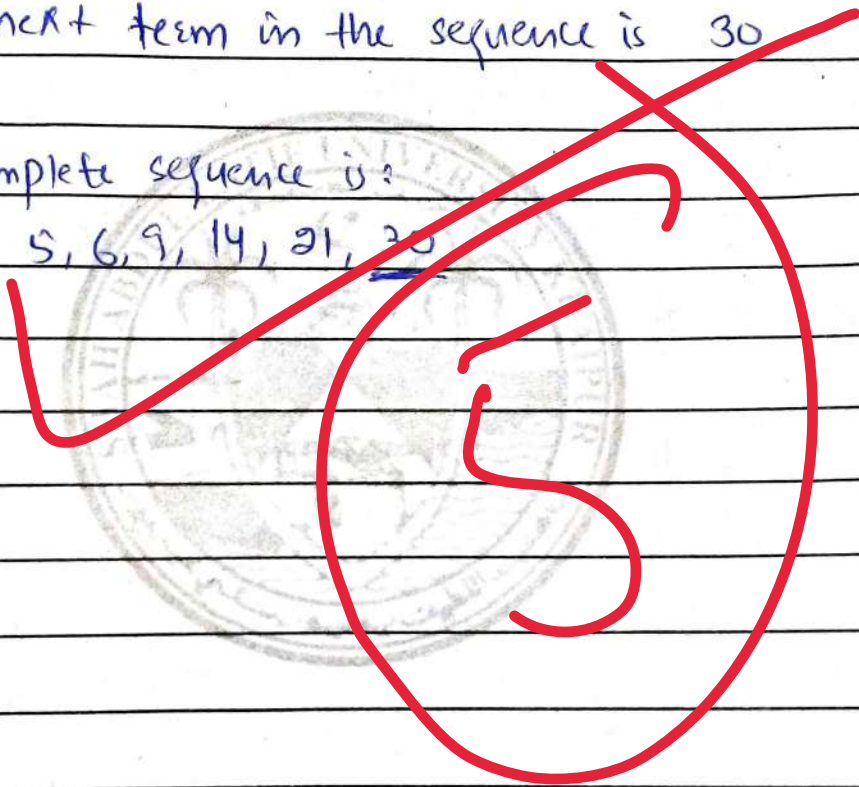
By Adding difference with last digit in given  
pattern

$$21 + 9 = 30.$$

Hence, next term in the sequence is 30

The complete sequence is:

5, 6, 9, 14, 21, 30





b.

5

Total persons = 18

As the man ordered once slice per person

Total slices = 18

Ratio of slices of small, Medium and large pizza =  $2x, 3x, 4x$

weight of each slice = 40g

price of smaller pizza = 320Rs

Price of total pizza = ?

weight of total pizza = ?

As the total number of slices ordered are 18. Hence,

$$2x + 3x + 4x = 18$$

$$9x = 18$$

$$x = 2$$

The number of slices per pizza:

(1) small pizza =  $2x$

(2) medium pizza =  $3x$

(3) large pizza =  $4x$

By putting the value of "x" the number of slices are:

$$\text{small pizza} = 2(2) = 4$$

$$\text{medium pizza} = 3(2) = 6$$

$$\text{large pizza} = 4(2) = 8$$

As weight of each slice is 40g. To find total weight we will multiply <sup>total</sup> number of slices with weight of one slice.

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$$40 \times (4+6+8) = \text{weight of total pizzas}$$

$$40 \times (18) = 720g$$

Hence, weight of total pizza is  $\boxed{720g}$

Now, Price of pizza is calculated. For this suppose price of one slice for all sizes is  $320Rs. = 80Rs$

To find price of whole pizza, we will multiply price of one slice with total number of slices.

$$= \cancel{80} \times (\cancel{6+8}) = 80(6+8)$$

$$= \cancel{320} = 80(14)$$

price for medium and large = 1120 Rs.  
pizzas

price of whole pizza is calculated by adding price of small, large and medium pizzas.

$$\text{Total price} = 320 + 1120 = 1440Rs.$$

Therefore, price for total pizzas =  $\boxed{1440Rs.}$



c

diameter of a circle = 6cm

circumference of circle = ?

Area of circle = ?

Formula for circumference of circle =  $2\pi r$

First find the value of radius.

$$\text{Radius} = \frac{\text{Diameter}}{2} = \frac{6}{2} = 3\text{cm}$$

Put the value of "radius" in circumference formula

$$\begin{aligned} \text{circumference} &= 2\pi r \\ &= 2(3.14)3 \\ &= 6 \times 3.14 \\ &= 18.84\text{cm} \end{aligned}$$

So, the circumference of circle is  $18.84\text{cm}$

To Find Area of circle.

$$A = \pi r^2$$

$$A = 3.14(3)^2$$

$$A = 3.14 \times 9$$

$$A = 28.26\text{cm}^2$$

Hence, Area of circle is  $28.26\text{cm}^2$

Q8.

a.

width of a rectangular room = 60% of length

length of classroom = 15 ft

Room's dimensions = ?

As the width is 60% of length.

$$\text{width} = \frac{60}{100} \times \text{length}$$

$$\text{width} = 0.6 \times \text{length}$$

Putting the value of length,

$$\text{width} = 0.6 \times 15$$

$$\text{width} = 9 \text{ ft}$$

Final dimensions:

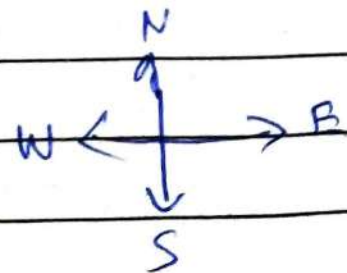
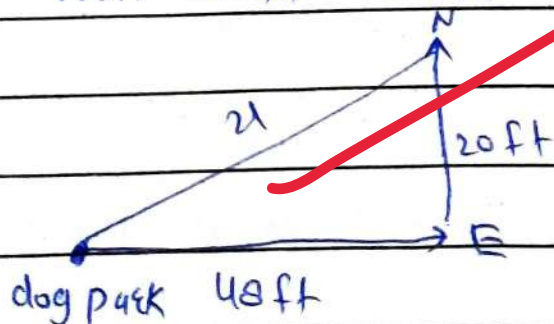
$$\text{length} = 15 \text{ ft}$$

$$\text{width} = 9 \text{ ft}$$

So, the dimensions of room are 15 ft by 9 ft

b.

Veena ran 48 ft east then turned and ran 20 ft north to reach water station.





If she ran straight the distance can be calculated by using Pythagoras theorem.

$$\text{Hyp}^2 = \text{Perp}^2 + B^2$$

$$x^2 = (20)^2 + (48)^2$$

$$x^2 = 2704$$

$$x = 52 \text{ft}$$

If Veera ran straight to the water station, she would have run 52ft

- c. average marks of 40 students = 52.15  
 the marks of one student = 49 instead of 85  
 actual average marks of class = ?

$$\text{average} = \frac{\text{Total marks}}{\text{no. of students}}$$

$$\text{Total marks} = \text{average} \times \text{no. of students}$$

$$\begin{aligned} \text{Total marks} &= 52.15 \times 40 \\ &= 2086 \end{aligned}$$

The total marks are 2086. To correct the error of marks.

$$\text{error} = 85 - 49 = 36$$

The one student is given 36 less marks

$$\text{So total correct marks} = 2086 + 36$$

$$\text{Correct marks} = 2122$$

with the use of

By using correct total marks, correct average of whole class is calculated

$$\text{correct average} = \frac{\text{Total marks}}{\text{Total students}}$$

$$\text{correct average} = \frac{2102}{40}$$

$$\text{correct average} = \boxed{53.05}$$

The correct average marks of class are  $\boxed{53.05}$

d. no. of people who like veg pizza = 37

no. of people liking chicken pizza = 25

neither liked = 3 people

probability of liking chicken pizza = ?

$$\begin{aligned} \text{The total number of people are} &= 37 + 25 + 3 \\ &= 65 \end{aligned}$$

The probability to like chicken pizza =  $\frac{\text{Number of people who like chicken pizza} \times 100}{\text{Total people}}$

$$= \frac{25}{65} \times 100$$

$$= \frac{5}{13} = 0.384 \times 100 = \boxed{38.4\%}$$

The probability that a randomly selected person likes chicken pizza is equal to 38.4%.