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.

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

General Science And Ability

PART - II

(SECTION - A)

Ques NO.2:

(a) Describe the structure of universe according to big Bang theory

The big bang theory suggest that the universe began approximately 13.8 billion years ago from an extremely hot and dense singularity.

- Expansion
  Space itself has been expanding ever since, causing all distances in the universe has been increasing all distances causing galaxies to move away from each other

- Composition:
  The universe consists of galaxies, stars, planets, and vast amounts of dark matter and dark energy

- Cosmic Microwave Background (CMB)
  This afterglow radiation provide a structural snapshot of the early universe

(b) Define urinary system and explain the working of nephron

The urinary system is the body's drainage system for removing urine, which is composed of wastes and extra fluid. It includes the kidneys, ureters, bladder and urethra.

Working of Nephron:

The Nephron is the functional unit of the kidney. It works through three processes.
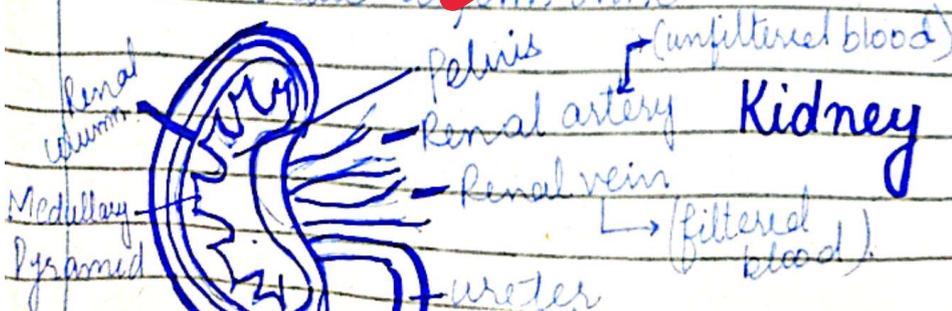
1 Filteration:
Blood enters the glomerulus where water and waste are filtered into Bowman's Capsule.

2 Reabsorption:
Useful substances (glucose, ions) are taken back into the blood.

3 Secretion:
Waste material are moved into the tubule to form urine

Renal
column

Medullary
Pyramid

Pelvis
Renal artery   (unfiltered blood)
Renal vein   **Kidney**
                (filtered blood)
ureter

(C) What is unbalanced diet? How it effects living healthy?

An unbalanced diet is a dietary pattern that fails to provide the body with nutrients (carbohydrates, proteins, fats vitamins and minerals) in the correct proportions required for optimal physiological functioning

Impacts on Healthy living:

An unbalanced diet acts as a primary catalyst for various physical and mental health complications

- **Metabolic disorders:**
  Excesive intake of sugar and fats leads to Obesity, which is a precursor to Type 2 Diebetes and Hypertension.

- **Cardiovascular Disease (CVDs)**
  High levels of saturated fats and sodium increase cholestrol levels leading to arterial blockages and heart failure.

- **Deficiency Diseases:**
  (i) Anemia: Caused by lack of iron
  (ii) Scurvy / Rickets: Caused by Vitamin C and vitamin D deficiencies respectively
  (iii) Goiter: Caused by iodine deficiency

- **Weakened Immunity :-**
A lack of essential vitamins and proteins impairs the body's ability to fight off infections, leading to frequent illness.

- **Stunted growth:**
In children unbalanced diet leads to permanent physical and cognitive stunting.

(d) Describe the structure and functions of cell wall, cell membrane, cytoplasm and mitochondria:

1 **Cell Wall :**
- **Structure:** A rigid, non-living outer layer found primarily in plant cells, fungi and bacteria. In plants, it is composed mainly of cellulose, hemicellulose, and pectin.

- **Function**
  (i) **Structural Support:**
  Provides a definite shape and mechanical strength to the cell

  (ii) **Protection:**
  Acts as a barrier against mechanical stress and physical damage.

  (iii) **Turgor Pressure:**
  Withstands the internal pressure of water, preventing the cell from bursting

2 Cell Membrane :

• Structure: A thin, flexible, semi-permeable lipid bilayer with embedded proteins (Fluid Mosaic Model)

• Functions:

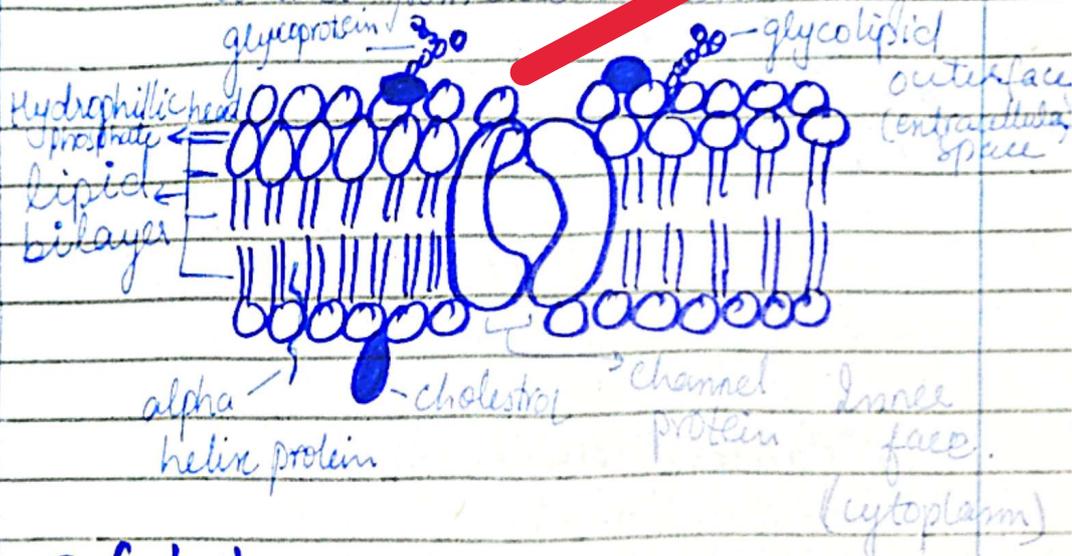**(i) Selective Permeability:**
Regulates the entry and exit of ions, nutrients and waste products.

(ii) Cell communication:
Contains receptors for chemical signaling and identification.

(iii) Compartmentalization:
keeps the internal cellular environment distinct from external surroundings

Diagram labels: glycoprotein, glycolipid, Hydrophillic head, phosphate, lipid bilayer, alpha helix protein, cholestrol, channel protein, outer face (extracellular space), Inner face (cytoplasm)

3 Cytoplasm

• Structure: A thick jelly like substance (cytosol) enclosed by the cell membrane, containing water, salts, and organic molecules

• Site • Functions

(1) Host many vital biochemical reactions such as glycolysis so its the site of metabolism.

2- Holds the organelles in place and facilitates the movement of materials through cytoplasmic streaming.

3- Acts as a reservoir for nutrients and molecular building blocks.

4 Mitochondria:

- **Structure:** A double-membraned organelle the outer membrane is smooth, while the inner membrane is folded into finger-like projections called cristae to increase surface area.

- **Functions**

(1) ATP production:
It is known as the "Powerhouse of the cell". It converts glucose into Adenosine Triphosphate (ATP) through aerobic respiration.

(2) Energy regulation:
Manages cellular metabolism by providing the necessary energy for physiological tasks.

(3) Calcium Homeostasis
Plays a role in maintaining the concentration of calcium ions with the cell.

Ques : # 4

(a) Explain the role of heart and blood vessels in circulation.

The circulatory system is a closed network responsible for the transport of nutrients, gases, and hormones.

- **The Heart as a Dual Pump:**
  The heart functions through two circuits, the Pulmonary Circuit, where the right ventricle pumps deoxygenated blood to the lungs, and the **systemic circuit**, where the left ventricle pumps oxygenated blood to the rest of the body.

- **Arteries:**
  These thick-walled muscular vessels carry blood under high pressure away from the heart. Except for the pulmonary artery, they carry oxygenated blood.

- **Veins:**
  These thinner-walled vessels carry blood back to the heart at lower pressure and contain valves to prevent back flow.

- **Capillaries:**
  These are microscopic vessels where the actual exchange of O_2, CO_2 and nutrients occurs between blood and tissues via diffusion.

(b) What is cyclone? Describe the formation of cyclone?

A cyclone is an atmospheric system characterized by the rapid inward circulation of air masses about a low-pressure centre.

• **Formation (Cyclogenesis)**

(1) **Thermal Trigger:**
It begins over warm tropical waters (>26.5°) where intense evaporation creates moist air

(2) **Low pressure Cell:**
As the warm air rises, it creates a "vaccum" or low-pressure zone at the surface.

(3) **Condensation:**
As the moist air rises, it cools and condenses into clouds, releasing "latent heat" which further fuels the rising air.

(4) **Coriolis Effect:**
The Earth's rotation causes the rushing winds to spiral-counter-clockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere.

(C) Enlist the functions of Nutrients:

• **Carbohydrates:**
Serve as the primary fuel for the brain and central nervous system; they are stored as glycogen in muscles for physical activity.

- **Proteins:**
  Acts as the building block for muscle, skin and enzymes, they are essential for cellular repair and immune response.

- **Fats:**
  Provide a concentrated source of energy, aid in the absorption of fat soluble vitamins (A, D, E, K) and protect vital organs.

- **Calcium:**
  Essential for the mineralization of bone and teeth, blood clotting and nerve signal transmission.

- **Iron:**
  A key component of hemoglobin, the protein in red blood cells that carries oxygen from the lungs to the body tissues.

(d) How remote sensing can be employed for environmental purposes?

Remote sensing involves gathering data about the Earth from a distance, typically via satellites or aircraft.

- **Deforestation Monitoring:**
  By comparing satellite imagery over time, authorities can track illegal logging and the rate of forest cover loss.

- **Climate Change Tracking:**
  Satellites measure the rate of polar ice-melt, rising sea levels, and surface temp-eratures.

- **Disaster Management:**
  It provides real-time data for mapping flood-affected areas, tracking forest fires, and predicting hurricane paths.

- **Pollution Control:**
  Sensors can detect oil spills in oceans and monitor the concentration of air pollutants like NO_2 or particulate matter in urban areas.

- **Agriculture:**
  It is used to assess crop health and manage water resources for irrigation.

PART - II

Section - B

Ques#6

(a) : Ahsan's brother's only daughter is Ahsan's <u>niece</u>.

If this niece is the granddaughter

of the woman, the woman is the mother of Ahsan and his brother

Answer: The woman is Ahsan's mother

(b)

Area of Rectangular Park:

Given Data:

- Speed = $12\,km/hr = \dfrac{\overset{200}{\cancel{12000}}\,m}{\cancel{60}\,min} = 200\,m/min$

- Distance = $200 \times 8 = 1600\,m$
  (Perimeter)

- Let length $L = 3x$ and breadth $B = 2x$

Solution:

$$2(3x + 2x) = 1600$$
$$10x = 1600$$
$$x = 160$$
$$L = 3(160) = 480$$
$$B = 2(160) = 320$$

$$Area = 480 \times 320 = 153600\ sq.\ m$$

(C):

let

   ten's digit = x
   unit digit = $x + 2$

$$10(x) + (x+2) = 11x + 2$$
sum of digits is

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

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

$$22x^2 + 22x + 4x + 4 = 144$$

$$22x^2 + 26x + 4 = 144$$

Subtract both equation sides from 144

$$22x^2 + 26x - 140 = 0$$

divide entire equation by 2

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

$$11x^2 + 35x - 22x - 70 = 0$$
$$x(11x + 35) - 2(11x + 35) = 0$$

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

$x - 2 = 0$	$11x + 35 = 0$
$x = 2$	$x = \dfrac{-35}{11}$

Ten's digit = $(x) = 2$
unit digit = $(x + 2) = 2 + 2 = 4$

$$2 + 4 = 6$$
$$2 \times 4 = 8$$

$$\boxed{6 \times 8 - 24 \text{ Ans}}$$

(d)

let the number be $2x$ and $3x$

LCM $(2x, 3x) = 6x$

$6x = 48$

$x = \dfrac{48}{6} = 8$

$2(8)$, $3(8)$

16 , 24

Numbers are $= 16, 24$

Sum $= 16 + 24 = 40$.

Ques : # 7

(a) $0.40\% \ x = \dfrac{2}{3}y$

$\dfrac{0.40\% \ x}{100} = \dfrac{2}{3}y$

$\dfrac{2\cancel{40}}{5\cancel{100}}x = \dfrac{2}{3}y$

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

$\dfrac{x}{y} = \dfrac{\cancel{2}}{3} \times \dfrac{5}{\cancel{2}}$

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

$x : y = 5 : 3$.

(C)

Let Son's age = S

Father's age = S + 24

In 2 years = (S+24)+2   2(S+2)

$$S + 26 = 2S + 4$$
$$S - 2S = 4 - 26$$
$$-S = -22$$
$$S = 22$$

Son's present Age is 22 yrs Ans

(b)

Loss = Total Cost Price CP - Total Selling price (SP)

Let cost price of 1 ball be x

cost price of 17 balls is 17x

cost price of 5 balls is 5x (which is loss)

Given selling price of 17 balls = Rs 720

Loss = CP of 17 balls - SP of 17 balls

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

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

The cost price of one ball =

(d)

Rashid's rate $= \dfrac{32}{6} = 5.33$ pgs/hr

Kamran's rate $= \dfrac{40}{5} = 8$ pgs/hr

combined rate $= 13.33$ pages/hr

Time for 110 pages $= 110/13.33$

8.25 hrs $= 8$ hrs 15 min

Add given asked solution formula and answer