

Dos and Don'ts for the General Science & Ability Paper
Hi there — you've prepared well! Remember, knowing the content is one thing, but presenting it in the paper exactly as required is another. Here are a few key points to keep in mind:

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Batch: 74

Question no 2

2. Data is the new oil

1. For a 5-mark part, aim to write at least 2 and at most 3 sides of the answer sheet. Often, a question has two or three parts, and the marks are divided accordingly — so address each part fairly.
2. Manage your time wisely — you have about 35 minutes per full question, which comes down to around 8 minutes for each 5-mark part. Stick to this to avoid rushing later.
3. Make your answers look scientific, not just theoretical. Use flowcharts and diagrams wherever they add clarity.
4. Neatness matters — keep your handwriting clean, avoid cutting or overwriting.
5. Mind your spelling and grammar — while GSA doesn't deduct marks for these, your expression leaves an impression.
6. In the ability portion, explain analytical ability questions in words. For a 5-mark part, show all steps and provide clear explanations.

2. Justification:-

Data fuels technologies like Artificial Intelligence, machine learning, and Big Data Analytics, enabling evidence-based decisions.

When analyzed it reveals consumer

patterns, resource needs, and predictive

insights, making it a modern economic

resource.

Here's a brief key/sample of your Ability questions

Q.6

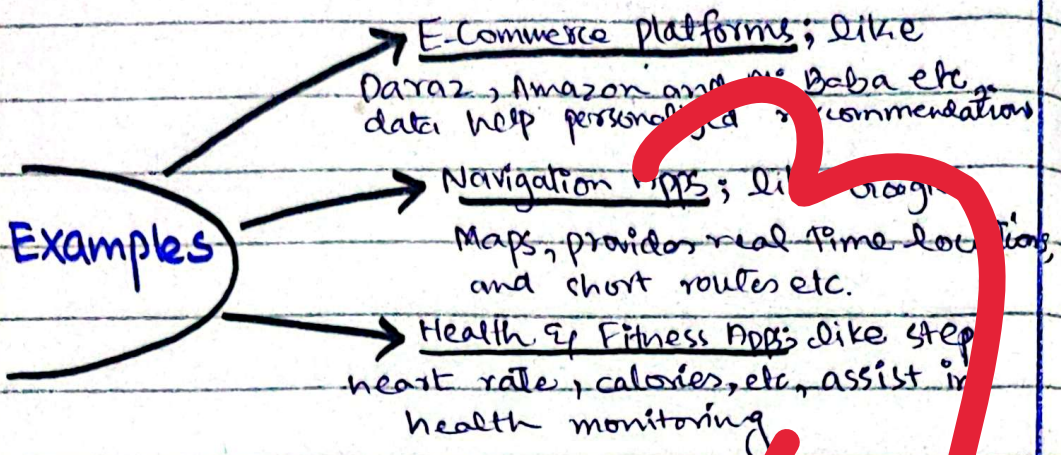
a) Candy ratio problem

Given: Packets in flavors Apple : Berry : Cherry : Date = 3 : 6 : 2 : 5.

Asked: If Apple candies exceed Date candies by 35, how many Berry candies are there?

Note (consistency check): The ratio shows Apple $\frac{3}{2}$ parts

3. Everyday Examples:-



4. Conclusion:- Yes, data today underpins economies just as oil once did, but it's a bigger responsibility and can be both asset and a challenge.

b. UNIVERSE IS EXPANDING:

1. Concept:- The expansion of the universe means galaxies are moving away from each other as space itself stretches.

2. Balloon Analogy:- Imagine dots as galaxies, drawn on the surface of a balloon. When the balloon inflates, the

dots move away from each other through they remain fixed on the surface.

Surface = Space

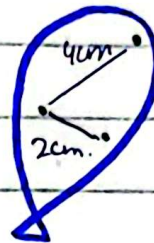
Dots = Galaxies.

Before



Dots further apart as balloon inflates

After



→ The Balloon Model helps visualize spatial expansion, not motion through space. The universe expands within itself, and all observers see others moving away, confirming cosmological expansion.

C. BALANCED DIET:-

“Let thy food be the medicine.”

1. Introduction:- A balanced diet includes adequate amount from the five basic food groups, like

milk, meat, pulses, green leafy vegetables and cereals, to provide all essential nutrients like proteins, fats, carbohydrates, vitamins, minerals, fibre, and water for the body's needs

Vitamin
A

(Retinol)

Vitamin
D

(Calciferol)

Vitamin
E

(Tocopherol)

(i) Source

Carrots, butter,
eggs

Sunlight,
fish oil

Nuts, vegetable
oils

(ii) Function

Maintain vision,
immunity, epithelial
tissue

Calcium absor-
ption, bone
mineralization

Antioxidant,
protects cell
membranes

(iii) Deficiency Disease / Effect.

Night blindness,
dry eyes
(xerophthalmia).

Rickets (children)
Osteomalacia
(adults)

Muscle
weakness,
anemia,
nerve damage.

Balanced Diet:- consist of grains,
fruits, vegetables, Dairy, meat and Fats.

d. WORKING OF GPS

1. Introduction:- GPS is Global Positioning System, a satellite based navigation network of **24 satellites** orbiting earth that transmits timing and location signals.

A receiver on earth calculates its position by comparing signal arrival times from multiple satellites.

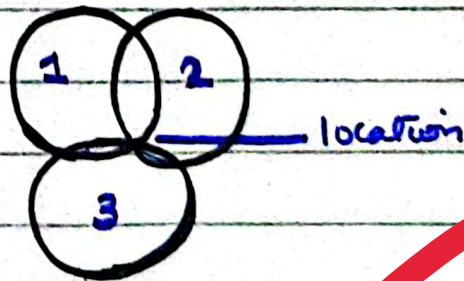
2. Working Principle (Trilateration):-

→ Each satellite broadcasts signals containing precise time and orbital data.

→ Receiver measures time delay (Δt) of each signal → Distance = $\text{Speed of light} \times \Delta t$.

→ 2D Position (latitudes & longitudes)

needs at least 3 satellites



→ 3D position

[latitudes, longitudes, and altitudes]

requires 4 satellites and correct receiver errors.

FIBER OPTIC

1. Definition and Role:-

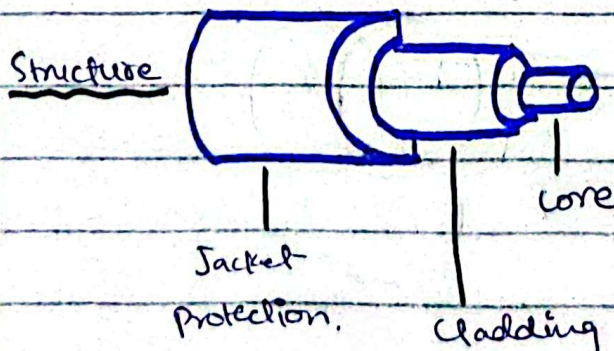
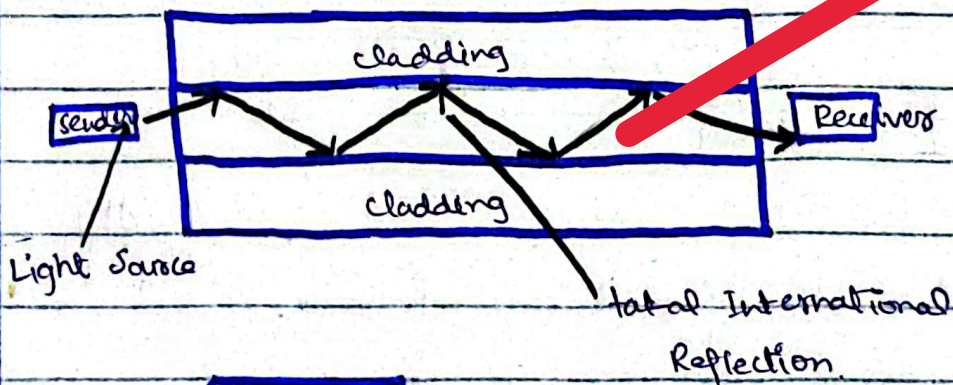
A fiber optic cable is a thin strand of glass or plastic transmitting data as light pulses through total internal reflection.

Enables fast data transfer between GPS stations, telecommunication hubs, and satellites.

2. Equations:-

$$v = c/n \quad [\text{Speed of light in fiber}]$$

communication process



→ GPS integrates satellites' collaboration with fiber-optic communication for accurate global navigation and real time geolocation.

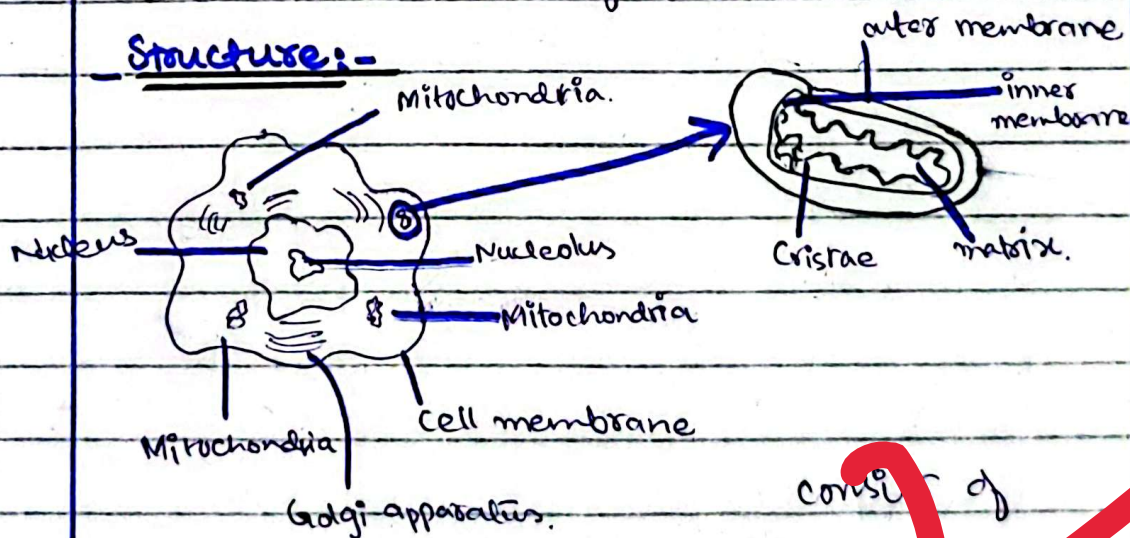
Question no 3

a. ORGANELLES AND MITROCHONDRIA.

1. Need for Organelles:- Cells form organelles to compartmentalize biochemical functions, allowing simultaneous, efficient processes under specialized conditions. For example, different pH, enzymes etc.

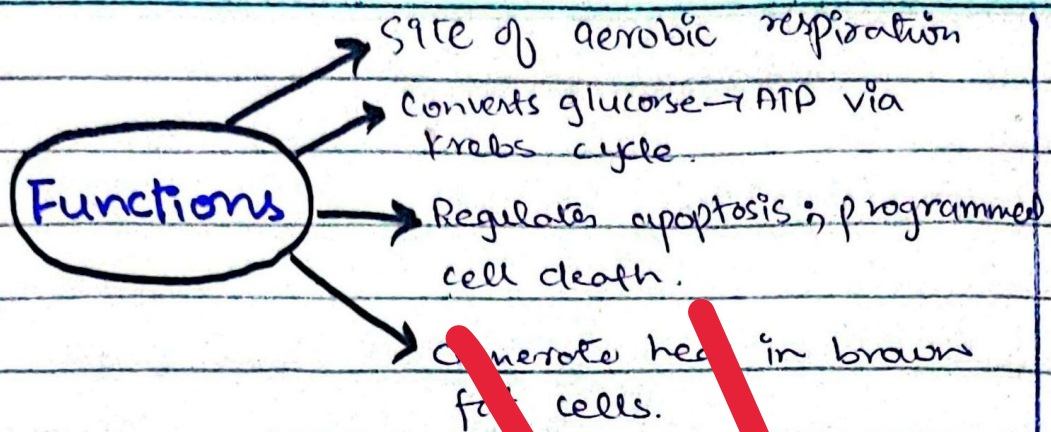
2. Mitochondria:- It is also called the "Powerhouse of Cell."

Structure:-



consist of double membrane

inner membrane folded into cristae to increase surface area. Contains matrix, mtDNA and ribosomes.



So mitochondria provide energy currency (ATP) vital for muscle contraction, nerve impulse and biosynthesis, core to all cellular life.

b. SEMICONDUCTORS AND DOPING

1. Introduction:- Doping is adding minute quantities of impurity atoms of to. a pure semi-conductors (like silicon) to enhance its conductivity by altering charge carrier concentration

2. Types of Semiconductors:-

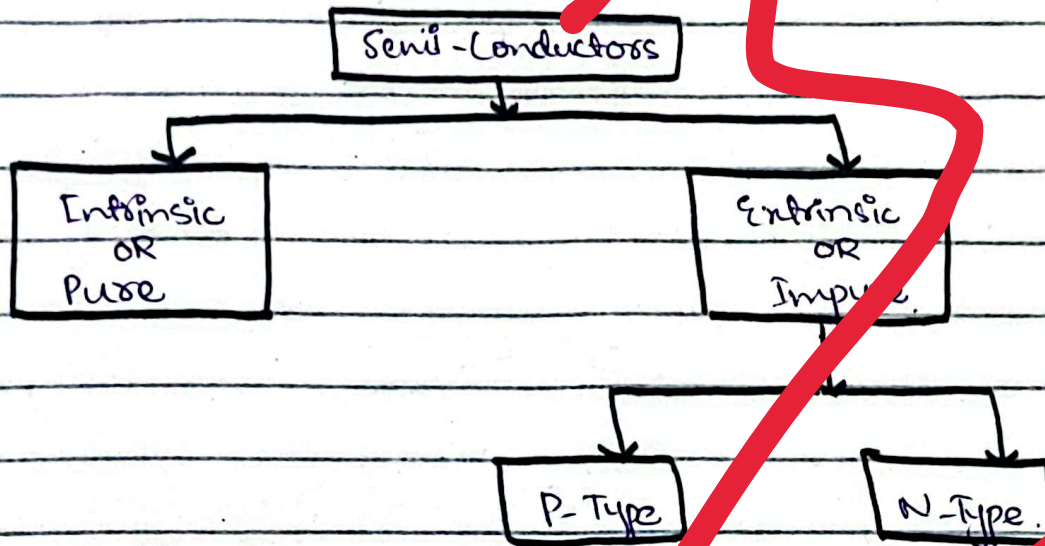
i) Intrinsic:- Pure Si or Ge; conductivity depends on temperature; electrons = holes.

ii) Extrinsic:-

→ n-type:- Doped with (As, P, Sb) adds free electrons $\rightarrow$ electrons = majority

carriers.

~~p-type~~:- Doped with (B, Al), creates holes $\rightarrow$ holes = majority carriers.



Applications:-

used in diodes, transistors, integrated circuits, and solar cells.

↳ Doping tailors semi conductors behaviour and foundation of all modern electronics and digital devices.

C- VOLCANO ERUPTION

MERITS

(i) Fertile Soil: Volcano ash adds minerals like potassium and phosphorous.

(ii) Geothermal Energy: Magma heat tapped for power. For example in Iceland.

(iii) Mineral Wealth: Deposits of copper, gold and sulfur.

(iv) Land Formations: Island such as Hawaii formed by volcanic activity.

DEMERITS

(i) Loss of Life and Property: Lava and ash destroy life and settlement.

(ii) Climate Disturbances: SO_2 and ash block sunlight causing cooling.

(iii) Air Travel Hazards: Ash damages jet engines.

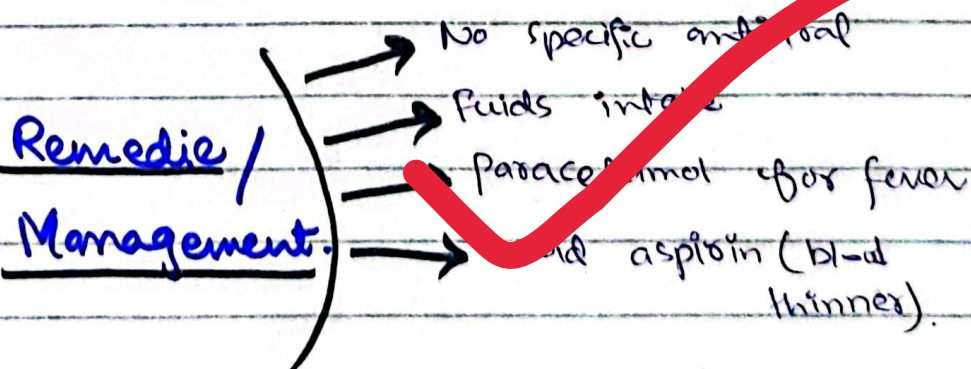
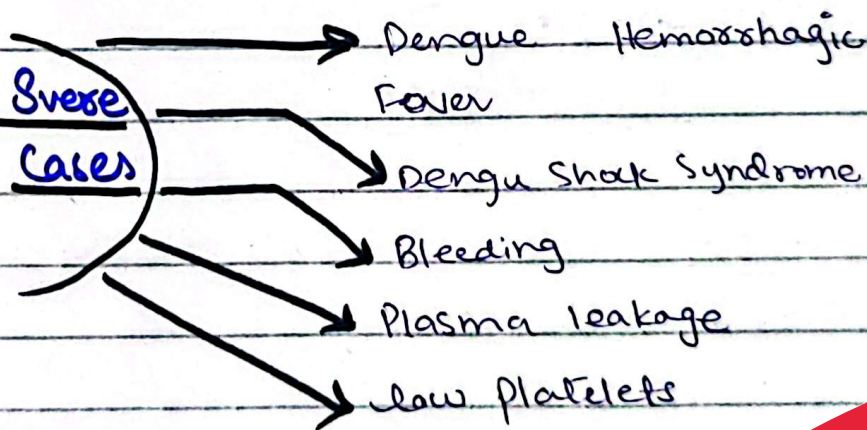
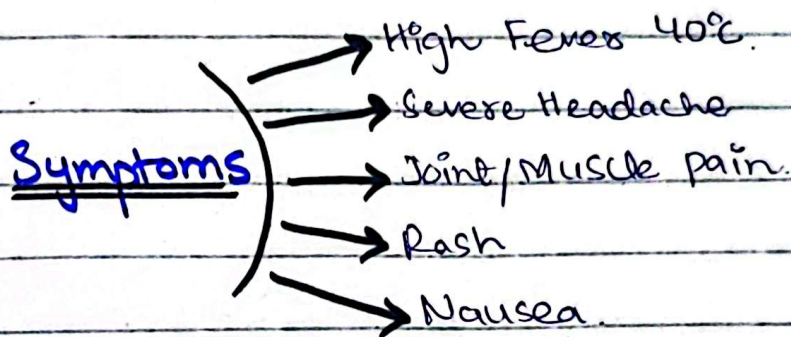
(iv) Health Issues: Respiratory problems and water contamination.

→ Volcano is a both destructive and creative force, shaping Earth's geography and resources.

d - DENGUE

→ Definition:- Dengue fever is a mosquito-borne viral disease.

→ Cause:- caused by Dengue virus (DENV 1-4), a Flavivirus, transmitted by Aedes aegypti mosquitoes.



Preventative Measures

- Remove stagnant water
- Use mosquito repellents and nets
- Fogging and community sanitation

→ Dengue control relies on vector eradication and early medical care to prevent mortality.

Question no 4.

e. METHODS OF SOLID WASTE MANAGEMENT

→ Definition:- "Solid Waste Management (SWM) is the process of collecting, treating, and disposing of solid materials in an environmentally safe manner."

MAJOR METHODS

1- Source Reduction and

Reuse: Minimizing waste generation.

2. Recycling: Converting waste into reusable materials such as, papers, glass etc.

3. Composting: Biological decomposition of organic waste into manure.

4. Incineration: Controlled burning for volume reduction and energy recovery.

5. Sanitary Landfill: Engineered site with liners and leachate control.

6. Waste to Energy (WTE): Modern plants converting waste into electricity.

d. DEFINITIONS:-

1. BIOFUEL:- Fuel derived from biomass such as plants and organic waste.

Examples:- bioethanol, biodiesel;
renewable & ecofriendly.

2. ADULTERATION: Mixing inferior or harmful substances with food or goods, reducing quality and endangering health.

3. HYDROSPHERE:- combined mass of Earth's water like, oceans, rivers, glaciers, groundwater and vapour.

4. TROPOSPHERE:- lowest layer of atmosphere (up to ~ 15 km) where weather occurs and temperature decreases with height.

5. ISOTOPES: Atoms of the same element having same protons but different neutrons.

example : C-12, C-14 etc.
