

GSA - Mock EXAM CSS 2026

PART II

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.

FOR INSTANCE:

- ↳ Nucleus stores genetic material (DNA).
- ↳ Mitochondria produces energy.
- ↳ Lysosomes break down waste.

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?

STRUCTURE OF MITOCHONDRIA:

OUTER MEMBRANE:

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

Outer membrane is smooth and permeable to small molecules and ions. It acts as a protective layer.

↳ INNER MEMBRANE:

Inner membrane is folded into structures called cristae, which increase surface area for energy production. It contains proteins involved in the electron-transport chain (ETC) and ATP synthesis.

↳ MATRIX:

Matrix is the fluid-filled space inside the inner membrane. It contains enzymes for the Krebs cycle, mitochondrial DNA (mtDNA) and ribosomes.

FUNCTIONS OF MITOCHONDRIA:

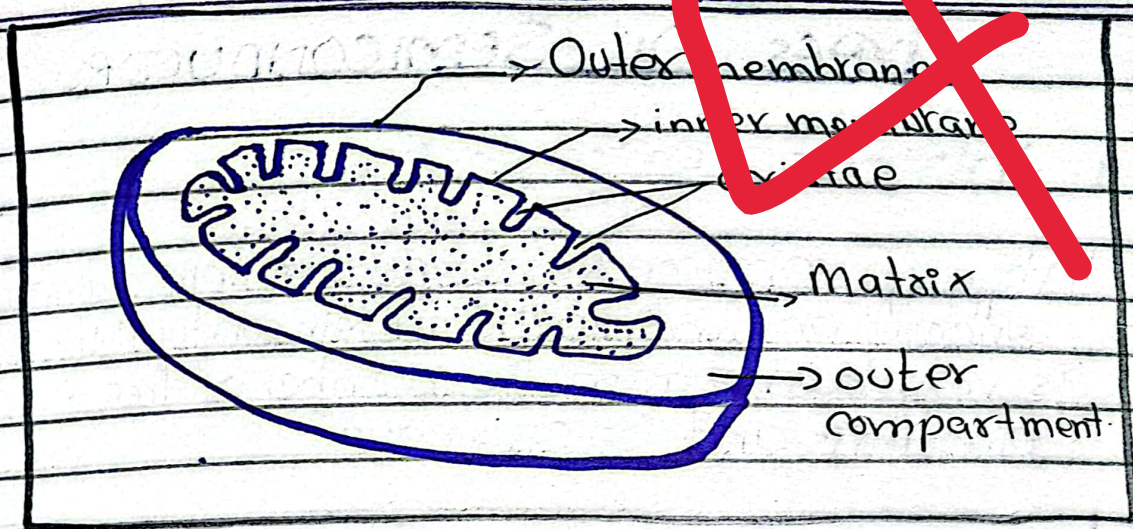
↳ REGULATE CELLULAR METABOLISM:

Mitochondria ~~release~~ plays a key role in metabolic pathways like fatty acid oxidation and amino acid metabolism.

↳ APOPTOSIS (PROGRAMMED CELL DEATH):

Mitochondria release proteins like cytochrome c to trigger apoptosis maintaining tissue health.

"MITOCHONDRIA"



6) What is doping? Discuss different types of semiconductors.

DOPING:

Doping is the process of adding impurities to a pure semiconductor (like silicon or germanium) to modify its electrical properties and improve its conductivity.

Pure semiconductors (called intrinsic semiconductors) have very low conductivity, as they don't have enough free charge carriers (electrons or holes) to conduct electricity efficiently.

SEMICONDUCTORS:

A semiconductor is a material that has electrical conductivity between that of a conductor (like copper) and an insulator (like glass). Its ability to conduct electricity can be controlled by external factors such as light, temperature or doping (adding impurities).

TYPES OF SEMICONDUCTORS:

Intrinsic Semiconductors:

Intrinsic semiconductors are pure semiconductors without any impurities. Their conductivity is very low because the number of free electrons and holes is equal.

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

2. EXTRINSIC SEMICONDUCTORS:

Extrinsic semiconductors are semiconductors that have been doped to increase their conductivity.

TYPES OF EXTRINSIC SEMICONDUCTORS

Based on the type of impurity added there are two types of extrinsic semiconductors.

a) N-Type Semiconductor:

N-type semiconductors are formed by adding a pentavalent impurity (like phosphorus, arsenic or antimony) to the semiconductor. These impurities have 5 valence electrons; the extra electron becomes a free electron for conduction.

b) P-Type Semiconductor

P-Type are formed by adding a trivalent impurity (like aluminium) to semiconductor.

These impurities have 3 valence electrons, creating a "hole" (a positive charge carrier) in the structure.

DIFFERENCE BETWEEN N-TYPE AND P-TYPE:

<u>TYPE</u>	<u>IMPURITY ADDED</u>	<u>MAJORITY CARRIERS</u>
N-Type	Pentavalent (5 valence electrons)	Electrons (negative)
P-Type	Trivalent (3 valence electrons)	Holes (positive)

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

VOLCANIC ERUPTION:

A volcanic eruption occurs when magma, gases and other materials from beneath the Earth's crust escape to the surface through a volcano. This happens due to the buildup of pressure in the Earth's mantle, forcing molten rock (lava), ash and gases to be expelled. Volcanic eruption can range from quiet lava flows to explosive eruptions that release massive amounts of ash and debris.

MERITS OF VOLCANO ERUPTION:

• Fertile soil: Volcanic ash contains

minerals that over time, enrich the soil making it highly fertile and ideal for agriculture.

Example:-

Merapi, Indonesia.

Rich farming near Mount

2. Geothermal Energy:

Volcanic regions are a source of geothermal energy, a sustainable and clean energy source.

Example:

3. ~~Creation of Landmass~~ Iceland utilizes geothermal energy extensively.

4. ~~Mineral Resource~~ Creation of Landmass: Volcanic eruptions create new landmasses, islands and mountains.

Example:

4. ~~Mineral Resource~~ The Hawaiian Islands were formed by volcanic activity.

5. Mineral Resource: Volcanoes bring valuable minerals like sulfur, gold and diamonds to the surface, which can be mined.

Demerits of Volcano Eruption:

1. Loss of Life and Property:

Explosive eruptions can destroy homes, infrastructure and claim lives.

Example: Mount Fuji in Japan and Mount Vesuvius in Italy.

2. ENVIRONMENTAL DAMAGE:

Ash clouds can cause widespread air pollution, damaging crops and ecosystems.

Example:

The 1991 Mount Pinatubo eruption caused significant ecological damage.

3. DISPLACEMENT OF COMMUNITIES:

Nearby populations are often forced to evacuate, disrupting lives and livelihoods.

4. HEALTH HAZARD

Volcanic ash and gases can cause respiratory problems and other health issues for humans and animals.

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

DENGUE: Dengue is a mosquito-borne viral disease caused by the dengue virus (DENV). It is transmitted to humans through the bite of infected female mosquitoes, primarily the *Aedes aegypti* mosquito.

SYMPTOMOLOGY OF DENGUE:

Symptoms of dengue usually appear 4-10 days after being bitten by an infected mosquito and can range from mild to severe. The disease has three phases: febrile phase, critical phase and recovery phase.

1. MAIN DENGUE SYMPTOMS:

- High fever (up to 104°F or 40°C).
- Severe headache.
- Pain behind the eyes (retro-orbital pain).
- Joint and muscle pain (so intense it's called "breakbone fever").
- Nausea and vomiting.
- Skin rash (appears 2-5 days after fever starts).
- Mild bleeding (e.g. nosebleeds, bleeding gums or easy bruising).

2. SEVERE DENGUE SYMPTOMS (DENGUE HEMORRHAGIC FEVER OR DENGUE SHOCK SYNDROME):

- Severe abdominal pain.
- Persistent vomiting.
- Rapid breathing.
- Bleeding from gums, nose and internal bleeding.
- Extreme fatigue and restlessness.

CAUSATIVE AGENT:

Dengue is caused by the Dengue virus (DENV) which belongs to the Flavivirus family.

There are 4 serotypes of the virus: DENV-1, DENV-2, DENV-3, DENV-4.

Infection with one serotype confers lifelong immunity against that specific serotype.

However, a second infection with a different serotype increases the risk

of severe dengue due to a phenomenon called antibody-dependent enhancement (ADE).

Remedies:

1. Home remedies for mild Dengue:

Drink plenty of fluids such as water, fresh juices. This prevents dehydration caused by fever and vomiting.

Traditional remedies like papaya leaf juice are believed to help increase platelet count.

Eat food rich in vitamin C to boost immunity. Avoid oily or heavy foods.

2. Medical Treatment for severe Dengue:

Patients with severe dengue need close monitoring in a hospital. Intravenous fluids are given to combat dehydration and maintain blood pressure. If platelet levels drop dangerously low, transfusions may be required.

3. Preventive measures:

Use mosquito repellents and wear long-sleeved clothing to avoid mosquito bites. Sleep under mosquito nets, even during the day.

Q4:

(a) Write a note on plant Kingdom, chlorophyll

PLANT KINGDOM:

The plant kingdom (Kingdom Plantae) includes all multicellular eukaryotic, photosynthetic organisms that produce their own food through the process of photosynthesis.

Plants are essential for life on Earth as they provide oxygen, food and habitat for other organisms. They are autotrophic, meaning they produce their own energy and their cells have a rigid cell wall made of cellulose.

CHARACTERISTICS OF PLANT KINGDOM:

1. Eukaryotic and Multicellular:

Plants have complex cells with a nucleus and membrane-bound organelles.

2. Photosynthetic:

Plants contain chlorophyll (a green pigment) that allows them to harness sunlight for energy.

3. Cell wall:

Cell wall is made up of cellulose, it provides structural support.

4. Reproduction:

Plants reproduce sexually and asexually (vegetative propagation).

CHLOROPHYLL

Chlorophyll is the green pigment found in the chloroplasts of plants, algae, and cyanobacteria. It plays a key role in photosynthesis, as it absorbs light energy from the sun and converts it into chemical energy.

Types of Chlorophyll:

1. Chlorophyll a:

Chlorophyll a is the primary pigment involved in photosynthesis. It absorbs light in the blue-violet and red range of the spectrum.

It is an essential part for the light-dependent reactions.

2. Chlorophyll b:

Chlorophyll b is an accessory pigment that helps in absorbing additional light. It transfers the absorbed energy to chlorophyll a for photosynthesis.

Role of Chlorophyll in Photosynthesis:

- Light Absorption: Chlorophyll absorbs sunlight and excites electrons which are used to produce ATP.

- Food Production: Through photosynthesis, plants convert carbon dioxide and water into glucose and oxygen.

1) Describe role of ribosomes in protein synthesis.

ROLE OF RIBOSOMES IN PROTEIN SYNTHESIS

Ribosomes are tiny organelles found in both prokaryotic and eukaryotic cells, and they play a crucial role in protein synthesis. They are often referred to as the "protein factories" of the cell because they assemble amino acids into specific proteins based on genetic instructions.

STRUCTURE OF RIBOSOMES:

Ribosomes are made of ribosomal RNA (rRNA) and proteins.

- They consist of two subunits:
- Small subunit: Small subunit binds to the messenger RNA (mRNA).
- Large subunit: Large subunit contains sites where amino acids are joined together to form a protein.

Ribosomes can be free-floating in the cytoplasm or attached to the endoplasmic reticulum, forming the rough ER.

Steps in Protein Synthesis:

Protein synthesis occurs in three main stages:

1) Initiation:

The small ribosomal ^{sub}unit binds to the mRNA (which carries the genetic instructions from DNA).

A specific start codon (AUG) on the RNA signals where protein synthesis begins.

The first transfer RNA (tRNA) carrying the amino acid methionine pairs with the start codon. The large ribosomal subunit then joins to form a complete ribosome.

2) Elongation:

The ribosomes move along the mRNA, reading its codons. Each codon specifies a particular amino acid. tRNA molecules bring the corresponding amino acids to the ribosomes. The large subunit has three sites:

- A site (aminoacyl site): Where the tRNA carrying the next amino acid binds.

- P site (peptidyl site): Where the growing protein chain is held.

- E site (exit site): Where tRNA without an amino acid exits the ribosome.

3) Termination:

When the ribosome reaches a stop codon the process ends. A release factor binds to the ribosome, causing the newly made protein to be released. The ribosome disassembles into its subunits ready to be reused.

Key Functions of Ribosomes in Protein Synthesis:

1. Decoding genetic information:
Ribosomes read the sequence of mRNA codons and ensure that the correct amino acids are added to the growing protein chain.

2. Catalyzing peptide Bond Formation:
Ribosomes facilitate the chemical reaction that links amino acids together.

3. Ensuring Accuracy:
Ribosomes ensure that the tRNA anticodon matches the mRNA codon, reducing errors in protein synthesis.

4. Recycling:
Once a protein is made, ribosomes are reused for synthesizing new proteins.

c) Discuss different methods of solid waste management.

SOLID WASTE MANAGEMENT:

Solid waste management refers to the process of collecting, treating, and disposing of solid materials in an efficient and environmentally friendly manner. Proper waste management helps reduce pollution, conserve resources and protect public health.

Methods of solid waste management:

1) Landfill: Landfill is disposal of waste by burying it in large, designated areas.

↳ Process: Waste is compacted to reduce volume. Layers of soil are added to cover the waste. Modern landfills have liners to prevent leaching of harmful substances into the soil.

2) Incineration: Incineration is the burning of waste at high temperatures to convert it into ash, gases and heat.

↳ Process: Waste is fed into an incinerator. Combustion reduces waste volume by 70-90%. Energy produced from burning can be used for electricity.

3) Recycling: Recycling is the waste converting into new products to reduce the need for raw materials.

↳ Process: Waste is collected and sorted into recyclable categories. Materials are processed and turned into raw materials for new product.

1) Define the terms:-

1) Biofuel.

2) Adulteration.

3) Hydrosphere.

1) Troposphere.

1) Lithosphere.

a) BIOFUEL:

Biofuel is the type of renewable energy derived from biological materials like plants, animal, waste or algae. Biofuels are used as alternative to fossil fuels and help to reduce greenhouse gas emissions.

Example:
and biodiesel.

Example include ethanol

b) Adulteration: The act of mixing inferior, harmful, or unauthorized substances with a product usually to increase profit or reduce costs.

Example: Mixing water in milk or low-quality oils in edible oil.

3) Hydrosphere: The water component of Earth, including all bodies of water such as oceans, seas, rivers, lakes, groundwater, glaciers and water vapor in atmosphere. It covers about 71% of Earth's surface and is essential for all forms of life.

4) Troposphere: The lowest layer of Earth's atmosphere, extending from Earth's surface up to about 8-15 km. Temperature decreases with altitude in this layer.

Isotopes: Isotopes are the variant of the same chemical element that have the same number of protons but different numbers of neutron in their nuclei.

Example: Carbon 12, carbon 13 and carbon 14 are isotopes of carbon.

PART - 2

d). Unscramble these math terms

i. STSTAICITS:

Ans: STATISTICS.

ii. LGEBMAR.

Ans: ALGEBRA.

c). A bicycle covers 36 km at 18 km/hrs starting at 1pm. What time does it reach?

Solution:-

• Distance = 36 km

• Speed = 18 km/h

• Time taken = $\frac{\text{Distance}}{\text{Speed}} = \frac{36 \text{ km}}{18 \text{ km/h}} = 2 \text{ hours}$

• Start time = 1pm.

• Arrived time = 1pm + 2 hours = 3pm!

Ans: The bicycle reaches at 3pm.

b) A camera priced at 200 \$ gets 25% off plus 6% tax. calculate the total amount paid

Solution:

- Original price = \$200
- Discount price = 25% off

- Discounted price = $200 \times (1 - 0.25) = 200 \times 0.75 = 150$

- Tax = 6% on discounted price.

- Tax amount = $150 \times 0.06 = 9$

- Total amount paid = Discounted price + Tax.

- $150 + 9 = 159$

Ans:- The total amount paid is \$159.

a)

Sol:- Let num of packets be $3n$, $6n$ and $5n$.

- $5n - 3n = 35$

- $2n = 35 \Rightarrow n = 17.5$

Berry candies = $6n$.

with $n = 17.5$, Berry = $6 \times 17.5 = 105$.

Q7:-

(a) :- Solution:

Diameter = 14cm.

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

Vol of sphere = $\frac{4}{3} \pi r^3$.

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

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

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

$$= \frac{4}{3} \times 22 \times 49 \text{ (since } 343 = 7^3 \text{ and } \frac{22}{7} \times 7^3 = 22 \times 7^2 \text{)}$$

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

$$= \frac{4312}{3}$$

$$= 1437.33 \text{ cm}^3$$

b)

Solutions:-

Total savings = 25,000 Rs.

Ratio of shares = 1 : 2 : 3 : 4 : 5

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

Smallest share = $\frac{1}{15} \times 25,000$

$$= \frac{25000}{15}$$

Ans = 1666.67 Rs.

c) solution:-

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

x by 3 to get next no.

$$2 \times 3 = 6$$

$$6 \times 3 = 18$$

$$18 \times 3 = 54$$

$$54 \times 3 = 162$$

$$162 \times 3 = 486$$

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

next prime no after 13 is 17.

Ans = 17.

d)

Solution:-

Sides of triangle are 5 cm, 12 cm, 13 cm.

$$\circ 5^2 + 12^2 = 25 + 144 = 169$$

$$\circ 13^2 = 169$$

Since $5^2 + 12^2 = 13^2$ it's a right-angled triangle.

Angles:-

- One angle = 90° (right angle)
- Other angles using trigonometry.

Angle opposite 5 cm (A):

$$A = \sin^{-1} \left(\frac{5}{13} \right) \approx 22.62^\circ$$

Angle opposite 12 cm (B):

$$B = \sin^{-1} \left(\frac{12}{13} \right) \approx 67.38^\circ$$

Angles of triangle:

- 90°
- $\approx 22.62^\circ$
- $\approx 67.38^\circ$