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

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 = 3 parts

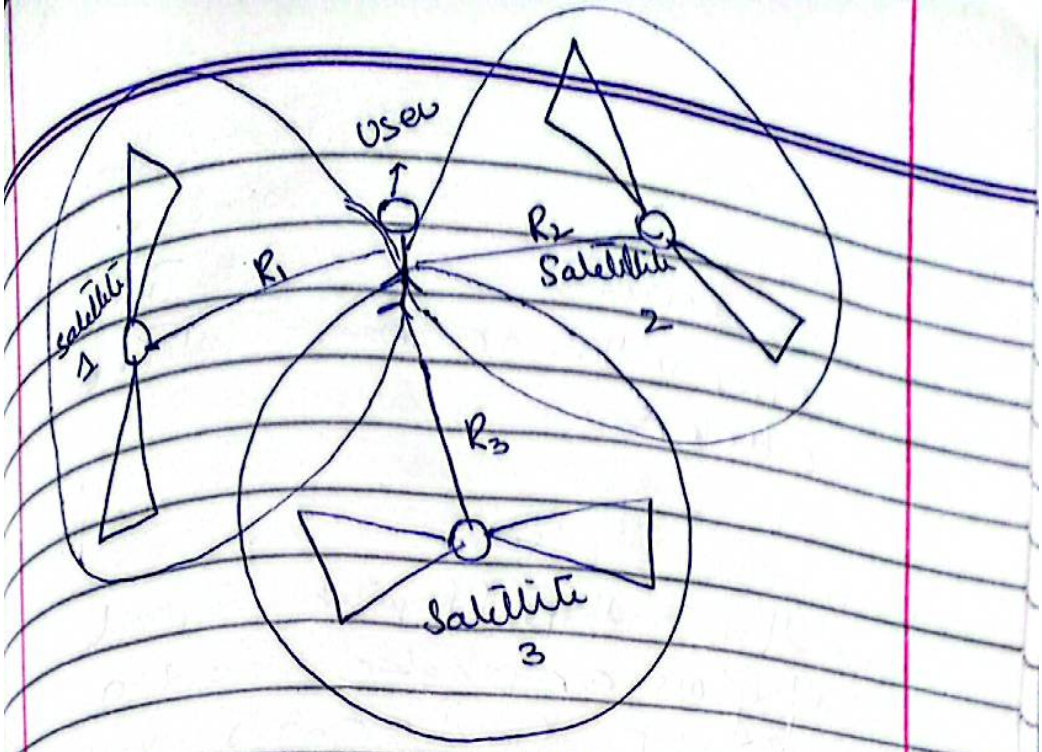

Figure: Trilateration

Satellite measure 2D and 3D locations using signals and distance calculations based on process called trilateration, the same method used in GPS.

For **2D location**, the GPS receiver needs signals from atleast 3 satellites. Each satellite sends information about its exact position and the time the signal was transmitted. The receiver calculates how far it is from each satellite by measuring how long the signal takes it to arrive. By find the point receiver determines the user's position on earth's surface giving 2D location.

For **3D location** the receiver requires signal from atleast four satellites. The first 3 satellites provide the horizontal position and while the

4th one helps determine the height above sea level and also corrects any slight time error in the receiver's internal clock.

Fibre optic

It is a thin flexible strand of glass or plastic used to transmit light signals over long distances. It carries information as pulses of light and relies on the principle of total internal reflection, which keeps the light confined within fibre. They are widely used in telecommunication, internet, medical imaging and military applications.

Basic Structure:

It is has 3 main layers:-

1) **Core**: It is a central part where light travels and made of high-refractive-index glass or plastic.
2) **Cladding**: It surrounds the core with lower refractive index. It ensures total internal reflection so light remains in the core.
3) **Buffer**: It is outer plastic layer for mechanical protection and

insulation.

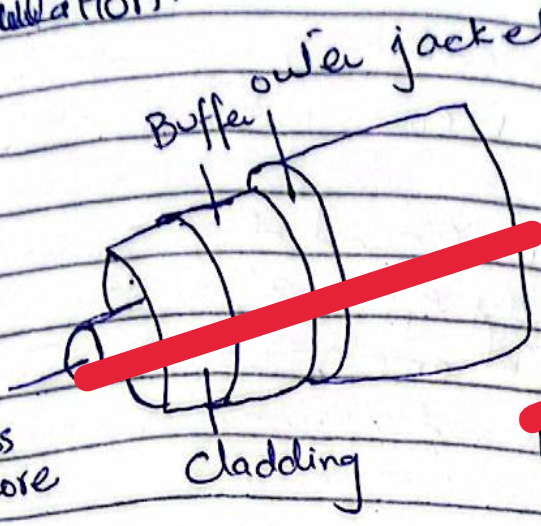

Figure 5 Fibre optics.

c) what do you mean by balanced diet....

Balanced diet:

•It is diet in which includes right amount of all the nutrients such as proteins, vitamins, minerals, fats, carbohydrates etc. for proper growth, development and normal functions of the body.

Deficiency effects:

Vitamin A deficiency: It causes poor vision, especially night blindness, and can lead to dry eyes and skin problems.

Vitamin D deficiency: It leads to weak bones and teeth, causing rickets in children and osteomalacia in adults.

Vitamin E deficiency: It may cause muscle weakness, [illegible] damage and problem with immunity.

So, a balance diet ensures that the body gets all these vitamins in the right amount to maintain good health and normal functioning.

b) Universe is expanding.....?

The expanding universe is often compared to a balloon being blown up because both show how space itself stretches.

The universe is expanding means that the distance b/w most galaxies increases with time; space itself stretches so that galaxies recede from each other. This expansion was first observed by Hubble (hubble's law) and is described by modern cosmology as metric expansion.

a) Uniform expansion: As the balloon inflates, every small region expands similarly there is no location on the surface single out as the centre

(ii) **Relative motion:** Galaxies recede because space between them grows, not because they are traveling through a fixed space; this is captured well by balloon surface.

(iii) **Distance-velocity relation:** Points farther apart on the balloon separate more quickly during inflation, giving an intuitive picture of why recession speed increases with distance.

The balloon model is simple as it illustrates uniform expansion, explains why distant galaxies recede faster, and helps visualize that expansion is a property of space itself.

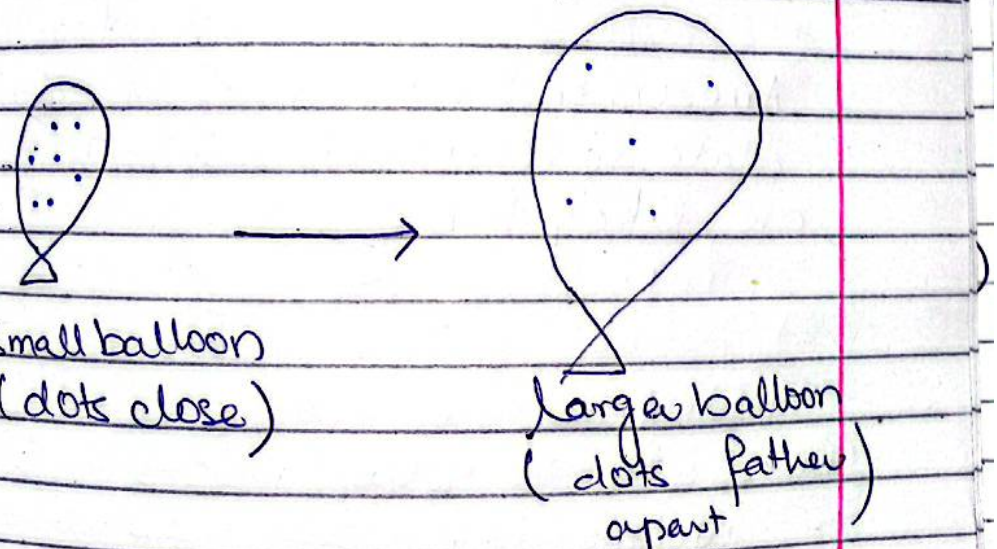

Figure: Shows expansion and increasing separation with distance.

a) Data is a new oil ...?

'Data is the new oil', just like oil powered the industrial age, data powers the digital age, with new innovations and helps people and organization make smarter decisions. As data is the main source of modern Technology and Buisness growth. It helps improve services, predict trends and personalize user experiences. Countries and companies that mananage data efficiently gain economic and strategic advantage.

Every day examples:

1) Online Shopping: Websites like Amazon or Daraz use consumer data to recommend products you are likely to buy.

2) Social media: Platforms like Instagram and Tiktok analyze user data to show posts and videos matching your interests.

3) Navigation Apps: Google maps utilizes real time traffic data to guide users through the fastest

routes and avoid congestion

Qno: 4

a) note on Plant Kingdom: 'Chlorophyll'

Chlorophyll:

It is a green pigment in the chloroplasts of plant cells that absorbs light energy and is essential for photosynthesis.

Structure:

It is mainly found in chloroplasts inside the thylakoid membrane. Chemically, chlorophyll molecules have a porphyrin ring (with central magnesium ion and a long phytol tail that anchors the molecule in the membrane.

Types:

a) Chlorophyll-a: It is a primary pigment directly involved in the light reaction

b) Chlorophyll-b: It is a accessory pigment, broadens the spectrums of light absorbed and transfers energy to chlorophyll-a.

Functions :-

1) It helps in light absorption mainly blue and red wavelengths.
2) It converts light energy into chemical energy during light independent

reaction.

3) It directly enables the splitting of water molecules, producing oxygen as a by product.

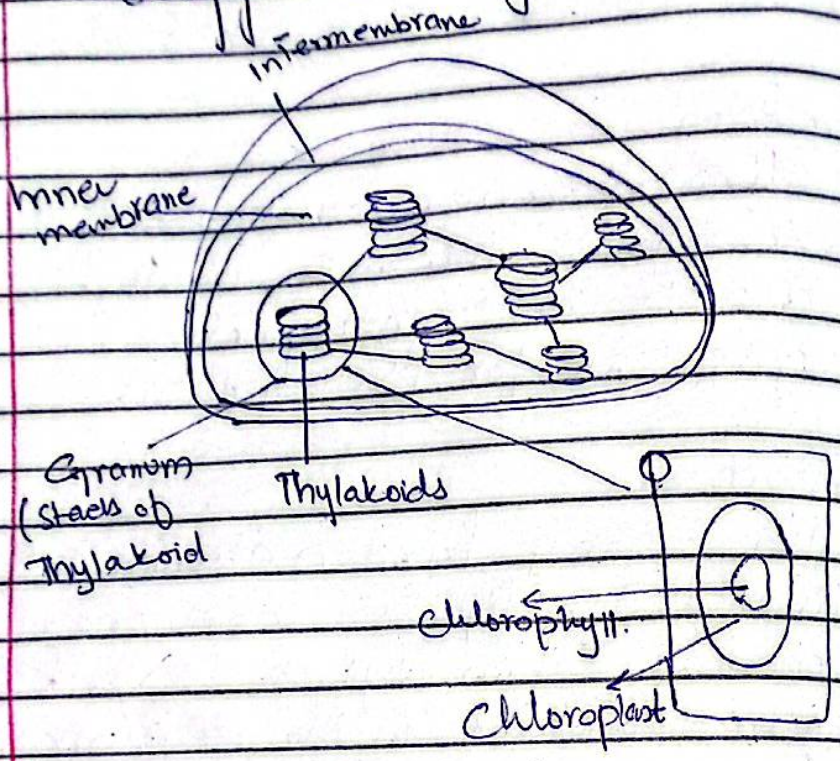

Fig: Plant cell → chlorophyll.

b) Role of Ribosome ....?

Ribosomes are Tiny, round organelles found in the cytoplasm or the surface of rough endoplasmic reticulum. They are known as the 'protein factories' of the cell because they are the main sites of protein synthesis.

Role in protein synthesis:-

1) **mRNA binding:** The small ribosomal subunit binds to messenger RNA (mRNA) which carries the genetic code.
2) **tRNA attachment:** The larger subunit provides sites for transfer RNA (tRNA) to bring specific aminoacids according to codons on mRNA.
3) **Peptide bond formation:** Ribosomes like amino acids together by forming peptide bonds creating a growing polypeptide chain.
4) **Chain elongation & termination:** The process continues until a stop codon is reached and the complete protein chain is released.

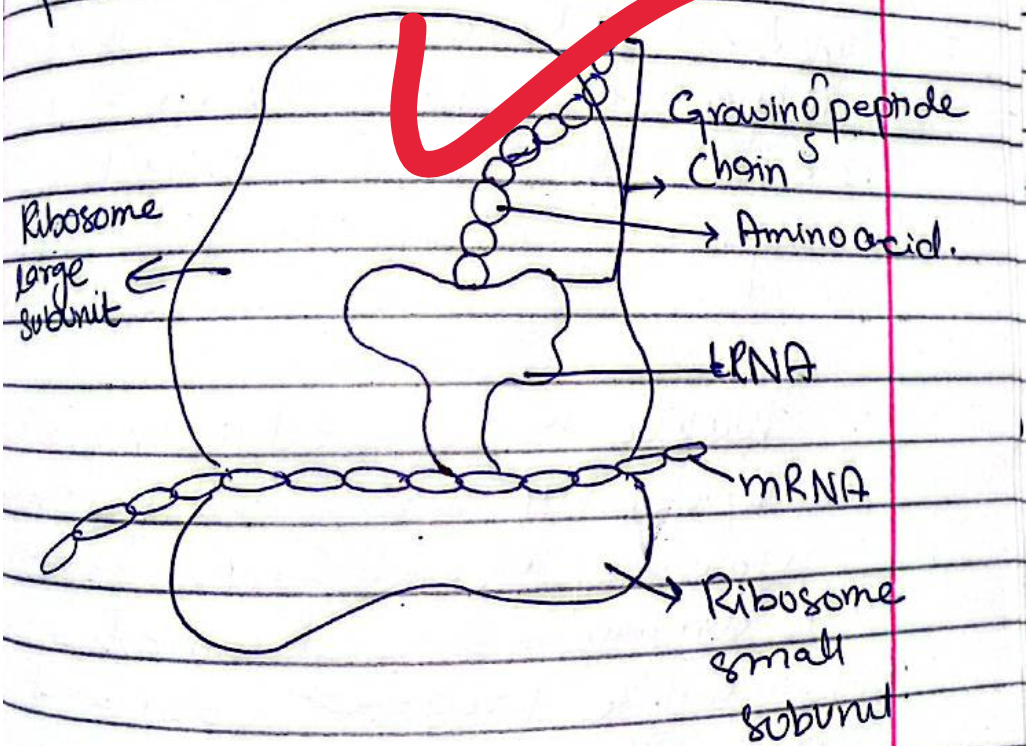

Fig: RNA and Ribosome.

c) Solid waste managment.

Solid waste management refers to the collection, treatment and disposal of solid waste materials that are discarded by humans. Proper management is essential to protect public health, conserve resources and maintain environmental cleanliness.

Methods of Solid waste management.

1) Open dumping (traditional method)

It is the oldest and simplest method where waste is dumped in open areas. It is cheap and cause pollution, foul smell and spreads diseases.

2) Land filling:

Waste is buried underground in specially prepared sites called Sanitary land fills. The waste is compacted and converted with soil to prevent Odor and pests. It is safe, economical, and widely used in developed countries.

3) Incernation (combustion):
Waste is burned at high temperatures reducing its volume upto 90%. It generates energy in the form of heat or electricity. However, it may release toxic gases if not properly controlled.

4) Composting:
It is a biological process in which organic waste (like food, leaves, and paper) decompose into compost or manure. It produces eco-friendly fertilizer that enriches soil. It is suitable for household and agriculture waste.

5) Recycling:
It involves collection, sorting and reprocessing materials like paper, glass, plastic and metal. It saves energy and natural resources and reduces landfill waste. It also promotes a circular economy by turning waste into usable products.

d) Define terms:

i) Biofuels:
It is the type of renewable fuel made from biological sources such as plants, animals waste or

algae. Exampligratia include ethanol (from sugarcane) and biodiesel (from vegetable oil). It is used as alternatives to fossil fuels to reduce pollution and carbon emissions.

ii) Adulteration:-
It means mixing inferior, harmful or cheap substance into food, fuel or other products to increase quantity or profit. It reduces quality and safety, often leading to health risks.
Exampligratia, mixing milk or chemicals in spices is food adulteration.

(iii) Hydrosphere:
It refers to total amount of water on earth, including rivers, oceans, lakes, glaciers and underground water.
It plays key role in climate regulation, weather patterns, and supporting life.

iv) Troposphere:
It is the lowest layer of earth's atmosphere extending upto 8-15 km above the surface. It contains most of the air,

clouds, and weather activities such as rain and storms. Temperature decreases with height in this layer.

v) Isotopes:

Isotopes are atoms of the same element that have the same number of protons but different number of neutrons. This means they have same atomic number but different atomic masses. Example, Hydrogen has three isotopes, protium (^1H), Deutrium (^2H), and Tritium (^3H).

Section - II

Qno:6

a) Ratio of apple : Berry : Cherry : Date
3 : 6 : 2 : 5

Assume that Date exceeds Apple by 35 as Date is longer than Apple ($5k > 3k$)

$5k - 3k = 35$

$2k = 35$

$k = \frac{35}{2} = 17.5$

$k = 17.5$

No. of berries candies = $6k$

So

berry = 6 x 17.5 = 105

Berry candies are = 105 Ans.

b) Camera price = $200

Discount 25%

tax = 6%

= 200 x 25% = 200 x 0.25 = 50$

Price per discount = 200 - 50 = 150

tax 6% on $150 = 0.06 x 150 = 9$

Total amount paid = 150 + 9 = $159

Answer

c) Distance = 36km

Speed = 18km/h

Time = ?

Time = distance / speed

= 36 / 18 = 2 hrs

Start time = 1:00 pm

Arrival time = 1 pm + 2 hours

= 3:00 pm Answer

d) STSTAICTS → STATISTICS

LGEBMAR → GAMBLER.

Q no: 7

a) volume of sphere with diameter = 14cm so radius r = 7cm

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

$\pi = \frac{22}{7}$

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

as $7^3 = 343$

So $\frac{22}{7} \times 343 = 1078$ (49)

now $V = \frac{4}{3} \times 1078 = \frac{4312}{3}\ cm^3$

as $\frac{4312}{3} =$ 1437.33 cm^3 Ans

b) Five friends total saving Rs 25,000, ratio 1:2:3:4:5

Sum of ratio parts = 1+2+3+4+5 = 15

Smallest share $\frac{1}{15} \times 25000$

$= \frac{25000}{15_3} = \frac{5000}{3}$

$= 1666.67$ Ohm

c)

1) 2, 6, 18, 54, 162, 486

each term is multiplied by 3 to get next sequence

→ All pattern fits perfectly, no number is out of place.

2, 6, 18, 54, 162, 486

×3 ×3 ×3 ×3 ×3

2) 3, 5, 7, 11, 13, ——

These are odd prime numbers in order so next prime number after 13 will (17)

So blank = 17

d)