

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

Part II

Section-I

Q. No. 3

Mitochondria:

Mitochondria is a double membraned, self-replicating organelle found in all eukaryotic cells.

It is the powerhouse of the cell.

It is the site of cellular respiration.

It is the site of energy production.

It is the site of fatty acid oxidation.

It is the site of heme synthesis.

It is the site of steroid synthesis.

It is the site of drug metabolism.

It is the site of protein synthesis.

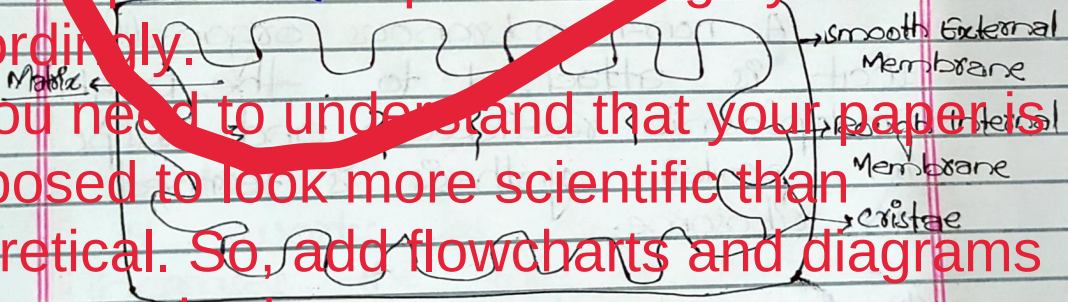
It is the site of DNA replication.

It is the site of RNA transcription.

It is the site of ribosome assembly.

It is the site of protein import.

It is the site of protein export.



are present in the matrix.

Function of Mitochondria: The Powerhouse of the cell:

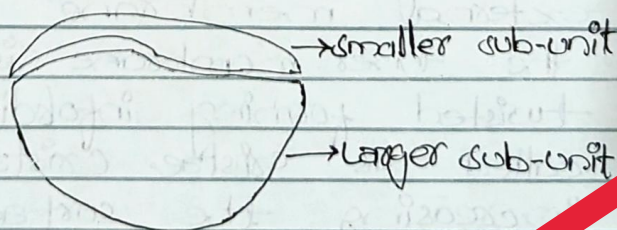
Mitochondria is often called as the powerhouse of the cell because it produces ATP to meet the energy needs of the cell, through respiration.

The production of ATP by the mitochondria makes it the powerhouse of the cell.

Ribosome:

A non-membranous organelle that is attached to the rough Endoplasmic reticulum and helps in protein synthesis is termed as ribosome.

Structure:



Ribosome has two subunits. The larger one is embedded in the

Rough Endoplasmic Reticulum (RER) and the smaller one is present over it.

Function of Ribosome:

Ribosomes help and produce proteins for the cell. It remains attached to the RER elongated from the nuclear membrane and helps in protein synthesis.

b.

Enzymes:

Enzymes are the biochemicals that increase the rate of a chemical reaction without being consumed or taking part in the reaction.

It works as a catalyst and increases the rate of reaction.

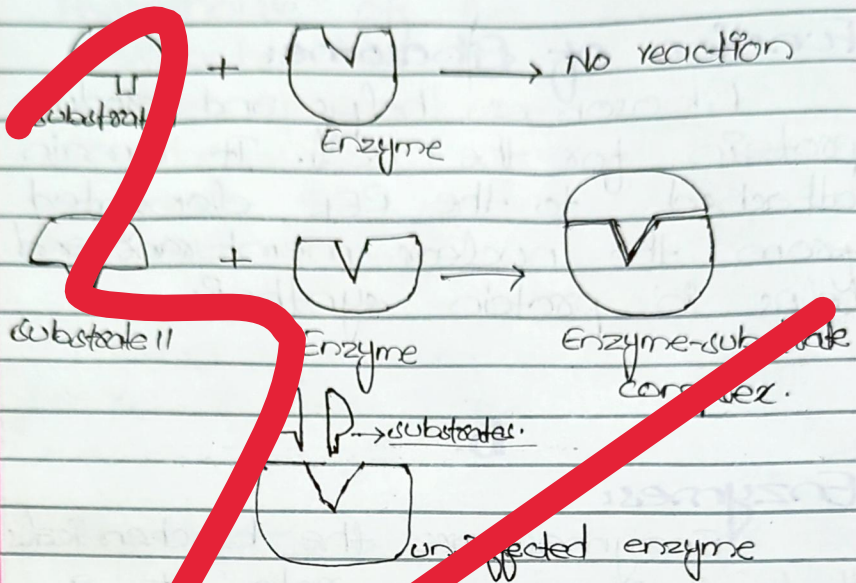
Lock-And Key Model:

Ernst Fischer presented the lock and key model in 1870 for the functioning of the enzyme.

According to this model the active site of enzyme is rigid and is fixed.

The enzymes will work on only

those substrates which can be easily fixed in the active site.

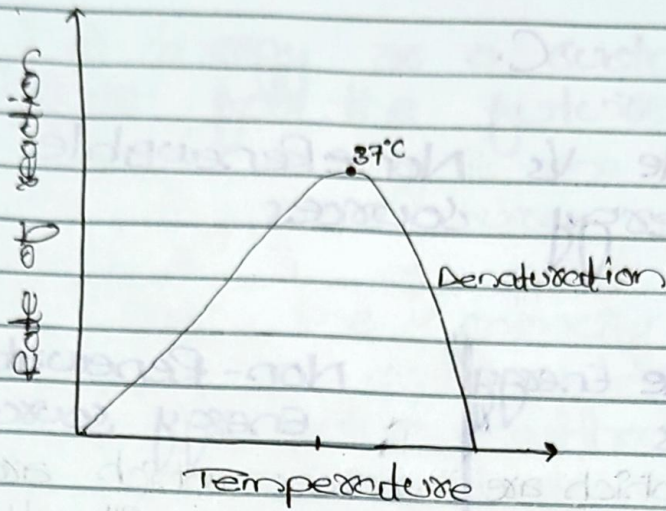


Factors affecting the Enzyme Activity:

1. Temperature.
2. pH.

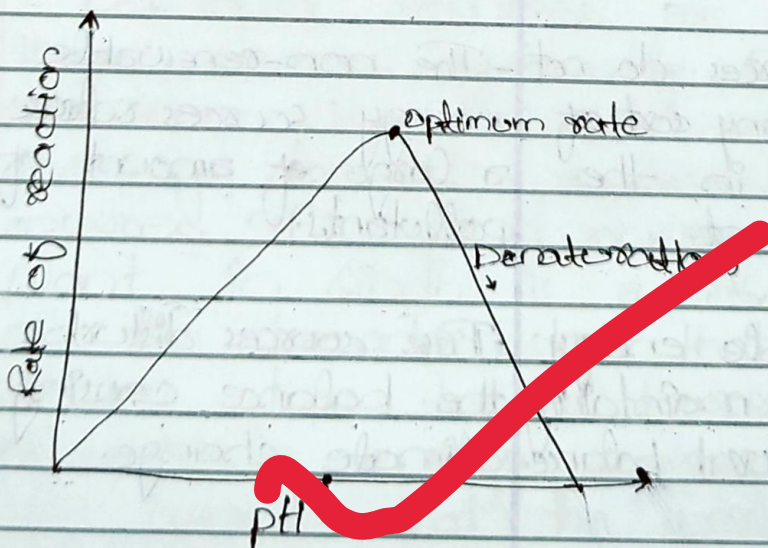
Temperature:

The rate of enzyme activity increases with the increase in temperature but upto a limit i.e. $37^\circ C$. Any further increase in the temperature will result in the denaturation of the enzyme and depletion of its activity.



pH:

The rate of enzyme activity increases with the increase in pH. The rate of reaction becomes maximum at pH 7. Any further increase in the pH will result in the denaturation of the enzyme.



C.

Renewable Vs Non-Renewable Energy Sources

Renewable Energy Sources

- Sources which are not consumed with the energy production are renewable.
- These energy sources are environment friendly as they do not impose any adverse impact on the environment.
- These sources do not release any sort of pollutant in the environment.
- Renewable energy helps in maintaining the natural balance causing climate change.
- eg. Hydel, wind, solar, Geothermal etc.

Non-Renewable Energy Sources

- Sources which are consumed with the energy production are non-renewable.
- These energy sources are not environment friendly as they impose serious adverse impacts on the environment.
- The non-renewable energy sources release a large amount of pollutants.
- These sources disturb the balance causing climate change.
- eg. Hydrocarbons, coal, etc.

Wind Energy as a sustainable source for the future

Wind energy is one of the most important sources of renewable energy. It is of great importance and has the capacity to be used as a sustainable source for the future without imposing any serious or adverse impact on the environment.

As it is evident from its nature that it produces energy from the natural wind without releasing any sort of pollutant in the environment. Thus the world can use energy sources like wind to meet the energy needs without releasing any kind of pollutant in the environment.

Developed countries are using these sources efficiently. Developing countries like Pakistan are also moving towards renewable energy sources. The wind energy power plant in Sindh is a example of the broader step that the country has taken towards using renewable energy sources. It can be hoped that the world will be greener and healthier with the use of renewable energy.

d.

Dengue Fever:

A viral fever that is caused by the flavivirus which is transferred through the mosquito bite is termed as dengue fever.

vector Responsible for Transmission:

It is a mosquito-borne disease which is mainly caused by the Aedes mosquito.

There are two kinds of Aedes mosquito. One is the primary vector and the other is the secondary vector.

Common symptoms of Dengue:

- High Temperature (104°F)
- Pain in body.
- Fall of WBCs.
- Difficulty in Breathing.
- Fatigue.
- Cough.
- Headache
- Restlessness
- Abdominal pain
- Vomiting.
- Pain in eyes
- Insomnia
- Bleeding gums

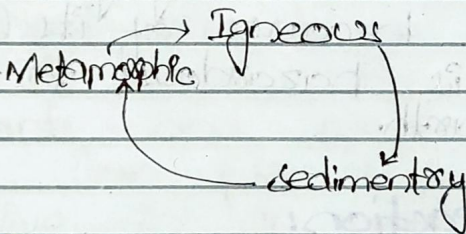
Preventive measures:

- Use of mosquito repellents.
- Use of nets.
- Avoid travelling.
- Ensuring neat and clean environment
- Avoiding water logging.

Q NO. 4

a. Rock Cycle:

Rock cycle means the conversion of one kind of rock into the other form of rock with the passage of time.



Kind of rocks:

There are three kinds of rocks.

- i. Igneous
- ii. Sedimentary
- iii. Metamorphic

a. Igneous Rocks:

Igneous rocks are the burning rocks present in volcanoes or in the deep earth.

b. Metamorphic Rocks

The rocks which have different forms and shapes.

c. Sedimentary Rocks:

These rocks are seen sedimented form and present in the earth's mantle.

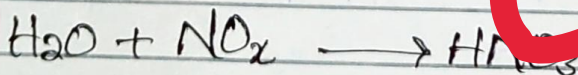
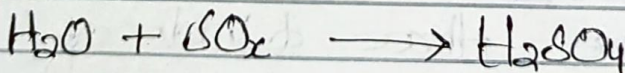
b.

Acid Rain:

Rain having pH below 7 is acid rain.

Acid rains are highly acidic in nature because of its low pH and is hazardous to the life on earth.

Chemical reactions:



When the pollutants like sulfur oxide and nitrous oxides react with the rain water

It forms sulphuric acid and the nitric acid, which reduces the pH of rain and makes the rain acidic.

Harmful Impacts of Acid Rain:

Acid rain is hazardous to both biotic and abiotic factors on earth.

Harmful Impacts on Aquatic life:

The acid rain when reach the lakes and ponds, because of its low pH, it reduces the pH of pond water. And make the water acidic.

An acidic environment is unfavourable to the aquatic life.

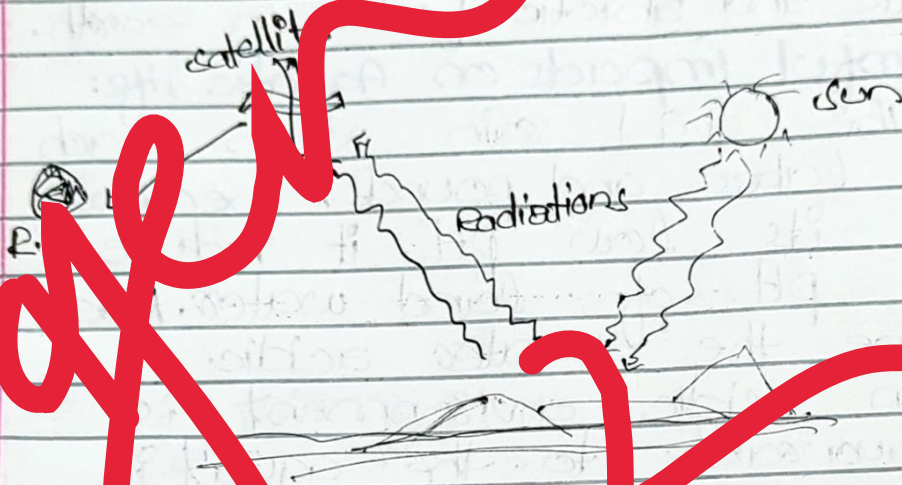
Harmful impacts on vegetation:

The acid rains destroys the plants and crops because of its low pH. Plants cannot survive in an acidic environment.

In short, Acid rain is hazardous to the life of earth. It can be helped by controlling the emission of pollutants.

Remote Sensing:

Remote sensing is the system used to examine certain parts by using the reflected radiation of sun from that particular place.



The radiations of sun hit the place after passing through the environment. The reflected radiations from the place are recorded by the satellite and send to the record section. When the results are observed and recorded by an operator.

The technique of record ending is used to assess the place and for disaster management.

Geographic Information System (GIS)

GIS is the most advanced technique using technology to monitor the environment and to manage the disasters.

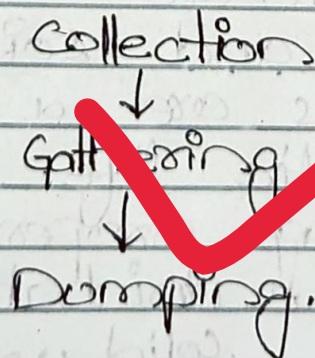
It is composed of,

1. Input system
2. Output system
3. Operator.

The operator ~~absorb~~ inputs the details and observe and record the details of the place.

d. Solid Waste Management:

The technique used to manage the solid wastes generated in the society are termed as solid waste management. It is occurred in three steps,



There are various methods of solid waste management.

1. Open Dumping
2. Incineration
3. Burying
4. Composting

Environmental hazards associated with improper disposal of urban waste:

1. Various health issues like dengue, malaria, hepatitis.
 2. Loss of aesthetics an issue to tourism.
 3. The non-degradable solid wastes remain on the surface and spoil the environment.
 4. The degradation of degradable solid wastes release a large amount of gases in the environment which cause pollution.
 5. The solid wastes cause air, water, and soil pollution.
 6. Solid wastes are a threat to the aquatic life.
- If not managed properly, the world will be uninhabitable because of the solid wastes.

Q.No. 7

a.

Given Data:

Total Number of People = $T = 100$

People watching Cricket = $C = 65$

People watching Hockey = $H = 40$

People watching neither = $N = 20$

People watching both = $x = ?$

Solution:

Using the set formula

$$x = C \cap H = ?$$

According to the Given situation

$$|C \cup H| = |C| + |H| - |C \cap H|$$

Putting values

$$80 = 65 + 40 - C \cap H$$

($C \cup H = 80$ because 80 people are watching, as 20 are not)

$$80 = 105 - C \cap H$$

$$C \cap H = 105 - 80$$

$$C \cap H = 25$$

25 People watched Both Hockey and Cricket.

b.

Given Data:

$$\text{Length} = l = 4 + w$$

$$\text{Perimeter} = P = 2l + 2w = 72 \text{ m}$$

$$\text{height/depth} = 2.5 \text{ m}$$

$$\text{Volume of water needed} = V = ?$$

Solution:

According to the given condition

$$P = 2(l + w) = 72$$

$$l + w = \frac{72}{2}$$

$$l + w = 36 \quad \text{--- (i)}$$

$$\text{As, } l = 4 + w$$

$$(i) \Rightarrow 4 + w + w = 36$$

$$2w = 36 - 4$$

$$w = \frac{32}{2}$$

$$\boxed{w = 16 \text{ m}}$$

As length is 4 meters more than its width. So,

$$l = 4 + 16$$

$$\boxed{l = 20 \text{ m}}$$

As we know that,

$$V = l \times w \times h$$

$$V = 20 \times 16 \times 2.5$$

$$\boxed{V = 800 \text{ m}^3}$$

A volume of 800 m^3 is needed to fill the depth of 2.5 m .

C.

Given Data:

Train leaves A at 8:00 AM

speed when leaves = $V_1 = 60 \text{ km/hr}$

Train leaving City 'B' at 8:00 AM

speed of train when leaves = 40 km/hr

the distance b/w city A and B = $d = 400 \text{ km}$

At what time will the two train meet = ?

Solution:

As the two trains are moving towards each other

So,

$$\text{Speed} = V = V_1 + V_2$$

$$V = 60 + 40$$

$$V = 100 \text{ km/hr}$$

As we know that.

$$\text{Distance} = \text{speed} \times \text{time}$$

$$t = \frac{d}{V}$$

$$t = \frac{400}{100} = 4 \text{ hr}$$

Adding 4 hours on 8 am will give 12:00 pm.

The two trains will meet at 12 pm.

d.

Given Data:

Sum of present ages = 75

Ten years ago = Father's age was four times the son's

what are their ages = ?

Solution:

Let the age of father be 'x' and that of son be 'y'

According to the given situation,

$$x + y = 75 \quad \text{--- (i)}$$

And,

$$x - 10 = 4(y - 10)$$

~~$$x - 10 = 4y - 40$$~~

$$x - 4y = -40 + 10$$

$$x - 4y = -30 \quad \text{--- (ii)}$$

Subtract (ii) from (i)

$$x + y = 75$$

$$-x - 4y = -30$$

$$5y = 105$$

$$\boxed{y = 21 \text{ years}} \quad \text{--- (iii)}$$

Put (iii) in (i)

$$x + 21 = 75$$

$$x = 75 - 21$$

$$\boxed{x = 54 \text{ years}}$$

The present Age of Father is 54 years and that of son is 21 years.

Q.No. 8

a.

Coding-Decoding
Given:

ROAD $\rightarrow$ UODG

To Find:

LAKE = ?

LAKE will be coded to OCNH

According to the given coding,

- R has moved three step forward to U.
- O has moved two step forward to Q.
- A has moved three step forward to D.
- D has moved three step forward to H.

In the same manner for LAKE,

- L will move three step forward to O.
- A will move two step forward to C.
- K will move three step forward to N.
- E will move three step forward to H.

Thus, LAKE will be coded to OCNH.

b.

Given:

Man tells woman that the son of his sister is father of the woman's son.

How they are related?

Solution:

As the man said that the son of his sister's husband is the father of the woman's son.

-It means that the first son mentioned is his sister's. Meaning thereby, he is the nephew of the man.

-Secondly, the nephew is the father of the son of the woman. Thus the woman is his Nephew's wife.

Hence, the woman is the wife of the Man's nephew.

The woman is the wife of the man's Nephew.

c.

(i)

4, 12, 8, 18, 9, 27, 135.

There is a pattern that each number is multiplied by '3' and the answer is divided by '2' to get the next two numbers in the series. As the product of 9 and 3 is 27. Thus when 27 is divided by 2, the next number in the series will be 13.5.

Hence, the next in series will be 13.5.

(ii)

1, 2, 6, 24, 120, 720.

According to the given pattern, the first number is multiplied by '2' and the second is multiplied by '3' and the product of second series is the third number. The third number is multiplied by '4' and the fourth number is multiplied by '5'. Thus the next number will be multiplied by '6'. And the product of 120 and 6 is 720. Thus the next in series will be 720.

d.

Given Data:

- P is shorter than Q
- P is taller than R.
- S is shorter than T
- S is taller than Q.

- Shortest person = 150 cm
- Tallest person = 180 cm.

Solution:

According to the given situation,
The sequence can be written as
 $R < P < Q < S < T$

Hence, the third tallest person is
Q.

As, we know that,

$$\text{Range} = \text{Maximum value} - \text{Minimum value}$$

$$\text{Range} = 180 - 150$$

$$\text{Range} = 30 \text{ cm}$$

Thus range is 30 cm.