

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:

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.

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

Q.6 Conclusion: like oil in the industrial

a) Candy ratio problem
Given: Packets in flavors Apple : Berry : Cherry : Date = 3 : 6 : 2 : 5.
and decision-making.

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

Note (consistency check): The ratio shows Apple = 3 parts

Q.2 (b)

The universe is continuously expanding, meaning that all galaxies are moving away from each other as space itself stretches. This expansion can be compared to blowing up a balloon.

Imagine a deflated balloon with dots drawn on its surface. Each dot represents a galaxy. As air is blown into the balloon, its surface expands, and all the dots move farther apart from each other.

Importantly, the dots themselves do not expand, they simply move away from one another because the surface is stretching.

Similarly, in the universe, space itself is expanding, increasing the distance between galaxies in all directions. This expansion occurs uniformly, so every galaxy appears to be moving away from every other galaxy, just as on the balloon's surface.

Q-2

(C)

"Let thy food be thy medicine"

- Hippocrates

A balanced diet contains adequate portions of food from five basic groups: milk, meat, beans and pulses, green leafy vegetables, and cereals. These groups provide seven essential nutrients: carbohydrates, proteins, fats, vitamins, minerals, water, and fiber, necessary for proper growth, development, and normal functioning of the body.

Vitamin Deficiencies:

1. Vitamin A : Its deficiency can cause night blindness, impaired vision, and weakened immunity.
2. Vitamin D : Lack of vitamin D leads to rickets in children (soft, weak bones) and osteomalacia in adults.
3. Vitamin E : Deficiency may result in nerve and muscle damage, weakness, and impaired coordination.

Q.2 (d)

Working of GPS (Global Positioning System):

GPS is satellite-based navigation system that allows users to determine their precise location anywhere on Earth. It works through a network of at least 24 satellites orbiting the Earth. Each satellite continuously sends signals containing its position and exact time. A GPS receiver calculates the distance to several satellites by measuring the time taken for signals to reach it. Using this information, it determines the receiver's location.

Fiber Optics:

Fiber optics is a technology that transmits data as pulses of light through thin glass or plastic fibres. It allows high-speed, long-distance communication with minimal signal loss and interference. Fiber optics is widely used in internet connections, telecommunications, and in transmitting GPS data signals reliably.

2D and 3D Location Measurement:

- 2D Positioning (Latitude and Longitude):
Achieved using signals from at least three satellites; the receiver calculates its location where the distances intersect.

- 3D Positioning (Latitude, Longitude, Altitude):
Requires signals from four or more satellites. The fourth satellite helps calculate altitude, providing a complete 3D position. This process is called trilateration.

Q.3

(a)

Cells form organelles to divide and organize their internal functions efficiently. Each organelle performs a specific role, preventing interference among biochemical processes. This compartmentalization allows better control, faster reactions, and overall coordination of cellular activities essential for survival.

Mitochondria :

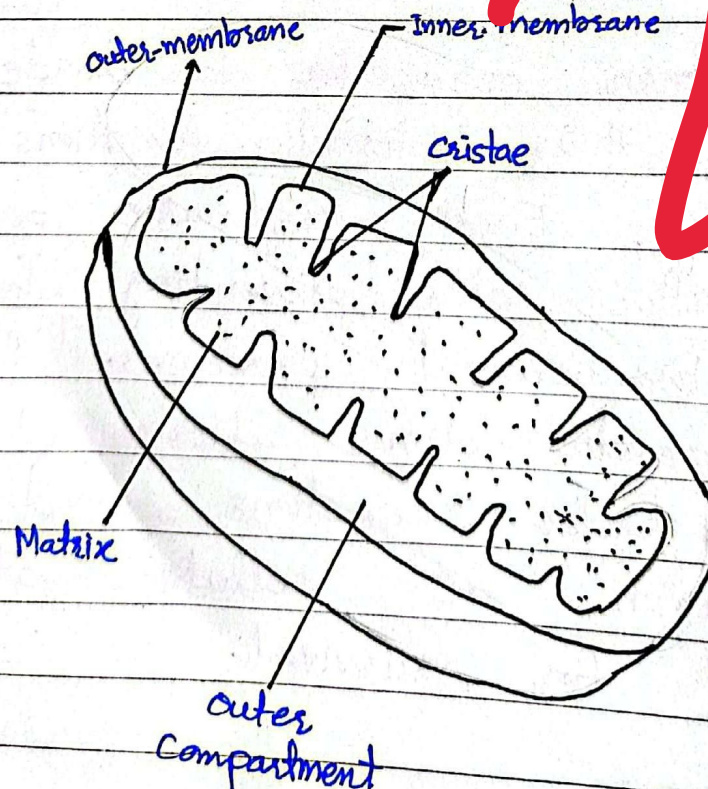
Mitochondria are double-membraned organelles known as the "powerhouse of the cell" because they generate energy in the form of ATP (adenosine triphosphate) through cellular respiration.

Structure :

Outer membrane: Smooth, encloses the organelle.

Inner membrane: Folded into cristae to increase surface area of energy reactions.

Matrix: Contains enzymes, mitochondrial DNA, and ribosomes for metabolism and self-replication.



Functions :

- a. Produce ATP for energy.
- b. Regulate metabolism and breakdown of nutrients.
- c. control programmed cell death (apoptosis)
- d. Maintain calcium balance within the cell.

Q.3 (b)

Doping:

Doping is the process of adding small amounts of impurities to a pure semiconductor (like silicon or germanium) to improve its electrical conductivity. The impurity atoms either increase the number of free electrons or create holes, making the material more conductive.

Types of Semiconductors:

1. Intrinsic Semiconductor:

A pure semiconductor that contains no impurities. Its conductivity depends only on temperature.

Example: Pure silicon (Si), germanium (Ge).

2- Extrinsic Semiconductors:

A doped semiconductor in which small amount of impurities are added to improve conductivity. It is further divided into two types:

(a) N-type Semiconductor:

Formed by doping with elements having 5 valence electrons (like phosphorus). Extra electrons increase conductivity.

(b) P-type Semiconductor:

Formed by doping with elements having three valence electrons (like boron). The deficiency of electrons creates holes, which act as positive charge carriers.

Q.3 (c)

Answer:

Volcanic eruptions have both positive and negative impacts on the environment and human life.

Merits:

1. **Fertile Soil:** Volcanic ash, when weathered, enriches the soil with minerals, making it highly fertile for agriculture.
2. **Geothermal Energy:** Heat from volcanic activity can be utilized to generate geothermal energy, an important renewable energy source. For instance, Iceland efficiently harnesses geothermal energy derived from volcanic heat to meet a large portion of its domestic heating and electrical needs.
3. **Formation of Landforms:** Eruptions create new landforms such as mountains and islands, reshaping Earth's surface.

4. Mineral Resources: Valuable minerals like sulphur, copper, and gold are often found near volcanic regions.

Demerits:

1. Loss of Life and Property: Violent eruptions cause destructions of settlements and can lead to heavy casualties.
2. Environment Pollution: Volcanic gas and ash pollute the atmosphere, affecting air quality and health.
3. Climate Effects: Ash clouds can block sunlight, leading to temporary cooling of Earth's surface.
4. Economic losses: Agriculture, infrastructure, and tourism in affected areas suffer long-term damage.

Q.3 (d)

Answer:

Dengue is ~~can~~ a mosquito-borne viral infection caused by the Dengue virus (DENV), which belongs to the Flavivirus genus. It is transmitted by the bite of infected *Aedes aegypti* and *Aedes albopictus* mosquitoes, which breed in stagnant water.

Symptomology:

Symptoms usually appear 4-10 days after the mosquito bite and include:

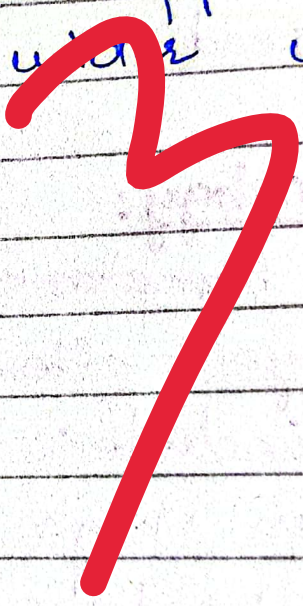
- Sudden high fever (up to 104°F)
- Severe headache, joint, and muscle pain (breakbone fever)
- Pain behind eyes
- Nausea, vomiting, and skin rash.

Severe cases may develop into Dengue Hemorrhagic Fever (DHF), leading to internal bleeding, low platelet count, and potentially death if untreated.

Remedies:

Patients are advised to take rest, maintain hydration, and use

paracetamol for fever. Severe cases require hospital care. Preventive measures include eliminating mosquito breeding sites and using repellents. Two vaccines are now available: Dengvaxia (for persons with prior dengue infection) and Qdenga (TAK-003), which ^{has been} approved in some countries for wider use.



Section II

Q-6 (b)

Solution:

$$\text{Original price} = 200$$

$$\text{Discount} = 5\% \text{ of } 200 = 50$$

$$\text{Price after discount} = 200 - 50 = 150$$

$$\text{Tax} = 6\% \text{ of } 150 = 9$$

$$\text{total amount paid} = 150 + 9 = 159$$

159 Ans.

(c)

Given:

$$\text{Distance} = 36 \text{ km}$$

$$\text{Speed} = 18 \text{ km/h}$$

$$\text{Starting time} = 1.00 \text{ pm}$$

Time Required:

$$\text{Arrival time} = ?$$

Formula:

$$\text{Time} = \frac{\text{Distance}}{\text{speed}}$$

Sol:

$$\text{Time} = \frac{36}{18} = 2 \text{ hours}$$

Now,

$$\text{starting time} = 1.00 \text{ pm}$$

$$+ 2 \text{ hours} = 3.00 \text{ pm Ans.}$$

(d)

- i. STSTAICITS → STATISTICS
- ii. LGEBMAR → ALGEBRA.