

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.
- i) Source of Air Pollution
- 1 - Combustion of Fossil Fuels is the main source of air pollution. Fossil fuel combustion produces carbon dioxide (CO_2) when it is burnt this leads to air pollution.
 - 2 - Combustion of Plastics is another source of air pollution. This is because plastic combustion produces many harmful residues, which affect the air.
 - 3 - Industrial sources are another source. An industry releases harmful gases in the air which is another source of air pollution.
 - 4 - Vehicular pollution is another source which is deteriorating the air. For instance in Pakistan cities like Lahore, this is the main source of air pollution.
 - 5 - Agricultural waste burning is another source of air pollution. Like when farmers burn their crops, this leads to air pollution.
- ii) Effects of Air Pollution and their Impact on Human Health and Environment
- 1 - Deteriorate human health. Air pollution exacerbates air diseases.

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

like Asthma, allergies and lung diseases. This impact human life and health.

2- Leads to acid rain, as when air pollutants like CO_2 , SO_2 etc. when combine with water molecules in the air, this leads to acid rain. The acid rain destroy soil nutrient contents.

3- Air pollution lowers human life expectancy. As per, Air Quality Index, in Pakistan the life expectancy is lowered by 3-5 years of an average Pakistani.

4- Air pollution alters biodiversity. Like, acid rain leads to loss of nutrients, destroy plants and leads to loss of habitat.

5- Air pollution exacerbate climate change phenomena. The too-much concentration of air pollutants makes acid rain more frequent and make it a permanent feature of climate.

iii) Differences between Primary and Secondary air pollutants.

Primary	Secondary
① These pollutants are directly emitted in the atmosphere.	① They are formed via the interaction of primary air pollutant.

② For example,
Carbon monoxide
Nitrous oxide

③ They are the
main source

② Examples are
volatile organic
compounds

③ They are the
product of primary air
pollutants

Ways to reduce air pollution

a - Individual Actions

- By not burning agricultural wastes and plastic materials.
- By using eco-friendly hybrid cars.
- Adopting public transport for personal and public use.
- By using less fossil fuels and using electric vehicle cars.

b - Collective Actions

- Formulating and implementing electric vehicle policy for public use.
- Incentivising adoption of public transport by discouraging and penalizing personal car use.
- Strictly monitoring industrial waste disposal system.
- Adopting and encouraging adoption of clean and green technologies in private sector.

(A)

(i) Main Components of Cell and their function

A → cell wall

→ Present in Plants, fungi but absent in Animals.

→ Maintain cell structure and provide shape to cell.

B → cell membrane

→ Present in animal, plants, fungi etc.

→ Selectively permeable membrane, allow selective things to pass through.

C → Cytoplasm

→ Present in between cell membrane and nuclear membrane.

D → It contain all organelles, ~~and~~ store water ~~and~~ other resources, moreover, glycolysis and other reaction occur here.

E → Mitochondria

→ Also Known as "Power House of the cell"

→ Also Known as "Self-replicating organelle" As it has ribosomes & RNA

F → Ribosomes

→ Also Known as "Protein factory of the cell"

→ they are synthesized in nucleus later transported to cytoplasm

G → Endoplasmic Reticulum

→ It transport protein and process lipid

H → Coalgic Apparatus

This organelle ^{by adding} modify protein and carbohydrate

I → Lysosome

This organelle involve in digestion and waste removal

ii) Differences between Prokaryotic and Eukaryotic cell

Prokaryotic	Eukaryotic
Liter meaning	
Pro - before	Euk - true
Nucleus is absent	Nucleus is present
No membrane bound organelle	Membrane bound organelle present
cell division done by binary fission	cell divide by mitosis and meiosis

iii) cell Response to external stimuli to maintain homeostasis

To main homeostasis, cell responds in unique way. For instance, cell absorb and discharge water through active transportation. Like, when in hypotonic ~~temperature~~ environment cell

expell water outside. On the contrary, when placed in hypertonic environment they retain water.

→ Similarly, in response to hot temper they alter their enzymatic activity

(B)

i) Working of mobile phone and key technologies involved in communication

Mobile phone convert data into radio signals via cell towers and route them into network to the receiver phone, where data or signal convert into voice or text.

Technologies involved

- 1- Cellular Network
- 2- Radio frequency
- 3- SIM card
- 4- Mobile standard
- 5- Smartphone users

iii) Advantages of Mobile phone

I- Connectivity as mobile phones connect people to one another

even though they are in different places at different time zones.

ii - Help in Information

Mobile phones help to transfer information of all sorts to people instantly.

iii - Help in Emergency

Mobile phones are the most trusted friend, as they help and connect in times of emergency.

iv - Immense economic opportunities

Involve in e-commerce business & freelancing.

ii) Disadvantages

i - Heavy dependence & addiction

Mobile phones are highly addictive as users most of time use it in family time.

ii - Harmful radiation

Mobile phone produces harmful radiation, which impacts health.

iii - Social impact

High users of mobile phones are irritants and have low tolerance for others.

v) Ways Mobile phone changed our communication

i) Have gone small in size
Mobile phones physically have gone small in size. The advent of Apple company has made it more convenient and easy to use for communication purpose.

ii) Live video calls

The feature of live video calls has made the information and connectivity more personal and user-friendly.

iii) More personalized communication

New models and feature of mobile phones have made communication more personalized and better, hence providing more personalized benefits.

iv) Feature of E-banking and social media apps.

Many mobile phones provide e-banking services, which has revolutionized the financial sector. Moreover, availability of social media apps provide another entertainment avenues to users.

(C)

i) Different Layers of Earth

1 - Crust is the outermost layer made of solid rocks.

2 - Mantle is present beneath crust, semi-solid and have tectonic plates.

3 - Outer core generate earth's magnetic field.

h - Inner core is solid and very hot due to inner pressure

ii) How do they interact

In Mantle, tectonic plates are present whose ^{Convection} movements causes earthquake & volcanic eruption.

iii) Earth water cycle and Support of life on Earth

Water cycle involves movement of water from earth to atmosphere.

It involves

I - Evaporation: On the earth from sun water evaporate from plants, oceans, rivers etc.

II - Condensation: These heated vapours in atmosphere cool to form clouds.

III - Precipitation: occur in glaciers where rain and snow returns to earth.

iv) This cycle support life as it provide fresh water to all living beings. Moreover, maintain climate and temperature and maintain earth ecosystem. Similarly, it maintain carbon cycle crucial to organic living beings.

V) Impact of Human activities on Earth ecosystem and natural resources

a- exacerbate climate change

Human activities have exacerbated the phenomenon of climate change. As evident in ^{irregular} monsoon cycles.

b- loss of habitat

The phenomenon of industrialisation has led to massive deforestation which has led to loss of habitat.

c- Intense global warming

Human activities like urbanization has led to vehicular pollution emissions in an unprecedented scale. This has intensified global warming.

d- Massive glacier melting

Similarly glacier melting is leading to emergence of glacial lake outburst floods (GLOF), which is leading to floods and destruction of natural habitat.

Q. No 1

Q. Define.

Major sources of water pollution

I- Discharge of industrial waste is the main source of water pollution. As untreated wastes when

enter water bodies, this causes water pollution

II - Discharge of fertilizer waste is another source of water pollution. As fertilizer when enter bodies they pollute water

III - Eutrophication is another source whereby, when heavy metals enters water they lead to high absorption of nutrients and destroy the water body

IV - House hold are the most important water pollution source. As untreated waste from ^{houses} pollute water bodies

ii) - Effect of water pollution

i - Deteriorate human health as water pollution lead to water borne diseases high prevalence. Cholera is an example

ii - Destroy marine life is another effect of water pollution. As untreated waste, when enter aquatic life destroy marine life

iii - Disturb ecosystem and habitat is, yet, another effect of water pollution. As water pollution disturb nitrogen and carbon cycle

iv - Disturb tourism economy, as people don't visit places where pollution is high leading to livelihood loss

iii - Ways to Prevent and control water pollution

- a - More regulation and compliance to ensure biodegradable or non biodegradable waste does not enter water bodies by industries
- b - Ensuring awareness among households not to release garbage in water bodies
- c - Using organic agricultural waste instead of chemical fertilizers, so that water bodies can be allayed from harmful effect
- d - Avoid garbage dumping, oil spill to ensure that marine life remain protected

(C)

I) Balanced Diet

Def. Balanced diet is a diet which contains all the right amount of nutrients needed in the body, so that the body can function properly

II) why it is essential?

Balanced diet is an essential component of the human body. This is because, it maintain and help in functioning. For instance,

Protein, carbohydrate, lipids and vitamin right quantity ensures that the body function properly. As deficiency leads to weakness, organ failure and in extreme case death.

(1) Importance of Macro and Micro nutrients in a balanced diet

Macronutrients

Macronutrients are the nutrients, which are required in ^{large} quantities. They are essential nutrients as body can not work without them.

I - Carbohydrate are main source of energy and make bulk of diet. Available in wheat, fruits etc.

II - Protein: build and prepare body tissues and also help in immune system. They are found in protein, lentil and bean etc.

III - Fats: are another source of energy and store vitamin.

IV - Water is the most important source and make up 50% of body. It regulate temperature and transport nutrients.

Micro nutrients

are nutrients which are required in small quantity but their

deficiency leads to serious diseases

I - Vitamins = Vitamins provide immunity, help in vision and maintain health. It has 2 types fat soluble vitamins soluble in fat. This include A, D, E, K vitamins and water soluble vitamins that are soluble in vitamins (C, B, E, K)

II - Minerals = are another micro nutrients, which maintain blood pressures, strong bones, enzymes functions. Example are sodium, zinc, and calcium etc.

iv) How balanced diet prevent chronic diseases

- a) Prevent obesity, a balanced diet ensure individuals remain fit and healthy and prevent obesity.
- b) Prevent cardiovascular diseases is yet another feature of balanced diet. As diet balance prevent heart failure chances.
- c) Reduce cancer is another distinctive feature as diet which is balance reduce cancer chances.
- d) Strengthen immunity is another benefit. Like, when body has all nutrients it remain fit and immune.

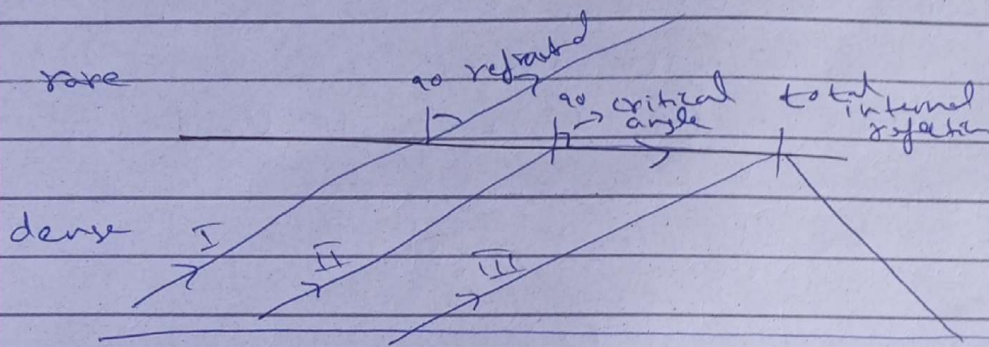
(A)

Fiber optics

Fiber optics are thin glass structure that transmit light signal through reflection at an unprecedented short time scale.

Working

The whole phenomenon work through the process of "Total Internal Reflection". As shown in the figure below



As when light ray move from denser to rare medium it get refracted in the first. Then it get equal to 90° angle also known as critical angle. In the third ray it bounces back in the medium via total internal reflection phenomena.

Advantages over traditional copper wire :

- I - It is cheap and highly efficient over copper wire
- II - More Faster than copper wire

III - Carries high band width and more signal than copper.

IV - work on long distances and losses less signal.

V - Easier to install and maintain.

How fiber optics enable high speed data transmission.

In fiber optics data is transmitted via light signal via using wavelength division. This is extremely fast and lead to minimal loss and video calling better, efficient, and cheaper.

(B)

Causes of Earthquake

The earth is made of various plates and when these plates collide, slide past this leads to seismic waves which is known as earthquake. Similarly, magma movement beneath volcano also lead to earthquakes.

Effect of earthquakes.

- (1) lead to loss of life
- (2) destroy infrastructure, building and facilities.
- (3) lead to heavy economic losses.

- ④ halt life fully as work stop across all domain.
- ⑤ Destroy habitat, culture and cities. For example Quetta 1935 quake destroyed whole Quetta city.

Types ① Body wave

P waves	S-waves
① fastest seismic wave	① slower arrive after P-waves
② follow longitudinal waves	② follow transverse waves.

2) Surface wave

Love waves	Rayleigh
→ cause horizontal shaking of ground	→ cause rolling motion
→ less deadly	→ more deadly

Measurement

- ① Seismeter measure ground vibration
- ② Richter Scale measure earth quake magnitude

Earth Quake resistant infra.

- ① By building shock absorbers and flexible building earth quake can be ameliorated.
- ② Enforcing strict building code

Ways to ensure preparedness

- ① Establishing emergency response system in building
- ② Ensuring Drill moments so it can be avoided of maximum losses.
- ③ Building in early warning system technology.
- ④ Building safe evacuation systems in building.

⑩

Section II

Q. No. 3

(B)

(i) 53, 53, 40, 40, 23, 27, 14, 14.

(ii) 14, 28, 20, 40, 32, 64, 28

(iii) 8, 6, 9, 23, 87, 429

(iv) B, F, R, R

(v) u, u, w, v, x, w, y

(C)

Given : $20\% \text{ of } a = b$.

$$\frac{20}{100} \times a = b$$

$$\boxed{\frac{a}{5} = b}$$

Desired

val. of 20

$$= \frac{b}{100} \times 20$$

$$= \frac{b}{5}$$

Now replace b with $\frac{a}{5}$

$$\frac{b}{5} = \frac{b}{5}$$

$$\frac{b}{5} = \frac{a/5}{5}$$

$$\text{b.t. of } 20 = \frac{a}{25}$$

