

Date: 24/11/25

Day: Monday

GSA - Final

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Section - 1

Q₂ - Question #2

a) Introduction

Blackholes are interstellar bodies which absorb everything in its path. Not even the light can escape it, when light enter its Event Horizon. There are many ways blackholes are formed such as Super Nova explosion, of the Stars.

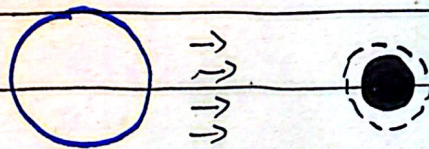
How are black holes formed through star's supernova?

Black holes form when the life cycle of the stars end. The fusion process from Hydrogen to Helium, Carbon,

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and Oxygen ultimately exhausts in
Final stages of the star and causes
its expansion. If the star is massive,
the core collapses into itself, resulting
in formation of black hole.



Final stage of
the star, greater
than its original size

Black hole formed
as star's ^{core} collapses
into itself

Conclusion

Black holes usually form when the
star cycle ends and the ~~the~~ core
collapses in itself. ~~However~~ However,
it is necessary for it to have a
massive size.

b) Introduction

The element's primary shell has

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two electrons. Whereas, the outer shell after Duplet Rule has 8 electrons, or can possess up to 8 electrons. This shell is usually known as Octet Rule.

Octet Rule

Octet Rule is the capacity of atom's shell which can hold up to 8 electrons. Hence, in order to stabilise, the atom requires 8 electrons. It comes after Duplet Rule with capacity of 2 electrons.

Table Salt - Ionic bonding

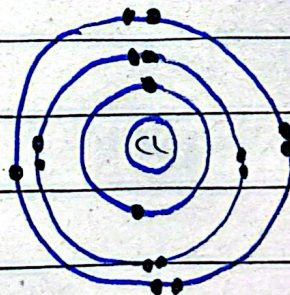
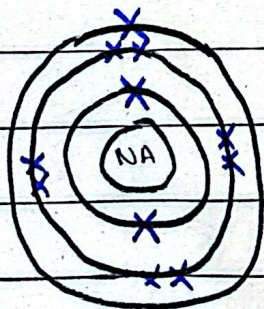
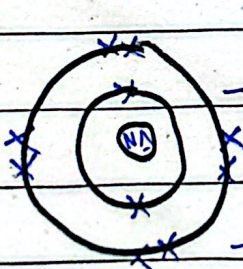


Figure 1



Ionic Bonding



Figure 2

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In the context of Ionic Bonding of Sodium Chloride, the element Sodium has one electron in its ^{outer shell} ~~outer shell~~ while Chlorine requires 1 electron to complete its outer shell. According to Octet rule, Sodium will give away its electron to Chlorine in order to stabilise i.e, have 8 electrons in its outer shell.

Conclusion

Octet rule defines that the outer layer of atom after the first must have 8 electrons for stability. In salt, Sodium gives away one of its electrons to Chlorine, and both form a stable outer shell of 8 electrons.

c) Introduction

Microwave, Radio waves and X-rays are a part of electromagnetic

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spectrum. They vary due to differing frequencies and wavelengths, giving them different properties.

Uses of microwave

1. Microwaves are used to heat food in even.
2. Microwaves help in telecommunication.
3. Microwaves are used in T.V remote to control T.V settings and channels.

Uses of radio waves

1. Radio waves are used to in catching signals in Radio.
2. Radio waves are used in satellite to transmit communication signals.
3. Many modern technological gadgets like mobile and laptop use it for internet and mobile communication.

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Uses of X-rays

1. X-rays are used to scan bones for any fracture.
2. X-rays are used to detect broken pipes in undergrounds.
3. X-rays are used in airports to check passenger's luggage for any illegal items.

Conclusion

X-rays, Microwaves and Radio waves make part of the broader electromagnetic radiation. They have various properties depending on their frequency and wavelength.

d) Introduction

UK hosted a conference of 28-countries in November 2023 to highlight and take measures on the threat of Artificial

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Intelligence (A.I). Many points were discussed in the Agenda to address the issue.

Main points of the Agenda

1. AI must operate within a standard framework of ethics.
2. AI should not be biased racially, geographically or gender-wise.
3. International laws must be enacted to monitor the operations of AI.
4. Limit A.I usage to avoid its utilisation for terrorism, criminal activities and warfare.

Conclusion

Since its dawn, AI has few regulatory frameworks. Hence, it creates threats to misuse. The conference intended to resolve the issue and fill any loopholes.

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Q4. Question #4

a)

i) Tornadoes are wind storms that occur on land while cyclones are formed in the oceans.

ii)

Hypocenter is the origin of earthquakes under the ground while Epicenter is the location on the ground perpendicular to hypocenter.

iii)

Global Positioning System (GPS) uses satellite to determine the exact location while Geographical Information System (GIS) uses satellite to map a geographical region.

iv)

~~RAM~~ Random Access Memory stores the data even for a longer time while Read Only Memory gives temporary storage to information.

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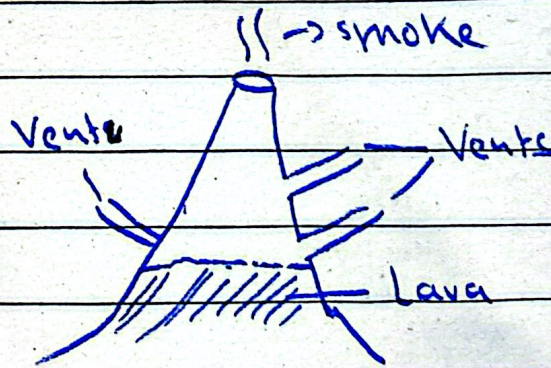
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- v) Insecticides are used to kill insects around the vegetation while Pesticides are utilized to eliminate pest infestation.

b) Introduction

Volcanoes are formed when magma accumulates and rises through molten.

Usually volcanoes are mountains have an upward trajectory in their shapes.



How volcanic eruption occurs?

Volcanic eruption occurs due to the pressure exerted by air, trapped inside the magma. If the magma is

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dense, air has difficulty escaping from vents. Hence, the accumulation of air in the trapped magma builds up pressure. This air is usually trapped when magma rises from the molten. When the pressure is high enough, it exerts a strong force, pushing the magma upwards and outside the volcano. Therefore, volcanic eruption occurs.

Conclusion

Volcanic eruption mainly results from dense magma which traps the gas inside. The pressure accumulated carries itself out through volcanic eruption.

c) Introduction

Solid Waste Management is essential

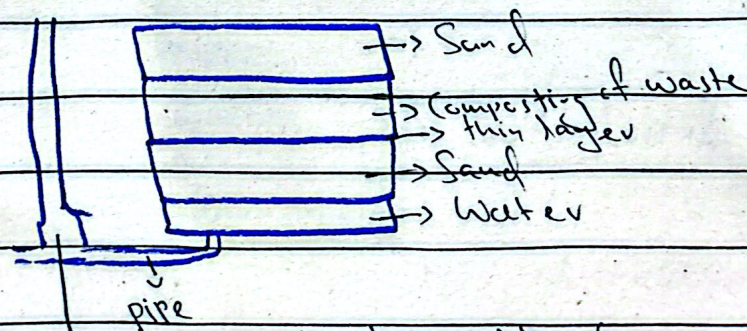
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to efficiently and effectively dispose waste. It reduces the problem of land pollution. Many ways are adopted to address the issue of waste which includes composting, pyrolysis and ~~composting~~ incineration.

Composting:

Composting involves burying the land waste underground. The waste usually starts decaying inside the ground ~~through~~ while ensuring certain protocols. These protocols include separating the waste through a thin sheet in order to prevent it from contaminating groundwater.



well to monitor the quality of underground water.

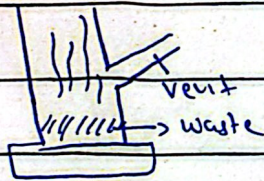
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Pyrolysis:

Pyrolysis is the process of adding bacteria and worms to increase the process of decaying. They are usually used against biodegradable waste.

Incineration:



Through the process of incineration, the waste is burnt into ashes. The air pollution is managed through minimisation of its diffusion into the year through physical and chemical processes.

d) Introduction

Balanced Diet is the sufficient intake of all the nutrients required by human body. These nutrients are

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necessary for body to thrive and survive. Otherwise, it could result in various human complications.

The need for balanced diet

Balanced diet is highly recommended by nutritionists. It involves the intake of nutrients as required by the body, not too little and not too much.

Components of a balanced diet:

Protein:

Human body require sufficient protein for growth, development and muscle repair.

A human body need around 50 grams of protein daily.

Carbohydrates:

Carbohydrates are essential in metabolism.

They produce energy for human body to

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function. Lack of Carbohydrates could result in ketosis, resulting in fat loss.

Fat:

Fat is essential to keep the body warm, store energy, protect the body from external shocks and help in production of cell. However, they must be taken in prescribed form. Otherwise, it could result in heart attack or obesity.

Minerals:

Minerals are essential for cell production, nerve functions, immunity and bones. The body's requirement vary for different minerals. Zinc is to be consumed in less amount while Sodium in more amount, for example.

Vitamins:

Vitamins are essential for vision, bones,

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immune system, cells and nerve functions.
Hence, the body must have to take it
sufficiently. For instance, Lack of Vitamin
A may cause Night Blindness.

Conclusion

A healthy diet containing half a plate
full of Carbohydrates ^{and vegetables}, a small portion of
Fats, Fibre, Protein, and Vitamins and
minerals. Balance diet is essential because
it could result in health complications
if taken in excess or deficiency.

Q7- Question # 7

a) i) 11, 13, 17, 19, 23

$$\begin{array}{ccccccc} & \vee & \vee & \vee & \vee & & \\ & 2 & 4 & 2 & 4 & & \end{array}$$

ii) 10, 28, 91, 370, 1805

$$\begin{array}{ccc} \vee & \vee & \vee \\ 18 & 63 & \end{array}$$

Since $10 \times 2 = 20 + 8 = 28$ and $28 \times (2+1)$
 $+ (8-1) = 91$

the number is next will be $91 \times (2+2) + (8-2)$

$$\therefore 370 \times (2+3) + (8-3) = 1805$$

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$$\begin{aligned} \text{b) Total Cost of the shirts} &= 35 \times 280 \\ &= 9800 \text{ Rs/-} \end{aligned}$$

$$\text{Profit} = \text{Selling price} - \text{cost}$$

$$\begin{aligned} \text{Total Selling Revenue generated} &= 35 \times 308 \\ &= 10780 \text{ Rs/-} \end{aligned}$$

$$\begin{aligned} \text{Total Profit (Rs)} &= 10780 - 9800 \\ &= 980 \text{ Rs/-} \end{aligned}$$

$$\text{Profit percentage} = \frac{\text{Profit}}{\text{Cost}} \times 100$$

$$= \frac{980}{9800} \times 100 = 10\%$$

The cloth merchant generated 10% profit.

$$\text{c) } \frac{12}{18} \times 100 = 120\%$$

$$\text{d) Average height} = \frac{\text{Sum of total height}}{\text{number of boys}}$$

$$\begin{aligned} \text{Total height (with error)} &= \text{no. of boys} \\ &\times \text{Avg. height} \end{aligned}$$

$$= 30 \times 150$$

$$= 4500 \text{ cm}$$

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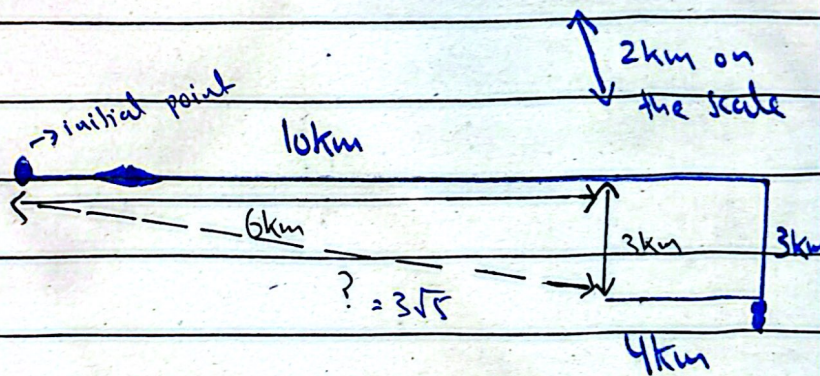
$$\begin{aligned}\text{Adjusting error} &= 4500 - 135 + 165 \\ &= 4530 \text{ cm}\end{aligned}$$

$$\begin{aligned}\text{Correct mean} &= \frac{4530}{30} = 151 \text{ cm}\end{aligned}$$

Average height after correction of the boys is 151 cm.

Q8- Question # 8

a)



Using Pythagoras Theorem

$$H^2 = b^2 + p^2$$

$$= 6^2 + 3^2$$

$$= 36 + 9$$

$$= 45$$

$$H = \sqrt{45}$$

$$= \sqrt{9 \times 5}$$

$$= 3\sqrt{5} \text{ km}$$

Hence, Sarah was

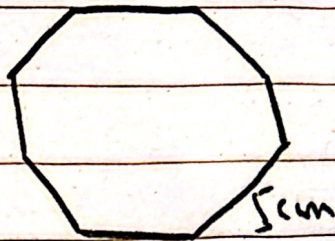
$3\sqrt{5}$ km away

from her initial point

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b)



Octagon

$$\begin{aligned}\text{Perimeter} &= 5 \times \text{total sides of octagon} \\ &= 5 \times 8 \\ &= 40 \text{ cm}\end{aligned}$$

$$\begin{aligned}\text{each Angle of Octagon} &= \frac{126 \times (4 \times 2)}{4} \quad \frac{(4-2)(180)}{4} \\ &= \frac{180 \times (8 \div 2)}{8} = \frac{180 \times 4}{8} \\ &= 135^\circ\end{aligned}$$

Hence, the total perimeter of Octagon is 40 cm while each side represent 135° .

c)

$$\text{Probability} = \frac{\text{Total selected item}}{\text{total of all}}$$

$$= \frac{10}{168} = \frac{5}{84}$$

The probability of ball being picked up as yellow is $5/84$.

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d) M A D R A S
N B E S B T

B O M B A Y
C P N C B Z

ICPN CBZ