

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

PART - II SECTION - I

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Q No. 2

Ans a. Yes, I agree that "Data is the oil." Just like oil powered the industrial era, data powers today's digital age. It drives innovation, decision making, and business growth.

1. **Online shopping:** Companies like Amazon use customer data to suggest products and improve sales.
2. **Social media:** Platforms like Facebook and Instagram analyze user data to show targeted ads.
3. **Health apps:** Fitness trackers use data to monitor health and give personalized advice.
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.

Ans b. The expansion of the universe resembles a balloon being blown up, where galaxies move away from each other as space itself expands.

Surface Expansion: As a balloon inflates, the surface stretches, similar to how space expands. Galaxies are like dots on the balloon's surface, moving away from each other as the balloon grows.

Uniform Expansion: The expansion occurs uniformly in all directions, just as the surface of a balloon expands evenly.

No center: There is no central point in the universe from which everything expands, akin to how every point on a balloon's surface moves away from every other point.

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

Point in the balloon's surface move away from every other point.

Cosmological Implications:

Hubble's Law: Observations show that galaxies are receding from us, with their speed proportional to their distance, supporting the balloon analogy.

Big Bang Theory: The universe began from a hot, dense state and has been expanding ever since, similar to the initial inflation of a balloon.

This analogy helps visualize complex concepts in cosmology, making the idea of an expanding universe more accessible.

Ans c. A balanced diet is a diet that contains all the essential nutrients like carbohydrates, proteins, fats, vitamins, minerals, fiber, and water in the right amounts to maintain good health, energy, and proper body functioning.

Deficiency Effects:

Vitamin A: Causes night blindness and weak immunity in human body.

Vitamin D: Leads to rickets in children and osteomalacia in adults (weak bones).

Vitamin E: Causes muscle weakness and nerve problems in human body.

Ans d. Working of GPS:

The Global Positioning System (GPS) uses signals from satellites orbiting Earth. A GPS receiver calculates position by measuring the

time taken by signals from at least four satellites to reach it.

Fiber Optic:-

Fiber optics are thin glass or plastic stand that transmit data as light signals, allowing fast and clear communication.

2D & 3D Location Measurement

Satellites measure:

- ⇒ 2D (latitude and longitude) using signals from three satellites
- ⇒ 3D (latitude, and altitude) using signals from four or more satellites.

Q.NO.3

Ans a. Cell form organelles to perform different functions efficiently and in an organized way. Each Organelle has a specific role that help the cell survive and work properly.

Reasons why cell form organelles:

1. **Division of labor:** Each organelle perform a specific task.
2. **Efficiency:** Different reactions can occur at the same time without interfering with each other.
3. **Organization:** Organelles keep the cell's activities well arranged and controlled.

Mitochondria in human cell

⇒ Mitochondria known as the powerhouses of the cell because they produce energy in the form of ATP through the process called cellular respiration.

- ⇒ Muscle, heart, and brain cell have the most mitochondria -
- ⇒ They have their own DNA, allowing them to make some of their own proteins -
- ⇒ Main function is to convert food and oxygen into energy needed for cell activities -

Ans b. Doping is the process of adding small amounts of impurities to a pure semiconductor (like silicon or germanium) to change its electrical conductivity. The added impurities increase the number of charge carriers (electrons or holes), making the semiconductor more useful in electronic devices.

Types of Semiconductors:

1. Intrinsic Semiconductor:

- ⇒ A pure form of semiconductor without any impurities.
- ⇒ Example: pure silicon or germanium
- ⇒ Has limited conductivity because it depends only on temperature -

2. Extrinsic Semiconductor:

- ⇒ A doped semiconductor with added impurities to increase conductivity -
- ⇒ N-Type: Doped with elements having more electrons (e.g, phosphorus in silicon), increasing free electrons as charge carriers -
- ⇒ P-Type: Doped with elements having fewer elements (e.g, boron in silicon), creating holes positive charge carriers -

Ans c. Merits of Volcanic Eruptions:

1. Fertile soil: Volcanic ash add minerals to the soil, making it rich for agriculture -
2. New land formation: Lava cool and solidifies, creating new islands and landforms -
3. Mineral resources: Volcanoes bring valuable minerals like copper, gold, and sulfur to the surface -
4. Tourism and geothermal energy: Volcanic areas attract and provide renewable geothermal

Demerits of Volcanic Eruptions:

1. Loss of life and property: Lava, ash and gases can destroy towns and kill people.
2. Air Pollution: Volcanic gasses cause breathing problems and acid rain.
3. Climate effect: Ash clouds block sunlight, causing temporary cooling.
4. Displacement: People living near volcanoes may lose homes and livelihoods.

Ans d. Dengue is a viral disease transmitted to humans through the bite of an infected *Aedes aegypti* mosquito. It is common in tropical and subtropical regions, including Pakistan.

Causative Agent:

⇒ Dengue virus (DENV) - are four types: DENV-1, DENV-2, DENV-3 and DENV-4

Symptoms of Dengue:

- ⇒ High fever (up to 104°F)
- ⇒ Severe headache and pain behind eyes
- ⇒ Muscle and joint pain (breakbone fever)
- ⇒ Nausea and vomiting
- ⇒ Skin rash after a few days.
- ⇒ In severe cases: bleeding, low platelet count and Shock.

Remedies

- ⇒ No specific antiviral medicine only supportive treatment.
- ⇒ Rest, plenty of fluids and paracetamol for fever
- ⇒ Hospital care if there is bleeding or dehydration
- ⇒ Prevention: Use mosquito repellents, cover water containers, and eliminate mosquito breeding sites.

SECTION - 11

Q.NO. 7

Ans. Solution:-

Diameter = 14cm

Radius $r = \frac{14}{2} = 7\text{cm}$

$$V = \frac{4}{3} \pi r^3$$

$$V = \frac{4}{3} \times \frac{22}{7} \times 7^3$$

$$7^3 = 343$$

$$V = \frac{4}{3} \times \frac{22}{7} \times 343$$

$$\frac{343}{7} = 49$$

$$V = \frac{4}{3} \times 22 \times 49$$

$$22 \times 49 = 1078$$

$$\frac{4}{3} \times 1078 = \frac{4312}{3} = 1437.33 \text{ cm}^3 \text{ Answer}$$

Ans. Solution:-

$$\text{Given ratio} = 1:2:3:4:5 = 15 \text{ parts}$$

$$(1+2+3+4+5) = 15 \text{ parts}$$

$$\begin{aligned} \text{Each part} &= \frac{25000}{15} \\ &= 1666.67 \end{aligned}$$

$$\text{Smallest share} = 1 \text{ part} = 1666.67 \text{ Rs}$$

Ans. Solution

$$(i) 2, 6, 18, 54, 162, 486$$

$$(ii) 3, 5, 7, 11, 13, \underline{17}$$

Ans. Solution

Triangle with sides 5cm, 12cm, 13cm

$$\text{Since } 5^2 + 12^2 + 144 = 169 = 13^2$$

Right angle is opposite the longest side (13cm)

$$\text{so, } \angle C = 90^\circ$$

$$\sin A = \frac{\text{Opposition}}{\text{hypotenuse}} = \frac{5}{13} \Rightarrow A = \arcsin\left(\frac{5}{13}\right) \approx 22.6$$

$$B = 190^\circ$$

$$B = 90^\circ - A = 90^\circ - 22.6 = 67.4^\circ$$

$$\angle A = 22.6, \angle B = 67.4^\circ, \angle C = 90^\circ$$

