

Section IIQuestion no: 06

Part (b):

let the total number of votes = x

$$\begin{aligned} \text{Number of votes of defeated candidate} &= 30\% \text{ of } x \\ &= \frac{30}{100} (x) \end{aligned}$$

$$\Rightarrow 0.3x$$

Number of votes of winning candidate = 70% of x

$$= \frac{70}{100} (x)$$

$$= 0.7x$$

Candidate defeated by = 15000 votes

So, total number of votes will be;

$$0.7x - 0.3x = 15000$$

$$0.4x = 15000$$

$$x = \frac{15000}{0.4}$$

$$x = 37,500 \text{ votes polled in an election}$$

Number of votes of winning candidate =

$$= \frac{7x}{10}$$

$$= \frac{7(37500)}{10}$$

$$\Rightarrow \frac{262500}{10} \Rightarrow 26250 \text{ votes polled for winning candidate}$$

Part (c):

total amount of mixture = 40 litres

Percentage/amount of water = 25%

$$\text{Amount of water} = \frac{25}{100} (40)$$

Amount of water = 10 litre

$$\begin{aligned}\text{Amount of milk} &= 40 - 10 \\ &= 30 \text{ litre}\end{aligned}$$

Now, amount of water added = 10 litre

$$\begin{aligned}\text{total amount of water} &= 10 + 10 \\ &= 20 \text{ litre}\end{aligned}$$

$$\begin{aligned}\text{Total amount of mixture} &= \text{Amount of water} \\ &\quad + \\ &\quad \text{Amount of milk}\end{aligned}$$

$$= 20 \text{ litre} + 30 \text{ litre}$$

$$= 50 \text{ litre}$$

$$\begin{aligned}\text{Percentage of milk} &= \frac{\text{Amount of milk} \times 100}{\text{total amount of mixture}}\end{aligned}$$

$$= \frac{30 \times 100}{50}$$

$$\text{Percentage of milk} = 60\%$$

Part (d) :Aslam can do work in = $\frac{1}{10}$ daysAli can do work in = $\frac{1}{15}$ daysNajam can do work in = $\frac{1}{20}$ daysTotal work done by Aslam, Ali and Najam together = $\frac{1}{10} + \frac{1}{15} + \frac{1}{20}$

$$= \frac{3+2+1}{30} = \frac{6}{30}$$

$$= \frac{1}{5} + \frac{1}{20}$$

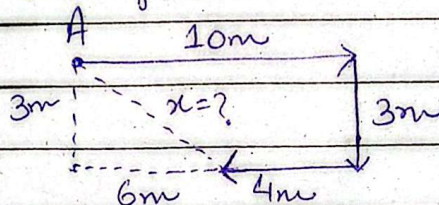
$$\text{Combined work} = \frac{10+3}{60} = \frac{13}{60}$$

$$\text{time required to complete this work} = \frac{60}{13}$$

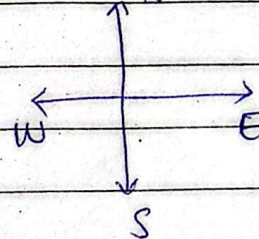
$$= \frac{60}{13} \approx 4.6 \text{ days}$$

Question no: 08Part a) :

(Starting Point)



Directions



According to pythagoras theorem

$$(\text{Hyp})^2 = (\text{perp})^2 + (\text{base})^2$$

$$= (3)^2 + (6m)^2$$

$$(\text{Hyp})^2 = 9 + 36$$

$$(Hyp)^2 = 45$$

Taking square root of both sides

$$\sqrt{(Hyp)^2} = \sqrt{45}$$

$$Hyp = 6.7m$$

Sarah's distance from the initial point = 6.7m

Part (c):

Number of green balls = 6

Number of yellow balls = 10

Total number of balls = $6 + 10 = 16$ balls

Probability of yellow balls = $\frac{\text{Nbr of yellow balls}}{\text{total nbrof balls}}$

$$= \frac{10}{16}$$

Probability of yellow balls = $\frac{5}{8}$

Part (d):

Coded language:

M A D R A S

+1 ↓ +1 ↓ +1 ↓ +1 ↓ +1 ↓ +1 ↓

N B E S B T

In the above ^{code} pattern followed is each word written as one word forward.

So, BOMBAY will be coded in the similar manner.

B	O	M	B	A	Y
↓	↓	↓	↓	↓	↓
+1	+1	+1	+1	+1	+1
C	P	N	C	B	Z

BOMBAY will be coded as CPNCBZ.

Part (b) :

Perimeter of a regular Octagon = ?

length of each side = 5cm

Perimeter of a regular Octagon = ?

$$\begin{aligned} \text{Perimeter} &= 8 \times \text{length of side} \\ &= 8 \times 5\text{cm} \Rightarrow 40\text{cm} \end{aligned}$$

Perimeter of a regular Octagon = 40cm

Each angle of the octagon = ?

$$\text{Angle of } n^{\text{th}} \text{ octagon} = \frac{(n-2) \times 180}{n}$$

As n is number of sides of an octagon which is 8. Hence, above equation will be;

$$\begin{aligned} \text{Angle of an octagon} &= \frac{(8-2) \times 180}{8} \\ &= \frac{6 \times 180}{8} \end{aligned}$$

$$\text{Angle of an Octagon} \Rightarrow \frac{1080}{8} \Rightarrow 135^\circ$$

Section I

Part (b):

Octet rule:

Octet rule refers to;
the tendency of atoms to
prefer to have eight electrons
in the valence shell.

In a chemical bonding, the atoms
which have eight electrons in their valence
shell tend to be most stable. It is
based on the observation that the
atoms of an element participate in a
chemical bonding in such a way that
each atom of the resulting molecule
has eight electrons in the valence shell.

Keeping in view this observation,
noble gases (He, Ne, Ar, Kr, Zn) are chemically
inert or most stable because their
valence shells are completely filled
with eight electrons.

Example of Sodium chloride (NaCl):

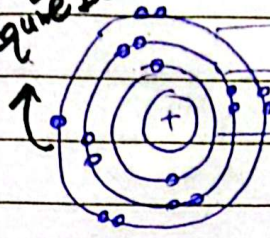
In sodium chloride, an ionic
bond is formed between positively charged
sodium ion (Na^+) and negatively charged
chloride ion (Cl^-).

Date: _____

M T W T F S

Cl
17

Requires $1e^-$ to complete octet



M (valence shell)

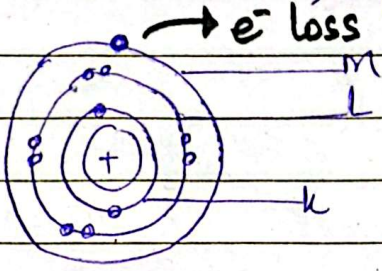
L

K

contains 7 electrons

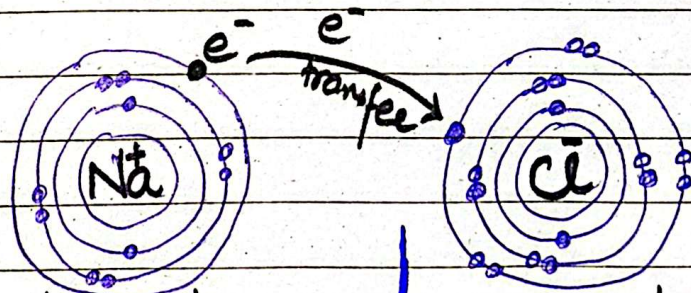
Cl needs only one electron in its valence " to complete its octet and gets stable.

On the other hand, Na



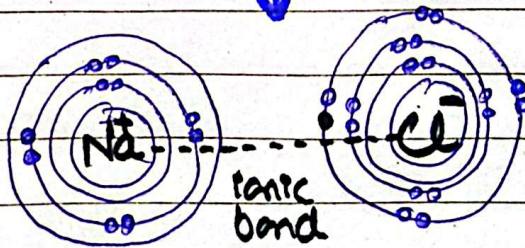
e^- loss "

In case of Na, it has one electron in its valence shell; to get stability have to remove valence electron to gain stability by attaining octet electronic configuration.



loss e^- to get Na^+ (cation)

gain e^- to acquire -ve charge (Cl^-) (anion)



ionic bond

Part (d):

1. Uses of Microwaves:

Microwaves are a form of electromagnetic radiation used in communication, remote sensing, radar, radio astronomy and in industrial processes.

In daily life, microwaves are used in,

- i) Wireless technologies to transmit data and signals
- ii) Can pass through Earth's atmosphere without significant absorption or reflection, hence used for communication between ground stations and satellites for television, telephone and internet services
- iii) Microwaves are extensively used in various medical processes like MRI (magnetic Resonance Imaging) to diagnose tissue.

2. Uses of Radiowaves:

In electromagnetic spectrum, radiowaves have the largest wavelength that allow them to travel long distances. Also, they have low frequencies, making them suitable for communication signals.

- i) Radiowaves are used in planes and ships to detect objects, measure speed and ensure safe navigation.
- ii) In wifi routers, radiowaves are used for internet connectivity.
- iii) Radiowaves are extensively used for weather forecasting to track storms, rainfall and cloud patterns.

3. Uses of X-rays :

X-rays have extremely short wavelength, high frequency, high energy and high penetrating power.

- i) X-rays are used in medical diagnosis to detect bone fracture, dislocation of joints and injuries.
- ii) X-ray crystallography are used to study the atomic structure of crystals, proteins, DNA and new materials.
- iii) Security scanners in malls, courts and offices work with X-ray technology.

Part (a):

Black hole:

Black holes are formed when very massive stars collapse under gravity. stages of formation of black holes are;

(i) Formation of a massive star

At first stage, a star much larger than the sun burns hydrogen into helium in its core. Over millions of years, it fuses heavier elements.

Helium $\rightarrow$ carbon $\rightarrow$ oxygen $\rightarrow$ iron

(ii) Iron core formation

When the star's core becomes iron, fusion reaction stops. Iron cannot release energy by fusion so the star loses its main source of outward pressure.

(iii) Core collapse

With no fusion pressure left, the star's core collapses in a fraction of a second. Gravity becomes extremely strong and compresses the core to a super dense state.

(iv) Supernova formation

Outer layers of the star explode outward into a massive supernova.

iv) Supernova Explosion

After the explosion, the leftover core;

if more than 3 times the mass of the Sun, gravity keeps collapsing it.

The core shrinks into an infinitely dense point called a singularity.

Around this point forms the event horizon; the boundary beyond which nothing not even the light can escape. This is called a blackhole.

Massive star



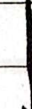
Fuel Exhausted



Core collapse



Supernova explosion



Core remnants

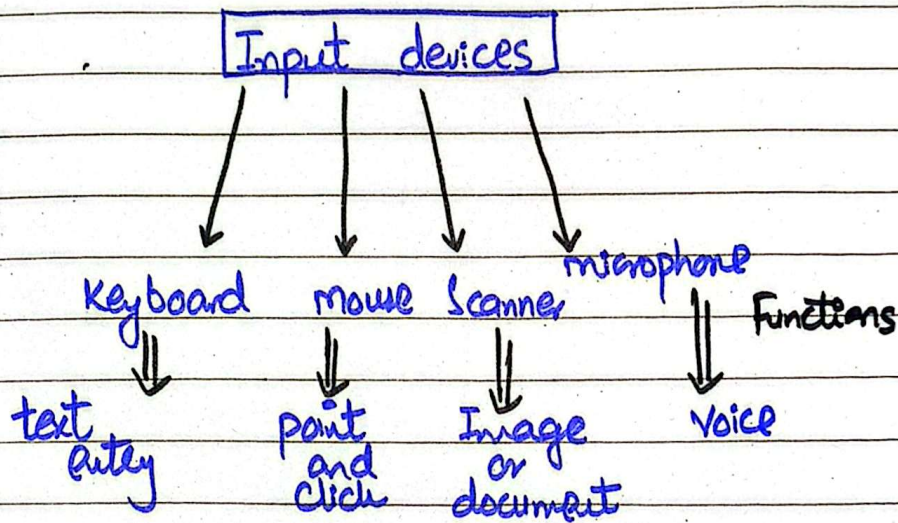


Blackhole formation

Question no: 03Part (b):1. Input devices of Computer:

Input devices are hardware components that allow users to enter data, commands and instructions into a computer system.

Also Input devices convert actions into signals that computer can understand.

a) Keyboard

A keyboard is an input device used to enter data such as text, numbers and commands into a computer.

Functions :

It types letters, symbols and numbers

- Sends commands to the computer using special keys i.e. Ctrl, Alt, Function keys

b). Mouse

A mouse is a pointing device that allows users to interact with the computer screen.

Functions :

- moves the cursor on the screen
- Allows selecting, dragging, opening and closing files

Example :

trackball mouse, wireless mouse

c) Scanner

A scanner is an input device that converts physical documents or images into digital format.

Functions :

- Captures text or images from paper
- Converts documents into editable digital files
- Used for storing, editing or sharing scanned images/documents

d) Microphone

A microphone is an input device that captures sound and converts it into electrical signals for the computer.

Function:

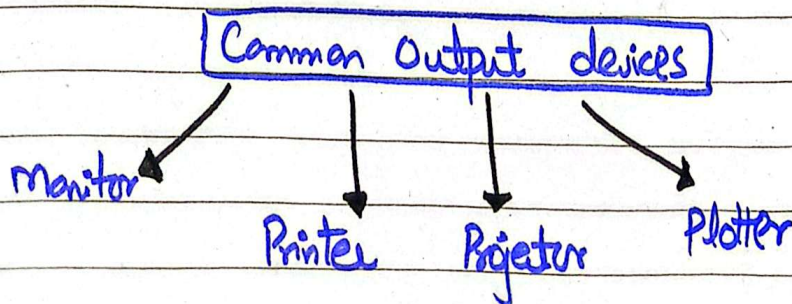
- Records voice for communication, audio recordings or voice commands
- Enables speed-to-text and multimedia input
- Used in video conferencing and voice recognition systems

Example:

USB microphone, headset microphone.

2. Output devices

Output devices are hardware components that take processed data from a computer and present it in a form understandable such as text, images, sound or physical output.



a) Monitor

Monitor is a screen that displays visual output from the computer.

Function:

↳ Shows texts, graphics, videos, and animations

Example:

LCD, LED, touchscreen

b) Printer :

Printer is an output device that produces hard copy of digital documents or images.

Function:

Convert digital files into physical copies on paper.

Example:

Laser printer, 3D-printer, Inkjet printer

c) Projector

Projector displays ~~out~~ computer output on a large screen or wall

Functions:

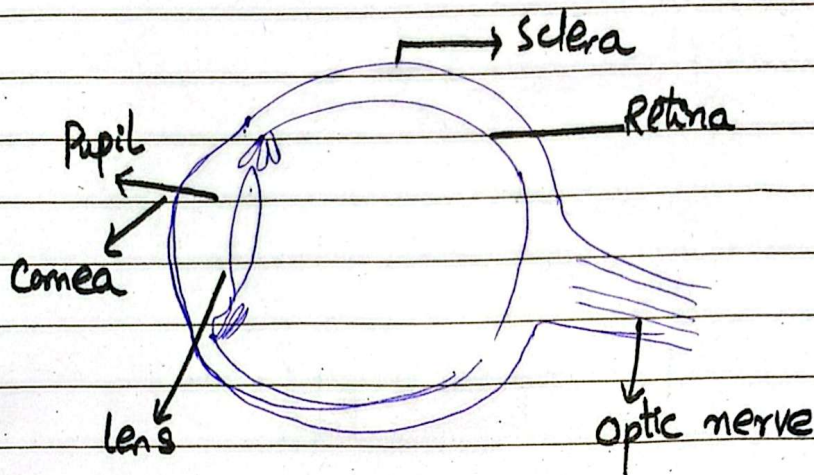
Useful for presentations, lectures, and video display

d) Plotter

Plotter prints large-scale images like maps, engineering drawings or architectural plans.

Function:

Produces accurate line drawings and designs on large sheets

Part (c):Functions:

i) Cornea

Cornea is a transparent outer layer covering the front of the eye.

Functions:

- ↳ It protects the inner parts of the eye i.e. Iris, lens and retina, from dust, germs and injury.
- ↳ Being transparent, it allows light to pass through clearly into the eye.
- ↳ Cornea bends incoming light rays to help focus them on the retina.

ii) Convex Lens

A convex lens is thicker in the middle and thinner at the edges, bends light rays towards a point called focus.

Functions:

- It converges parallel rays of light to a single point.
- Can form real or virtual images of the object
- Magnify objects

iii) Pupil:

The pupil is the black circular opening in the centre of the Iris of the eye.

Functions:

The pupil adjusts its size in response to light intensity.

• Bright light → Pupil Constricts

Protects retina from excessive light

• Dim light → Pupil dilates

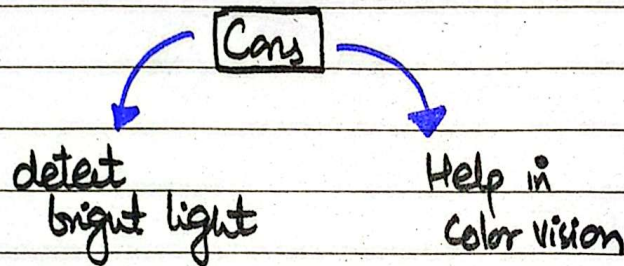
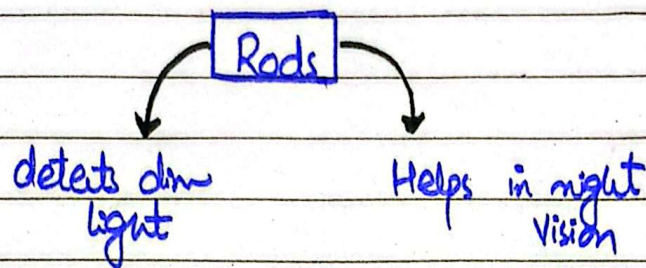
allows more light to enter for better vision

in Retina

Retina is the innermost layer of the eye that is photosensitive and plays a crucial role in vision.

Function:

- Contains photoreceptor cells — rods and cones that detect light.



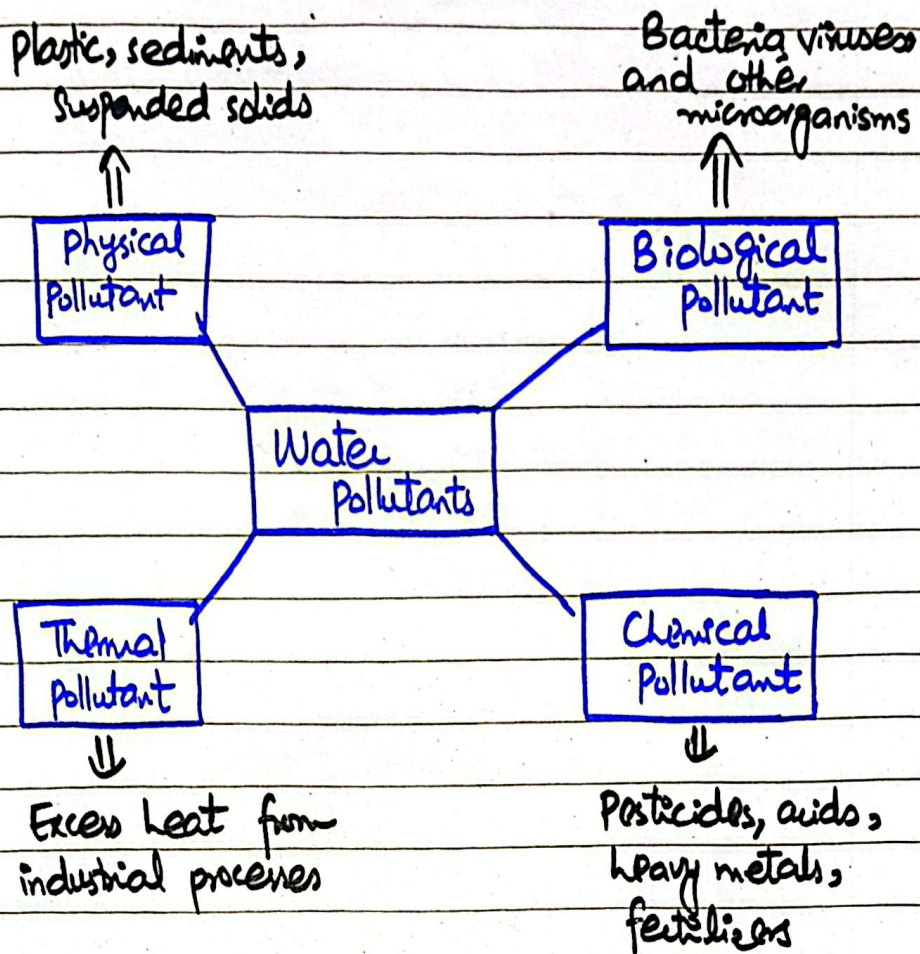
- Retina receives light rays to form a real and inverted image of object.

Part (d):

Causes of water Pollution

Water pollution occurs when harmful substances such as chemicals, waste or microorganisms enter water bodies.

(rivers, lakes, oceans) making the water unsafe for drinking purposes.



1. Causes of Water Pollution

a). Industrial Waste

Factories release harmful chemicals, heavy metals, and toxins directly into oceans, lakes, rivers, making water unsafe for aquatic life and humans.

b). Domestic Sewage

Untreated household wastewater, detergents and toilet waste flow into water bodies, spreading

bacteria and pollutants.

c) Agricultural runoff

Fertilizers, pesticides and insecticides used in farming, wash into rivers and lakes during rainfall thus contaminating water.

d) Oil Spills

Oil from ships, refineries or pipelines spreads on water surfaces, destroying marine ecosystem.

e) Natural Causes

Soil erosion, floods and volcanic eruptions can carry sediments and minerals into water, causing water pollution.