

Dos and Don'ts for the General Science & Ability Paper

Day: Saturday

Date: 03-03-2026

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:

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NOA Batch: 007 MOC26-NOA-15

Subject: General Science and Ability

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.

Good luck for CSS 2026, you're going to ace it, in sha Allah! ✨

01. Introduction

02. Constituents of universe

03. Age of universe

04. Big Bang Theory

05. Evidence Supporting Big Bang

06. Conclusion

Introduction:

"The cosmos is within us.

We are made of star-stuff."

(Carl Sagan)

The universe is the entirety of space and time, including all the matter and the energy.

It is vast, encompassing everything from the smallest particles to the largest galaxies. It

contains all the cosmic structures that are formed from both visible and invisible matter.

Constituents of universe:

(i) Visible Matter:

— "Ordinary matter that emits

light and forms stars, planets etc."—

example:

- For example; stars, planets, asteroids etc.

Percentage of universe:

• 5%.

(ii) Dark matter:

— "Invisible matter that exerts

gravitational forces."—

example:

- Detected through gravitational effects.

Percentage of universe:

• 27%.

(iii) Dark Energy:

— "Hypothetical energy causing the expansion

of the universe."—

Example:

- Permeates all space.

Percentage of universe:

.68%

Age of the Universe:

— "The most incomprehensible thing about the universe is that it is comprehensible." —

(Albert Einstein)

Understanding age of universe helps in grasping the cosmological models, the evolution of galaxies, and the future of cosmos. It connects with theories about the origin of the universe, space and time, the fundamental forces from singularity to vast space we see today.

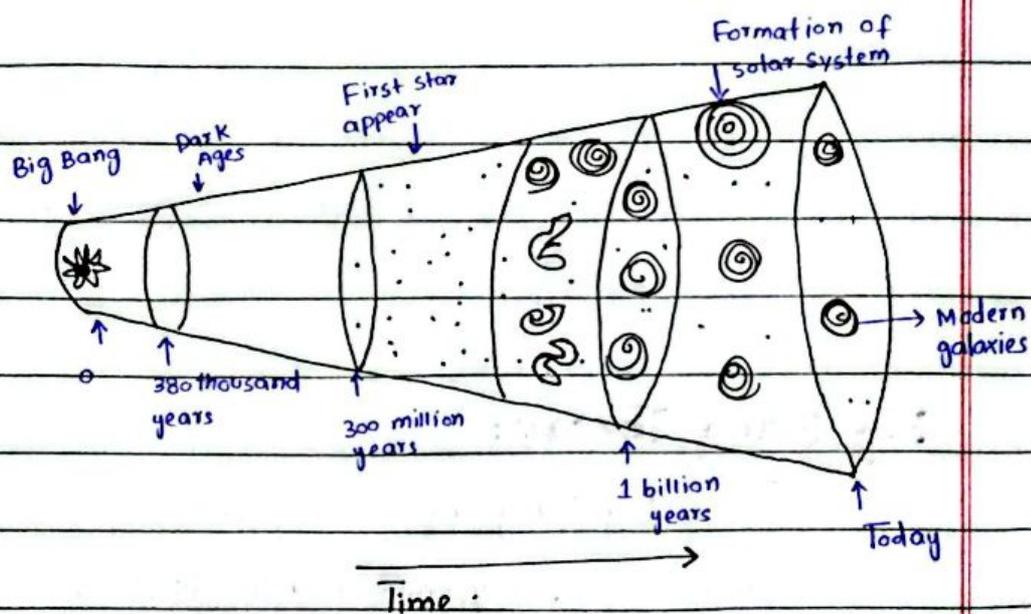
Big Bang Theory:

— "The Big Bang Theory which we now know, happened nearly 14 billion years ago, is the origin of everything we know about the Universe" —

(Stephen Hawking)

The Big Bang Theory is the leading explanation for the origin and evolution of the universe. It suggests that Universe began

as an infinitely small, hot and dense point around 13.8 billion years ago and has been expanding ever since. The theory was first proposed by George Lemaitre and later supported by Edwin Hubble's observation of galaxies moving away from the Earth.



Evidences:

Below are the key evidence that supports

Big Bang theory:

- 1) Cosmic Microwave Background Radiation.
- 2) Redshift of Galaxies.
- 3) Abundance of light elements.

Conclusion:

Hence, According to Big Bang theory, universe began as a hot, dense singularity and has been expanding ever since, leading to the formation of galaxies, stars, planets, all cosmic structures we observe today.

(b)

Urinary Sys. and Working of Nephrons.

Outline:

01. Urinary System
02. Nephrons
03. Working of Nephrons
04. Conclusion.

Urinary System:

The urinary system is a body system responsible for the formation, storage, and elimination of urine. Its main function is to remove metabolic waste products, regulate

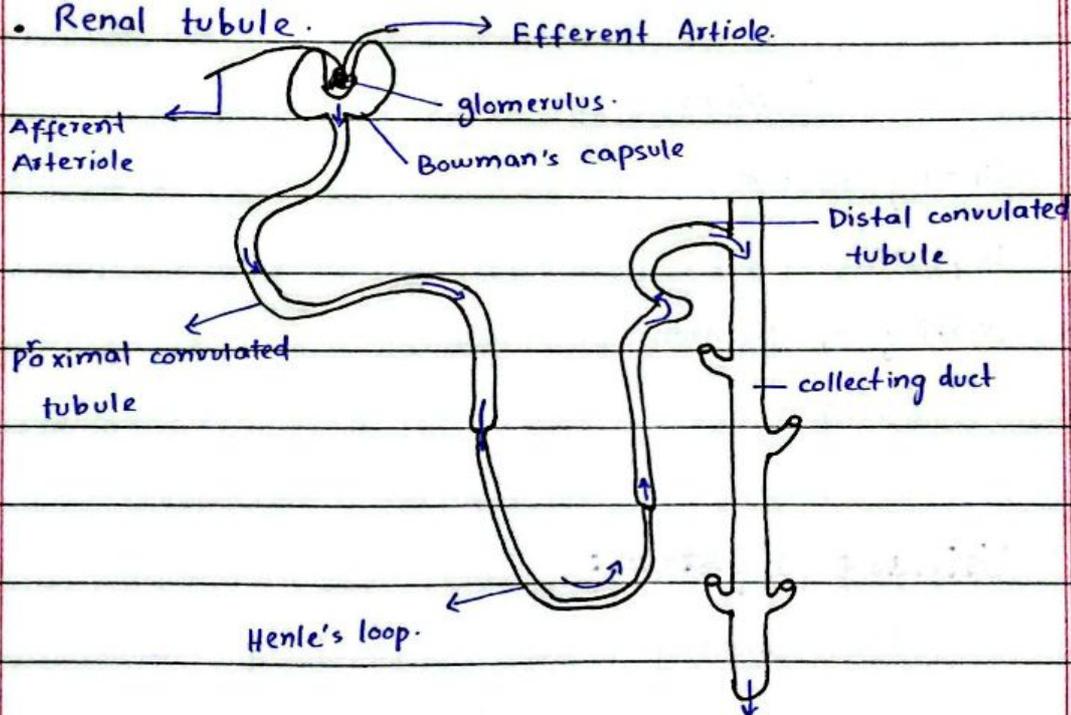
the balance of water and electrolytes, and maintains the acid-base balance of body.

Nephrons:

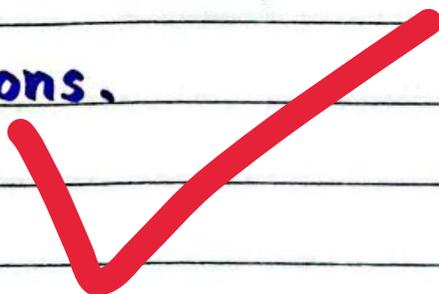
A nephron is the structural and functional unit of the kidney. Each kidney contains million of nephrons, and each nephron is responsible for filtering blood and forming urine.

A nephron consist of two main parts:

- Renal corpuscle
- Renal tubule.



Nephrons.



Working of Nephrons.

The working of Nephrons involves four main processes.

01. Glomerular Filtration:

Blood enters the glomerulus through the afferent arteriole. Due to high pressure, water, glucose, salt, urea, and other small molecules are filtered from the blood into Bowman's capsule. Blood cells and large protein are not filtered and remain in the blood.

02. Selective Reabsorption:

As the filtrate passes through the proximal convoluted tubule, useful substances such as glucose, amino acids, vitamins and most of the water are reabsorbed into the blood. This process ensures that essential substances are not lost in urine.

03. Tubular Secretion:

In the distal convoluted tubule, additional waste material such as hydrogen ions, potassium ions and certain drugs are actively secreted from the blood into the tubular fluid. This

helps maintain the chemical balance of the blood.

04. Concentration of urine:

In the loop of Henle and collecting ducts, water is reabsorbed according to the body's needs, resulting in concentrated urine. The final urine contains excess water, salts, and nitrogenous wastes such as urea.

Conclusion:

Through filtration, reabsorption, secretion and concentration, the nephron effectively removes waste products from the blood and maintains internal balance, producing urine that is excreted from the body through the urinary system.

(c)

Un-Balanced Diet.

Outline:

01. Introduction.
02. Effects on Healthy living
03. Conclusion.

Introduction:

An unbalanced diet is a diet that does not provide the body with the required nutrient in proper proportions. It may contain an excess or deficiency of one or more essential nutrients such as carbohydrates, proteins, fats, vitamins, minerals, water, or dietary fiber. Such diet fails to meet the nutritional needs necessary for normal growth, development and maintenance of health.

Effects of an unbalanced diet:

1) Malnutrition:

Deficiency or excess of nutrients can lead to malnutrition, causing weakness, fatigue, or obesity.

2) Weakened immune system

Lack of essential vitamins and minerals reduces the body's resistance to infections and diseases.

03) Deficiency Disease:

Insufficient intake of specific nutrients may cause diseases such as anemia, rickets, scurvy and night blindness.

04) Digestive Problems:

Lack of dietary fiber may cause constipation and other digestive disorders.

05) Mental and Emotional Effects:

Poor nutrition can affect brain function, leading to poor concentration, irritability, and reduced work performance.

Conclusion:

A balanced diet is essential for healthy living, as it provides all necessary nutrients in the right amounts. An unbalanced diet disrupts normal body functions and reduces overall quality of life.

(d) Structure and Function.

(i) Cell wall:

Structure:

- The cell wall is a rigid, non-living outer covering present in plant cells, fungi, and bacteria.
- In plant cell it is mainly composed of cellulose.
- It is freely permeable and provides definite shape to the cell.

Functions:

- Provides mechanical support and protection to the cell.
- Maintains the shape and rigidity of cell.
- Prevent the cell from bursting due to excess water intake.

(ii) Cell membrane:

Structure:

- The cell membrane is a thin, living, flexible membrane present in all cells.

- It is made up of a phospholipid bilayer with embedded proteins.
- It surrounds the cytoplasm and lies just inside the cell wall in plant cells.

Functions:

- Regulates the movement of substances into and out of the cell.
- Maintains the internal environment of cell.
- Provide protection and structural support.

(iii) Cytoplasm:

Structure:

- A semi-fluid, jelly-like substance present between cell membrane and the nucleus.
- It is composed mainly of water, proteins, enzymes, and salts.
- All cell organelles are suspended in the cytoplasm.

Function:

- Serves as a site of many metabolic and biochemical reactions.
- Supports and hold the cell organelles in position.

(iv) Mitochondria:

Structure:

- Mitochondria are double-membraned organelle found in eukaryotic cells.
- The outer membrane is smooth, while the inner membrane is folded into structures called cristae.
- The inner space is called matrix, which contains enzymes, DNA, and ribosomes.

Function:

- Known as the powerhouse of the cell.
- Responsible for cellular respiration.
- Produce energy in the form of ATP.

Question - 3 (a) Global Warming.

Introduction:

Global warming refers to the gradual increase in the average temperature of Earth's

atmosphere due to the excessive accumulation of greenhouse gases such as carbon dioxide, methane and nitrous oxide.

How Global warming can be reversed?

01. Reduction of greenhouse Gas Emission:

- Limiting the use of fossil fuels such as coal, oil and natural gas.
- Promoting cleaner industrial practices and reduces vehicular emissions.

02. Use of Renewable Energy sources:

- Shifting from fossil fuels to renewable energy such as solar, wind, hydroelectric and geothermal power.
- Encouraging energy-efficient technologies.

03. Afforestation and Reforestation:

- Planting more trees to absorb CO_2 from the atmosphere.
- Preventing deforestation and protecting existing forests.

04. Public Awareness and Global Cooperation:

- Educating people about climate change and its impacts.
- International agreements and cooperation among countries to reduce emissions globally.

Conclusion:

Global warming is a serious global issue that threatens life on earth. While complete reversal may not be immediately possible, adopting sustainable practices, reducing emissions, and protecting natural resources can significantly slow down and control its harmful effects.

(d)

Definitions and Examples.

(1) Food Additives:

Food Additives are substances intentionally added to food in small amounts to improve its taste, texture, flavor, color, or shelf life.

Example:-

- Artificial colours added to sweet and soft drinks.
- Flavor enhancers such as monosodium glutamate.

(ii) Food Preservatives:

— "Substances added to food to prevent spoilage by inhibiting the growth of microorganisms i.e fungi and bacteria"

Example:

- Salt used in pickle and meat preservation.
- Sugar used in jams and jellies.

(iii) Food Adulteration:

— "The deliberate addition of inferior, harmful or cheaper substances to food items or the removal of valuable nutrients, in order to increase profit."

Example:

- Mixing water in milk.
- Adding artificial colour to spices.

(iv) Food Contamination:

— "When food become unsafe for consumption due to the presence of harmful substances, microorganisms during production, handling, storage, or transportation."—

Example:

- Bacterial contamination in uncovered cooked food.
- Chemical contamination from pesticides on fruits and vegetables.

(b)

Ceramics.

Introduction:

Ceramics are inorganic, non-metallic materials made from natural raw materials such as clay, silica, alumina and other minerals.

The term ~~cerma~~ 'ceramic' comes from Greek word "keramas" meaning "pottery clays"

Properties of Ceramics:

Ceramics have a wide range of properties that make them suitable.

(i) Hardness:

- Ceramics are generally very hard and durable which make them ideal for tools, cutting instruments and construction material.

(ii) Brittleness:

- They are often brittle, meaning they can break or shatter under high stress or impact.

(iii) High Melting Point:

- They can withstand extremely high temperatures, making them suitable for engines and other high temperature environment.

Application of Ceramics:

1) Everyday Uses:

- Dinnerware such as plates, cups, bowls.
- Tiles and bricks in construction.

2) Medical Application:

- Dental implants and bone replacement.

- Surgical instrument.

(c)

Working of Optic Fibres and Mobile Phones.

Definition:

Fibre optics communication involves the use of light signals transmitted through fibre optic cables to transfer data over long fibres to carry data at high speed with minimal loss.

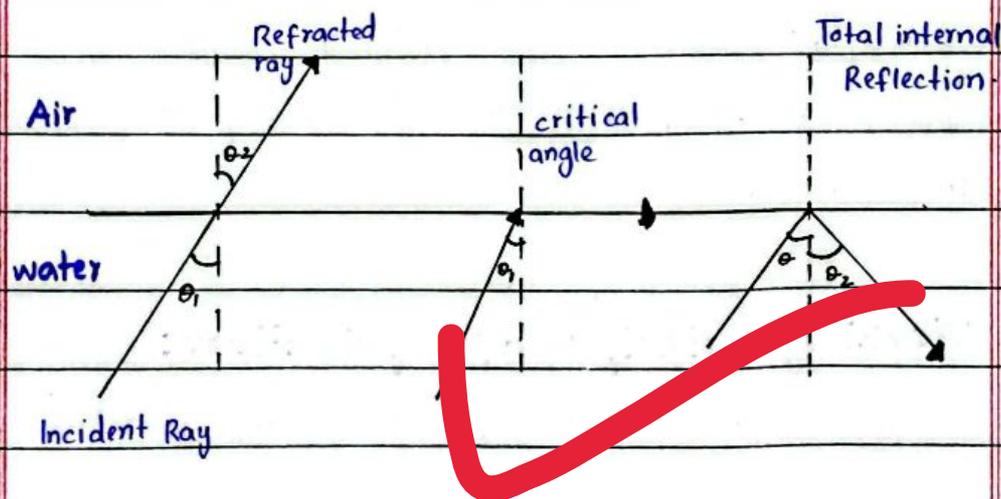
Working principle of Optic Fibre:

Fibre Optics works based on the principle of total internal reflection. This principle explains how light travels along the core of fibre without escaping, even when the fibre is bent.

Total internal Reflection:

When light travels from a denser medium to less dense, it bends or reflects. If the angle at which light hits the boundary

between the core and the cladding is larger than the critical angle, the light reflects back to the core rather than passing into the cladding. This is total internal reflection which allows the light to travel through fiber.



What is mobile phone?

Mobile phones allow users to make phone calls, send messages and use the internet without being physically connected by cables, using radio waves to transmit data between mobile devices and base stations.

Working Principle of Mobile Phone:

When you initiate a mobile call, your cell transmits to the closest base station. The base station then contacts the switching station, which figures out and keeps track of the cellular's number and the receiving number. The switching station will then transmit the call to the base station closest to the receiver. The base station then sends a signal to the receiver of the call. Cell phones use electromagnetic radiation in the microwave range.

Section B

Question-06 (a)

A pointing - - - - -
- - - - - to Ahsan?

Sol:

- Ahsan says → Her granddaughter is the only daughter of my brother.
- The only daughter of Ahsan's brother is Ahsan's niece.

• That niece is describe as the granddaughter of woman.

• Therefore, the woman must be the mother of Ahsan's brother's parents.

• Since Ahsan and his brother share same parent.

Answer:

• The woman is Ahsan's Mother.

(b)

The ratio between -----
----- area of park?

Sol:

Given:

Ratio of length to breadth = 3:2

Speed of cycling = 12 km/hr.

Time for one round = 8 min.

To find:

Area of park = ?

Solution:

Let: Convert speed into m/min:

$$12 \text{ km/hr} = \frac{12 \times 1000}{60} = 200 \text{ m/min.}$$

Day: _____

Date: _____

Distance covered in 8 minutes:

$$\begin{aligned}\text{Perimeter} &= 200 \times 8 \\ &= 1600\text{m.}\end{aligned}$$

Let:

$$\text{Length} = 3x$$

$$\text{Breadth} = 2x$$

Perimeter of rectangle:

$$2(L+B) = 1600$$

$$2(3x+2x) = 1600$$

$$2(5x) = 1600$$

$$10x = 1600$$

$$x = 160.$$

Find length and Breadth:

$$\begin{aligned}\text{Length} &= 3x = 3 \times 160 \\ &= 480\text{m.}\end{aligned}$$

$$\begin{aligned}\text{Breadth} &= 2x \\ &= 2 \times 160 \\ &= 320\text{m.}\end{aligned}$$

Find Area:

$$\begin{aligned}\text{Area} &= L \times B \\ &= 480 \times 320\end{aligned}$$

$$\text{Area} = 153,600 \text{m}^2$$

(c)

In a two - - - - -
- - - - - number is?

Sol:

Let the ten's digit = x Unit's digit = $x+2$

So,

The number = $10x + (x+2) = 11x + 2$.Sum of digits = $x + (x+2)$

$$= 2x + 2$$

The product of the number and sum of its
digits is 144:

$$(11x+2)(2x+2) = 144$$

Factor:

$$(11x+2) \cdot 2(x+1)$$

Divide both sides by 2

$$(11x+2)(x+1) = 72$$

$$11x^2 + 13x + 2 = 72$$

$$11x^2 + 13x - 70 = 0$$

$$(11x+35)(x-2) = 0$$

So

$$x = 2$$



Ten's digit = 2

Unit digit $2+2 = 4$

The required number is 24

(d)

The L.C.M - - - - -

- - - - - number is ?

Sol:

Let,

The numbers be: $2x$ and $3x$

$$\text{L.C.M } (2x, 3x) = 6x$$

$$6x = 48$$

$$x = 8$$

$$\text{First number} = 2x = 2 \times 8 = 16$$

$$\text{Second number} = 3x = 3 \times 8 = 24$$

Add the above numbers:

$$16 + 24 = 40$$

The sum of two number is 40.

Question : 07 (a)

if 40% of -----
----- second number?

Sol:

40% of 1st number = $\frac{2}{3}$ of 2nd number

Let,

1st number = x

2nd number = y .

$$\frac{40}{100} x = \frac{2}{3} y$$

Simplify:

$$\frac{2}{5} x = \frac{2}{3} y$$

$$\frac{1}{5} x = \frac{1}{3} y$$

$$3x = 5y$$

$$\frac{x}{y} = \frac{5}{3}$$

The ratio of the first number to the second number is 5:3.

(b)

On selling - - - - -

- - - - - ball is ?

Sol:

Given:

Selling price of 17 balls = Rs 720

Loss = Cost price of balls.

To find:

Cost price of one ball = ?

Evaluation:

Let, the cost price of one ball = x Cost price of 17 balls = $17x$ Loss = 5 balls = $5x$

By using loss formula:

Loss = Cost price - Selling price.

$$5x = 17x - 720$$

$$5x = 17x - 720$$

$$720 = 17x - 5x = 12x$$

$$x = \frac{720}{12} = 60$$

Cost price of one ball is Rs 60.

Day: _____

Date: _____

(C)

A man is - - - - - .

- - - - - son is ?

Sol:

Let the present age of son = x years.

Then,

Present age of man = $x + 24$ years

In 2 years:

Son's age = $x + 2$

Man's age = $x + 24 + 2 = x + 26$

man's age will be twice the son's age:

$$x + 26 = 2(x + 2)$$

By solving equation:

$$x + 26 = 2x + 4$$

$$26 - 4 = 2x - x$$

$$22 = x$$

The son is 22 years old.

Day: _____

Date: _____

(d)

Rashid -----

----- 110 pages?

Sol:-

Rashid:

$$\text{Pages typed} = 32$$

$$\text{Time taken} = 6 \text{ hr.}$$

$$\text{Rashid's rate} = \frac{32}{6} = \frac{16}{3} \text{ pages per hour.}$$

Kamran:

$$\text{Pages typed} = 40$$

$$\text{Time taken} = 5 \text{ hr.}$$

$$\text{Kamran's rate} = \frac{40}{5} = 8 \text{ pages per hour.}$$

$$\text{Combined rate} = \frac{16}{3} + 8 = \frac{16}{3} + \frac{24}{3} = \frac{40}{3} \text{ pages per hour.}$$

$$\text{Time} = \frac{\text{Total page}}{\text{combined rate}} = \frac{110}{\frac{40}{3}}$$

$$= \frac{110 \times 3}{40} = \frac{330}{40} = 8.25 \text{ hrs.}$$

They will take 8 hrs 15mins working together.