

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 question, 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 crossing or overwriting.
5. Mind your spelling and grammar – while GSA doesn't deduct marks for this, your expression leaves an impression.
6. In the ability portion, explain analytical ability questions. 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 (consistent with the ratio shows Apple = 3 parts and Date = 5 parts, so Date is larger than Apple in the ratio. The statement "Apple candies exceed Date candies by 35" contradicts the ratio (Apple cannot exceed Date if ratio is 3:5). Two ways to handle this:

1. If the problem truly intends Apple : Date = 35, that's impossible given ratio (would require negative common factor).

2. Most likely the intended meaning is Date exceeds Apple by 35 (i.e. Date - Apple = 35). I will solve that reasonable interpretation.

Formula: Let common factor = k . Apple = $3k$, Date = $5k$.

So $5k - 3k = 35 \Rightarrow 2k = 35$.

Solution: $2k = 35 \Rightarrow k = 35 \div 2 = 17.5$ (mock - 4 ess 2026)

Berry = $6k = 6 \times 17.5 = 105$.

Answer: 105 Berry candies.

(If you intended the other wording exactly as written, note that it is inconsistent with the ratio.)

b) Camera discount + tax

Given: Original price = \$200. Discount = 25% off. After discount, 6% tax applied.

Asked: Total amount paid.

Formula / Steps:

Discount amount = $25\% \times 200$.

Sale price = $200 - \text{discount}$.

Tax = 6% of sale price.

Total = sale price + tax.

Solution (digit by digit):

Discount = $200 \times 0.25 = 50$.

Sale price = $200 - 50 = 150$.

Tax = $150 \times 0.06 = 9$.

Total paid = $150 + 9 = 159$.

Answer: \$159.00

c) Bicycle travel time

Given: Distance = 36 km, speed = 18 km/hr, start time = 1:00 PM.

Asked: Arrival time.

Formula: Time = Distance $\div$ Speed.

Solution: Time = $36 \div 18 = 2$ hours. Start 1:00 PM + 2 hours = 3:00 PM.

Answer: 3:00 PM

d) Unscramble math terms

i. STATISTICS

ii. GAMBLER

Q7.

Given:

- Diameter (d) = 14 cm

- Radius (r) = $d/2 = 14/2 = 7$ cm

- $\pi = 22/7$

Asked: volume of sphere

Formula:

Volume = $(4/3)\pi r^3$

Now, let's plug in the values:

Volume = $(4/3) \times (22/7) \times (7)^3$

= $(4/3) \times 22 \times 7 \times 7$

= 1437.33 cm^3

Answer:

The volume of the sphere is approximately 1437.33 cm^3

(b) Five friends' savings (total Rs. 25,000; ratio 1:2:3:4:5)

Given: Total = Rs. 25,000. Ratio = 1 : 2 : 3 : 4 : 5.

Asked: Smallest share (the "1" part).

Formula: Sum of ratio parts = $1+2+3+4+5 = 15$. Smallest = $(1/15) \times \text{total}$

Part - II

SECTION-I

Question: 3:

a - Why cells form organelles? Discuss mitochondria in a human cell.

Answer:-

Cell:-

It is the unit of structure and function of all living things. The cells are so small that one cannot see a single cell with a naked eye. ~~cell~~ The word cell is derived from latin term "cellula" which means "little room". The cell was discovered by Robert Hooke in 1665. Cytology is the study of all aspects of cell.

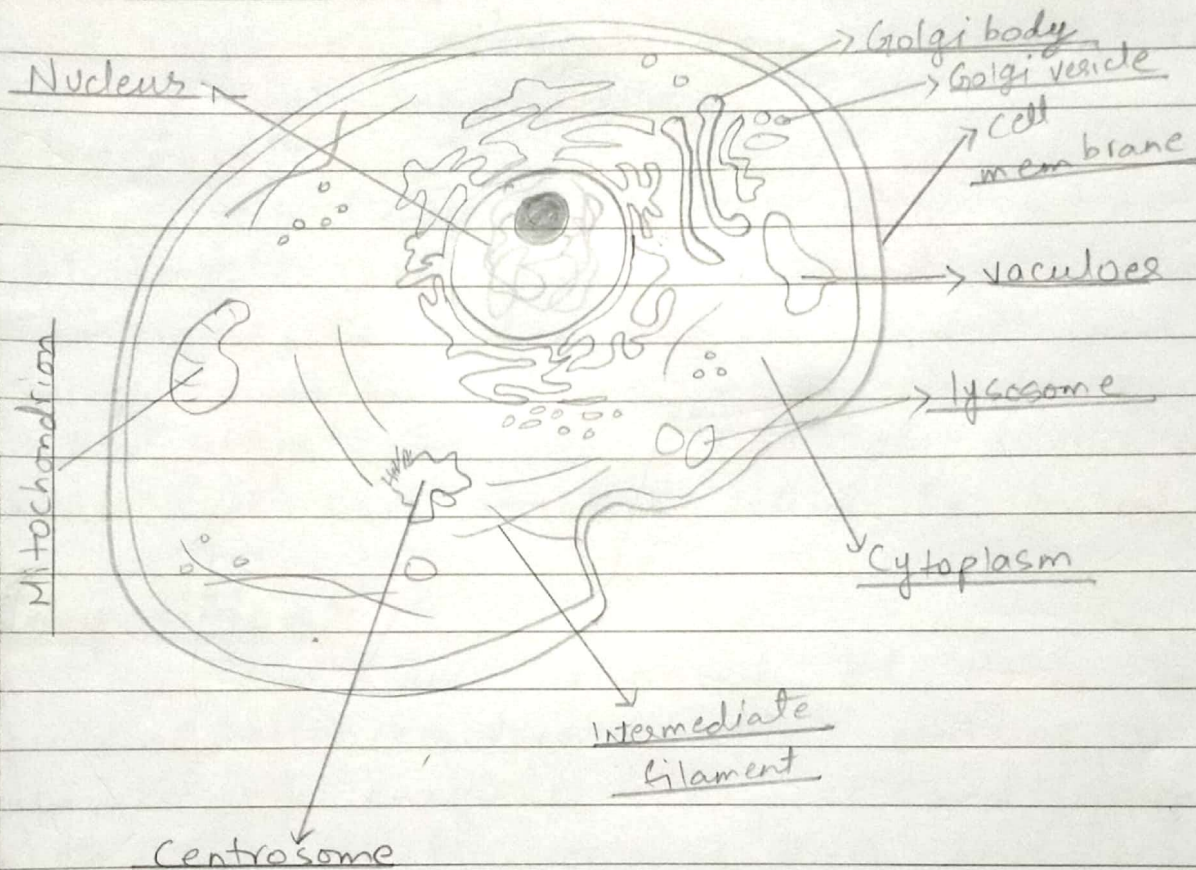
Cell Organelle

It is a specialized subunit within a cell that performs distinct functions essential for the cell's life and operation. These create compartmentalized environments. ~~biological processes~~

Why cells form Organelles:-

Cells form organelles because compartmentalization allows different biochemical processes to occur efficiently and simultaneously without

interference. Organelles create specialized environments, optimize reactions and help organize cellular functions like protein synthesis and waste disposal.



Types of Cell Organelles:-

- 1- Endoplasmatic reticulum
- 2- Ribosomes
- 3- lysosomes
- 4- Nucleus
- 5- Mitochondria
- 6- Chloroplasts
- 7- Centrosomes.
- 8- Vacuoles.

Mitochondria:-

It is known as the powerhouse of the cell. These are present only in Eukaryotic cells. Mitochondria is involved in the manufacturing and supply of energy to the cell. Mitochondria are self-replicating organelles.

Structure:-

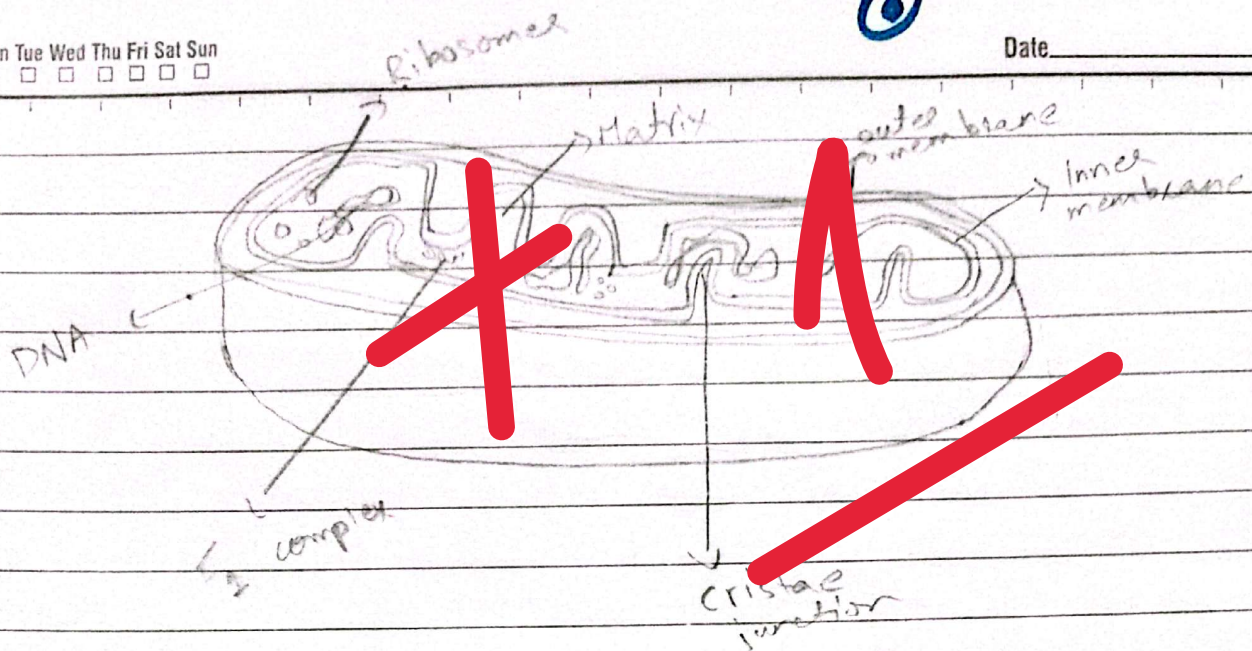
Mitochondria may be vesicle or filament shaped. These are bounded by two membranes; the outer one is smooth and the inner membrane forms many infoldings called cristae. The inner surface of cristae contains small knob like structure, called F_1 particles.

Composition:-

These are composed of lipids and proteins. Mitochondria matrix contains large number of enzymes, coenzymes and inorganic salts. They also contain DNA and ribosomes.

Function:-

Many important metabolic processes take place in it. These are fatty acid metabolism, Krebs cycle etc. Energy is released from organic food during these metabolic processes which is transferred to energy rich compound called ATP.



Q: What is doping? Discuss different types of semiconductors?

Answer:

Doping:-

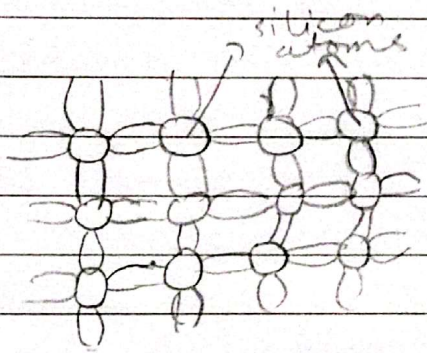
Doping is a fundamental process in semiconductor manufacturing, involving the intentional addition of impurity atoms called dopants. They are used to pure semiconductor materials like silicon. This process modifies the electrical properties of the material, enabling it to conduct electricity in a controlled manner, which is essential for creating electronic components such as transistors, diodes and integrated circuits.

How does Doping works:-

Doping introduces free charge carriers i.e. electrons or holes into the semiconductor significantly increasing its conductivity from nearly insulating to conductive.

Semiconductor:-

These are used extensively in electronic circuits. It is a material that conducts current but partly. Its conductivity can be controlled to act as a switch, enabling it to be used for building electronic devices like transistors and integrated circuits. Most semiconductors are crystals made of certain materials. The common semiconductors include chemical elements and compounds such as silicon, germanium, selenium etc.



Types of semiconductor:

There are two main types of Semiconductors:

1) N-type semiconductor:

It is created when the dopant is an element that has five electrons in its valence layer. Phosphorus is commonly used for this purpose while donating extra electrons (negative charge carriers). These extra electrons start to behave like the single valence electrons in a regular conductor.

such as copper.

2) P-type semiconductor:-

These are doped with elements having fewer valence electrons e.g. boron in silicon while creating holes (positive charge carriers). Like positive charge, holes attract electrons but when an electron moves into a hole, the electron leaves a new hole at its previous location. Thus, holes are constantly moving around within the crystal as electrons constantly try to fill them up.

c) State some of the merits and demerits of volcanic eruption?

Answer:-

Volcanic Eruption:-

A volcano is simply an opening or vent on earth's surface through which molten magma, escape on to the earth's surface. Volcano happens when magma rises and to the surface which cause bubbles of gas to appear in it. This gas can cause pressure to build up in the mountain, and it eventually explodes. When the magma bursts out of earth, it is called lava.

Types of Volcanoes:-

- 1) Still active
- 2) Dormant (temporarily inactive).

3) Extinct (never likely to erupt again).

Merits of Volcanic Eruption:-

- 1) Fertilizes soil with nutrient-rich ash, enhancing agriculture.
- 2) Generates geothermal energy useful in electricity production.
- 3) Creates new land forms and attracts tourism.
- 4) Brings valuable minerals closer to the surface for mining.

Demerits of Volcanic Eruption:-

- 1) can cause loss of life and property destruction.
- 2) Damage to habitats and landscapes.
- 3) Volcanic activity in sea can trigger tsunamis.
- 4) Hazardous clouds can affect air travel and climate.
- 5) Disruption of economic activities and businesses.

d) What is dengue? Discuss symptoms, causative agents and remedies?

Answer:-

Dengue:-

It is a mosquito-borne viral infection caused by the dengue virus transmitted mainly by *Aedes aegypti* mosquitoes. It is widespread throughout the tropics, with local variations.

in risk influenced by rainfall, temperature and unplanned urbanization (rapid).

Symptoms:-

- High fever
- Severe headache
- Pain behind eyes
- Rash
- Mild bleeding from nose or gums.
- Joint or muscle pain
- Rapid breathing.
- Persistent vomiting.

Causative agents:-

It is caused by dengue virus. It is transmitted to humans by through the bites of infected female mosquitoes.

Remedies:-

- 1) Vaccination:- In late 2015 and early 2016, first dengue vaccine was registered.
- 2) Preventing mosquitoes from accessing egg-laying habitats by environmental management.
- 3) disposing of solid waste properly.
- 4) Applying appropriate insecticides to water shortage outdoor containers.

Question: 4:

a) Write a note on plant kingdom "chlorophyll".

Answer:-

Chlorophyll:-

Chlorophyll in a plant kingdom is a green pigment found in the chloroplasts of plant cells. It is essential for photosynthesis, the process by which plants convert sunlight into chemical energy. Chlorophyll absorbs light most efficiently in the blue and red wavelength and reflects green, giving plants their characteristic color. It plays a vital role in capturing light energy to drive the synthesis of organic compound from carbon dioxide and water.

Benefits:-

- 1) It has antioxidant properties.
- 2) Eating chlorophyll rich foods are also provide nutrients like fiber which support overall health.
- 3) It is also available in liquid and tablet form.

b) Describe role of ribosomes in protein synthesis?

Answer:-

Ribosomes:-

These are tiny granular structures present in cytoplasm. Palade was the first person who studied ribosomes in 1955.

Ribosomes are composed of ribonucleoprotein

These are mainly present in two forms:

- a) Freely dispersed form in cytoplasm.
- b) Attached with RER as tiny granules.

Formation of Ribosomes:-

These are synthesized in the nucleolus of the nucleus. The nucleoli are factories of ribosomes. Ribosomes pass through pores in the nuclear membrane and enter the cytoplasm.

Role of ribosomes in protein synthesis:-

Ribosomes are cell organelles that serve as the site of protein synthesis. During this process, they read messenger RNA sequences and translate them into polypeptide chains by assembling amino acids in the correct order. This function is crucial for cell function and growth, as proteins are fundamental components of cellular structure, enzymes and signaling molecules.

c) Discuss different methods of solid waste Management.

Answer:-

Solid Waste Management:-

"Solid wastes are the discarded leftovers of our advanced consumer society. This growing mountain of garbage and trash represents not only an attitude of indifference towards

valuable natural resources, but also a serious economic and public health problem."

(Jimmy Carter).

Methods of Management :-

Following are the different methods for solid waste management :-

1) Landfilling :-

Burying waste in designated areas with protective measures to avoid contamination.

2) Recycling :-

Converting waste materials into reusable products to conserve resources.

3) Incineration :-

Burning waste at high temperature to reduce volume and generate energy.

4) Composting :-

Decomposition of organic waste into nutrient-rich soil amendments.

5) Waste-to-Energy :-

Generating energy from waste materials through incineration or other processes.

6) Pyrolysis :-

Thermal decomposition of waste to recover energy or materials.

d) Define the terms :-

1) Biofuel :-

A fuel derived from biological

materials such as plants or animal are used as an alternative to fossil fuel.

2) Adulteration:-

The process of adding inferior, harmful or unauthorized substances to food or other products.

3) Hydrosphere:-

The total amount of water on Earth, including rivers, oceans, lakes etc.

4) Troposphere:-

Lowest layer of earth's atmosphere where the weather occurs and most atmospheric activities take place.

5) Isotopes:-

These are variants of chemical element that have same number of protons but different numbers of neutrons in their nuclei which results in different atomic masses.

SECTION - III

Question: 7:

- a) Calculate volume of sphere with diameter 14cm. (Use $\pi = 22/7$).

Solution:-

$$\text{Volume of sphere} \Rightarrow V = \frac{4}{3} \pi r^3$$

The radius r is half the diameter, so here as diameter is 14 cm then $r = 7$ cm.

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

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

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

$$= \frac{4}{3} \times 1078$$

$$= 1,437.33 \text{ cm}^3$$

b) Five friends' total savings = 25,000 Rs, ratio 1:2:3:4:5. Find the smallest share.

Answer:-

Data:-

Total savings = Rs 25000

Ratios = 1:2:3:4:5

Required:-

Smallest share = ?

Solution:-

$$\text{Sum of ratios} = 1 + 2 + 3 + 4 + 5 \\ = 15$$

Smallest share $\Rightarrow 4$

$$= \frac{\text{Smallest share}}{\text{sum of ratio}} \times \text{Total savings}$$

$$= \frac{1}{15} \times 25000 \\ = 1666.67 \text{ Rs.}$$

- c) Spot the error/complete the series:
- i; 2, 6, 18, 54, 164, 486 (which number doesn't fit?)
 - ii. 3, 5, 7, 11, 13

Solution:-

i) 2, 6, 18, 54, 164, 486

* series multiplies by 3 each time, so there is no error.

ii) 3, 5, 7, 11, 13, 17

$\rightarrow$ Next prime no.

- d) A triangle with sides 5cm, 12cm, 13cm. Find all three angles.

Question: 8:

a) A hiker walks a right triangle path-----
 ----- start?

Solution:-

b) Six siblings share ----- amount?

Solution:-

Data:-

Total sharing = Rs 9000

$$A = \frac{1}{2} B$$

$$B = 3C$$

$$C = 4D$$

$$D = 2E$$

$$E = F$$

Required:-

each amount = ?

Solution:-

Let suppose

$$F = x$$

from this:-

- $E = F = x$

- $D = \cancel{2x} 2E = 2x$



- $C = 4D \Rightarrow 4 \times 2x = 8x$
- $B = 3C = 3 \times 8x = 24x$
- $A = \frac{1}{2} B = \frac{1}{2} \times 24x = 12x$

Sum of all shares :

$$\begin{aligned} &\Rightarrow A + B + C + D + E + F \\ &= 12x + 24x + 8x + 2x + x + x \\ &= 48x \end{aligned}$$

Total sharing:

$$48x = 9000$$

$$x = \frac{9000}{48} = 187.5$$

Now each amount =

$$F = 187.5$$

$$E = 187.5$$

$$\begin{aligned} D &= 2E \\ &= 2 \times 187.5 \\ &= 375 \end{aligned}$$

$$\begin{aligned} C &= 4D \\ &= 4 \times 375 \\ &= 1500 \end{aligned}$$

$$\begin{aligned} B &= 3C \\ &= 3 \times 1500 \\ &= 4500 \end{aligned}$$

$$\begin{aligned} A &= \frac{1}{2} B \\ &= \frac{1}{2} \times \frac{2250}{4500} \\ &= 2250 \end{aligned}$$

c) A rectangle - - - - - volume?

Data :-

Length = 8m
 width = 6m
 height = 4m

Required :-

Surface Area and volume.

Solution :-

$$\begin{aligned} \text{S. Area} &= 2(lw + lh + wh) \\ &= 2(8 \times 6 + 8 \times 4 + 6 \times 4) \\ &= 2(48 + 32 + 24) \\ &= 2(104) \\ &= 208 \text{m}^2 \end{aligned}$$

$$\begin{aligned} \text{Volume} &= l \times w \times h \Rightarrow 8 \times 6 \times 4 \\ &= 192 \text{m}^3 \end{aligned}$$