

day/date

Dos and Don'ts for General Science & Ability Paper

Hi there, you've done well. Know that acquiring knowledge is one thing and reproducing it in paper according to what's asked is another.

There are a few things I would like to highlight.

1. A 5 marks part requires at least 2 and at max 3 sides of a paper. Know that there can be two or three parts of a question and their marks are divided accordingly. So, address all of them in a just manner.

2. Focus on time management. You get 35 minutes to solve one question and about 8 minutes per 5 mark part. Manage your time accordingly.

3. You need to understand that your paper is supposed to look more scientific than theoretical. So, add flowcharts and diagrams where required.

4. Your handwriting and neatness can be really impactful. Avoid cutting and overwriting.

5. Focus on your spellings and your grammar. Here, in GSA there's no deduction in marks but your expression will definitely create an impact.

6. In ability portion, give explanation for analytical ability question in words. You need to understand that a 5 mark part requires all steps written and explained.

Good luck for CSS 2025. You're gonna rock in this. :)  
Add early critical CSS 2025.

b. Explain dark matter and dark energy?

- Dark Matter :-

- Invisible matter making up 27% of the Universe's mass-energy density.
- Does not interact with light, making it invisible.
- Affects galaxy rotation, cosmic structure formation and gravitational lensing.

- Dark Energy :-

- Mysterious energy driving the Universe's accelerating expansion.
- Accounts for 68% of the Universe's mass-energy density.
- Causes space to expand faster over time.

c. Discuss structure and function of mitochondria. How is it the powerhouse?

- Mitochondria Structure :-

- Double membrane-bound organelles
- Inner membrane: folded into cristae, increasing surface area
- Crystalline space contains enzymes, DNA and ribosomes.

- Function :-

- Cellular respiration generates ATP (energy) through oxidative phosphorylation
- Powerhouse of the cell: produces most ATP
- Regulates cell growth, division, and apoptosis.

## - Why Mitochondria is the Powerhouse:-

- Generates 90% of Cellular ~~energy~~
- Converts glucose into ATP through Cellular Respiration
- Essential for Cellular metabolism

## D. what are Covalent bonds? Explain types along with elaborating structures?

### - Covalent Bonds :-

Covalent Bonds are chemical bonds formed by sharing electrons between atoms.

### - Types :-

- 1- Sigma ( $\sigma$ ) Bonds; formed by end-to-end overlap of atomic orbitals
- 2- Pi ( $\pi$ ) bonds; formed by side-by-side overlap of atomic orbitals.
- 3- Polar Covalent bonds; Unequal electron sharing between atoms.
- 4- Nonpolar Covalent bonds: equal electron sharing between atoms.

Proper elaboration is required

### - Elaborating Structures:-

- Single bond ( $\sigma$ ); one pair of shared electrons (e.g.  $H_2$ )
- Double bond ( $\sigma + \pi$ ); two pairs of shared electrons (e.g.  $O_2$ )
- Triple bond ( $\sigma + 2\pi$ ); three pairs of shared electrons (e.g.  $N_2$ )

## Question # 3

Add diagrams

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Q3: A: what is lunar eclipse? Explain in detail with apt diagrams?

- Lunar eclipse :-

A lunar eclipse occurs when Earth passes between the Sun and the Moon, blocking sunlight from reaching the Moon.

- Types of lunar Eclipses :-

- Penumbral lunar Eclipse; Earth's Penumbra (Partial Shadow) falls on the Moon.

- Partial lunar Eclipse; Earth's Partial Shadow falls on the Moon.

- Total lunar Eclipse; Earth's Umbra (Complete Shadow) falls on the Moon.

Diagram:

Sun → Earth → Moon

- Phases of a Total lunar Eclipse.

- 1- Penumbral phase
- 2- Partial Phase
- 3- Total Phase
- 4- Eclipse maximum

B: Explain function of enzymes in detail with example?

- Enzymes :-

Enzymes are biological molecules (proteins) that catalyze chemical reactions in living organisms.

- Function :-

- Speed up chemical reactions
- Lower activation energy

- 3- Increase reaction specificity
- 4- Reusable

### - Example -

- Amylase (Saliva): breaks down Starch into Sugars
- Lactase (Intestine): breaks down Lactose into glucose and galactose
- Protease (digestive system): break down Proteins into amino acids.

### C. Give a brief account of electromagnetic radiations. what is EMR Spectrum?

EMR Spectrum are energy waves Propagating through space.

#### EMR Spectrum:-

- Radio waves (long wavelength, low frequency)
- microwaves
- Infrared (IR) Radiation
- Visible light
- Ultraviolet (UV) Radiation
- X-Rays
- Gamma Rays (short wavelength, high frequency)

Add diagram

#### Characteristics:-

- Electric and magnetic field components
- Transverse waves
- Travel at the Speed of light

### D. Are earthquakes and volcanic eruptions interconnected? if yes then how?

Yes, earthquakes and volcanic eruptions are interconnected.

## - Relationship :-

- Tectonic plate movement: earthquakes and volcanic eruptions occur at plate boundaries.
- Magma movement; earthquakes can trigger magma rise, leading to eruptions.
- Volatiles release; earthquakes can release gases, increasing eruption likelihood.
- Ground deformation; earthquakes can alter ground shape, affecting volcanic activity.

## - Examples :-

- 2010 Iceland volcanic eruption: triggered by earthquake
- 1980 Mexico earthquake: triggered volcanic activity.

## - Earthquakes :-

- Alter magma chamber pressure
- Create pathways for magma ascent
- Release gases, increasing eruption likelihood
- Change ground stress, affecting volcanic activity.