

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

Date:

OB 74

Hi there — you're 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:

Remember these maths terms:
i- STATISTICS ii- GAMBLER

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 off 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.

a. A bicycle covers 26km at 18km/hr starting at 1pm. What time does it reach?

Bicycle distance (d) = 26km.
Speed (s) = 18 Km/hr

Formula:
 $d = st$

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

$$t = \frac{26}{18} = 1 \frac{2}{3} \text{ hr}$$

$$t = 2 \text{ hr}$$

b. A camera priced at 200 \$ get 25% off plus 6% tax

Calculate the total amount paid.

Original Price = 200 \$

$$\text{Discount} = 25\%$$

$$\text{Tax} = 6\%$$

$$\text{Total amount paid} = ?$$

$$\begin{aligned} \text{off price} &= 200 \times \frac{75}{100} \\ &= 200 \times \frac{25}{100} \end{aligned}$$

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$$= 2 \times 25$$

$$\boxed{\text{off price} = 150}$$

Amount after 6% tax on off price = off price +
off price \times 6% tax.

$$= 150 + \left(150 \times \frac{6}{100} \right)$$

$$= 150 + 9$$

$$\boxed{\text{Total amount paid} = 159}$$

Q7. Calculate volume of a sphere with diameter 14cm (use $\pi = \frac{22}{7}$).

Diameter of a sphere = 14cm
Volume of a sphere = ?

Formula;

$$\text{Volume of sphere} = \frac{4}{3} \pi r^3$$

$$r = ?$$

$$d = 2r$$

$$r = \frac{d}{2}$$

$$r = \frac{14}{2} = 7$$

$$\boxed{r = 7}$$

$$\text{Volume of sphere} = \frac{4}{3} \times \frac{22}{7} \times (7)^3$$

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$$\text{Volume of sphere} = \frac{4}{3} \times \frac{22}{7} \times 7 \times 7 \times 7$$

$$= \frac{4}{3} \times 22 \times 49$$

$$1437.33$$

$$4312$$

$$3$$

$$\text{Volume of sphere} = 1437.33$$

c- Spot the error / complete the series

i- 2, 6, 18, 54, 162, 486 (which does not fit?)

$$2, 6, 18, 54, 162, 486$$

$\times 3 \quad \times 3 \quad \times 3 \quad \times 3 \quad \times 3$

Every series numbers are going right.

ii- 3, 5, 7, 11, 13, 15

$$3, 5, 7, 11, 13, 15$$

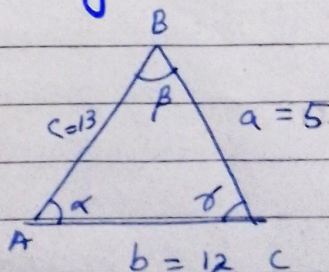
$+2 \quad +2 \quad +4 \quad +2 \quad +2$

d- A triangle with sides 5cm, 12cm, 13cm. Find all three angles?

$$a = 5\text{cm}, \alpha = ?$$

$$b = 12\text{cm}, \beta = ?$$

$$c = 13\text{cm}, \gamma = ?$$



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$$a^2 = b^2 + c^2 - 2bc \cos \alpha$$

$$b^2 = a^2 + c^2 - 2ac \cos \beta$$

$$c^2 = a^2 + b^2 - 2ab \cos \gamma$$

$$(i) \quad a^2 = b^2 + c^2 - 2bc \cos \alpha$$

$$2bc \cos \alpha = b^2 + c^2 - a^2$$

$$\cos \alpha = \frac{b^2 + c^2 - a^2}{2bc}$$

$$\alpha = \cos^{-1} \left(\frac{b^2 + c^2 - a^2}{2bc} \right)$$

$$= \cos^{-1} \left(\frac{(12)^2 + (13)^2 - (5)^2}{2bc} \right)$$

$$= \cos^{-1} \left(\frac{144 + 169 - 25}{2bc} \right)$$

$$= \cos^{-1} \left(\frac{343 - 25}{2bc} \right)$$

$$= \cos^{-1} \frac{318}{2(12)(13)}$$

$$= \cos^{-1} \frac{318}{312} = \cos^{-1} \frac{106}{104} = \cos^{-1} \frac{53}{52}$$

$$\alpha = \cos^{-1} 1.01$$

b. 5 Friends have total saving 25000 Rs
ratio 1:2:3:4:5. Find the
Smallest share.

$$\text{Total amount} = 25000 \text{ Rs}$$

$$\text{Ratio} = 1:2:3:4:5$$

$$\text{Total friends} = 5$$

$$\text{Share smallest} = ?$$

$$\text{total ratio} = 1+2+3+4+5 = 15$$

$$\text{Per share} = \frac{25000}{15} = 1666.66\ldots$$

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(One) per share = 1666.7

$$\begin{aligned} 1 \text{ Friend} &= 1 \times 1666.7 \\ &= 1666.7 \text{ rs.} \end{aligned}$$

$$2 \text{ Friend} = 2 \times 1666.7$$

$$3 \text{ Friend} = 3 \times 1666.7$$

$$4 \text{ Friend} = 4 \times 1666.7$$

$$5 \text{ Friend} = 5 \times 1666.7$$

Smallest share is 1666.7 of friend having ratio 1.

Section I

Q2.
b. Universe is expanding, how it resembles with balloon blowing in working?

Universe : A universe

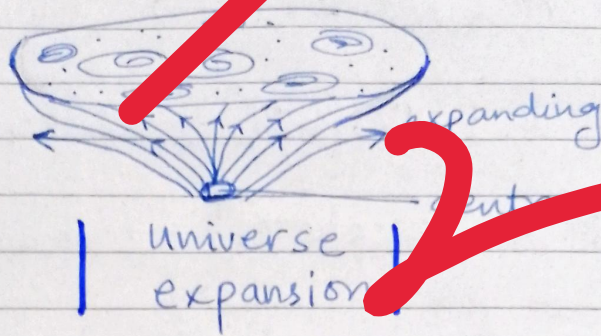
" A universe is a body in which all the matter, gas, energy, Planets, solar systems, galaxies and stellar remnants are present. "

Universe is expanding:

Universe is expanding and we can predict it through the wavelengths of the light, if its longer wavelength means red shift the universe is expanding and if its shorter in length than blue shift its contracting.

Resemblance with balloon blowing in working:

Yes, the universe expansion resembles with balloon blowing at one point you blow it the balloon expands and move away from the centre of blowing point or increasing in size and length but once you stop blowing it will contract or starts decreasing in size, coming closer to the centre.

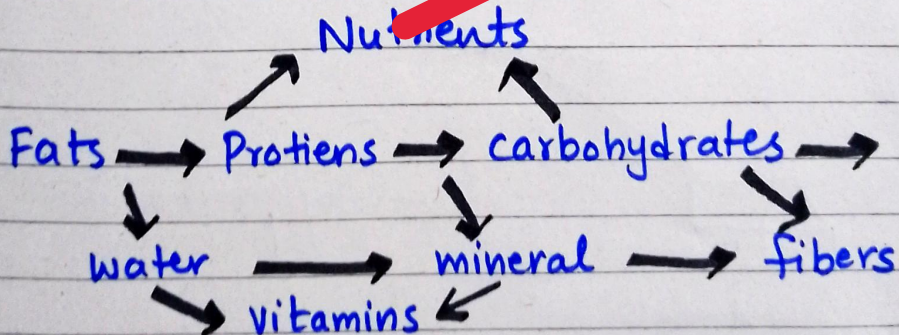


c. What do you know about balance diet? Deficiency of vitamin A, D and E can result in what type of imbalances in human body?

Balance diet:

"Let thy food be thy medicine"

"There are seven groups of nutrient in which we have proteins, lipids, carbohydrates, fats, water, minerals, vitamins and fibers. If there is a balance amount of these nutrient in our body then it is called a balance diet."



Vitamin A, D and E deficiency can result:

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Vitamin A (~~Retinol~~) → ~~Blindness~~ ^{Deficiency}

Vitamin D (Calciferol) → Osteoporosis & Rickets

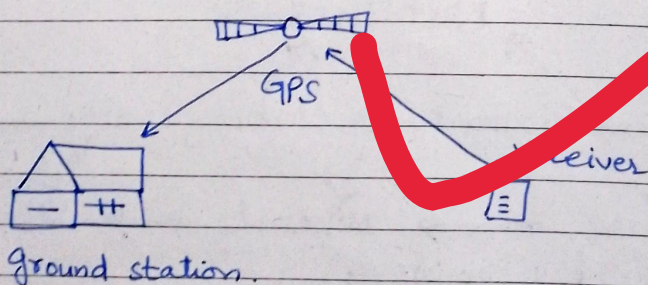
Vitamin E (Tocopherol) → Anaemia

- d. Discuss working of GPS. What is fiber optics? How 2D and 3D locations are measured by satellites?

Working of GPS:

The GPS stands for "Global Positioning System." It is a system of a satellite introduced by the United America.

It works on the Principle of triangulation. In this system we have a receiver, satellites and a ground station. We use this for the location purpose, time, distance.



How 2D and 3D locations are measured:

2D locations:

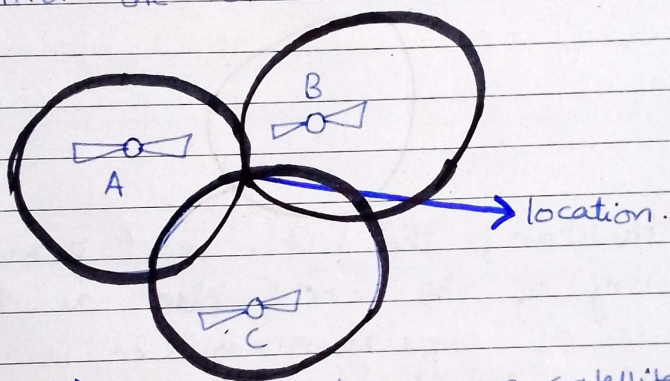
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"The 2D locations are measured by the help of maps in which we are not using the technology of the satellites."

3D locations:

"The 3D locations are measured through the satellites in which the principle of triangulation works to find the exact location."



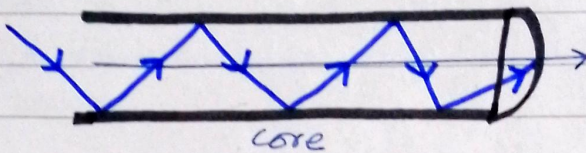
| 3D location by use of satellites |

Fiber Optics:

"When a digital data transfer from one point to the other point in the form of light is called fiber optics"

Principle: It works on the principle of total internal reflection. When the incident light is greater than the critical angle that is called total internal reflection.

$$\theta_i > \theta_c$$



Fiber optics

Uses:

It has many uses in communication, medical, electronic, technical, fields and is very important for the working of world where information passes through this principle as well.

Q5.

a. Pakistan is the fifth most populous country of the world. What are the causes of population explosion in Pakistan? What are the control measures?

Population Explosion:

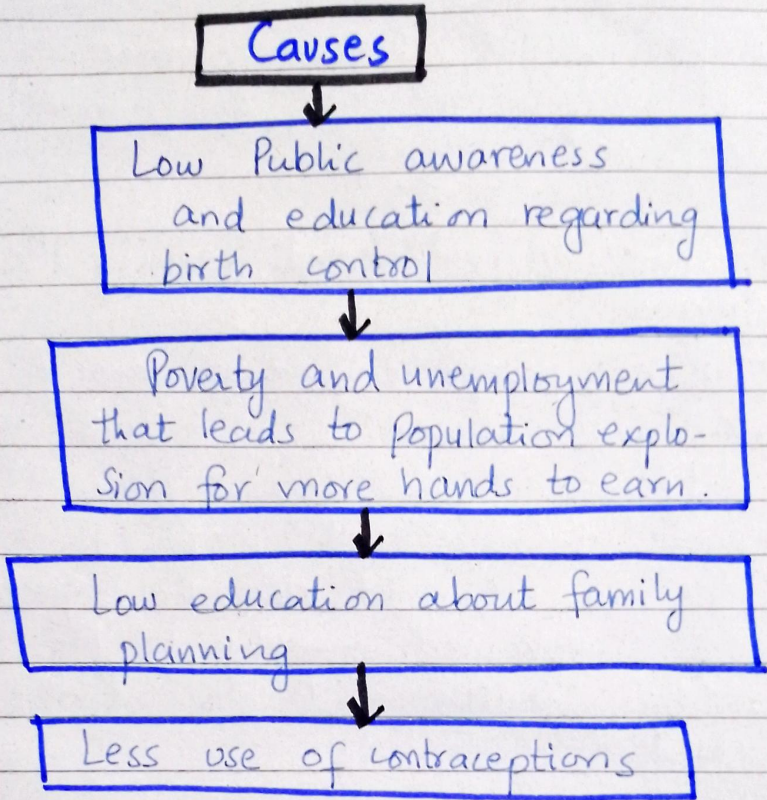
"Population explosion mean when there is uncontrollable birth rate and death rate is low and the place is short and people are increasing in their population at a rapid rate."

Pakistan is the fifth most populous country of the world with the amount of ~250 million by 2025 and it will reach at 403 million by 2050.

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Causes of Population explosion:



What are the control measures:
Control

Measures : Following are the control measure that we can use and apply to curb this population explosion.

1. Public awareness and education:

We need to aware people about the uncontrol explosion of birth rate poses threats to their lives as well as on the enviornment.

2. Use of Contraception:

We need to aware people and couples about the contraception and its advantages to save from unexpected pregnancies.

3. Knowledge about family Planning:

The campaigns regarding family planning should be conducted in different areas to couples to guide them about proper planned for family. and also the impacts of unplanned family on the mother health and also on the child.

4. Empowerment of Women:

The empowerment of women is necessary through which we can control birth and over population rate. They need to aware of their reproductive rights and health conditions.

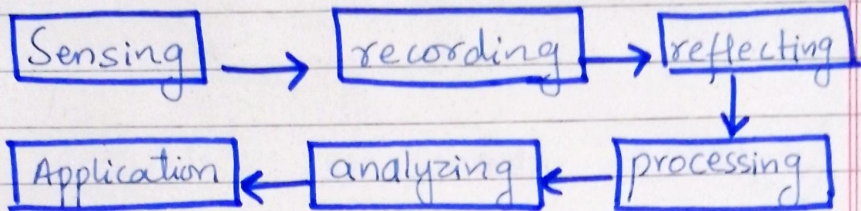
b. What is remote sensing? Discuss role of GIS in environmental environment?

Remote Sensing :

"This is the science of getting information from the Earth's surface without actually being in contact with it."

→ It is done by sensing, recording reflected or emitted energy and processing, analyzing and applying that information.

Principle:



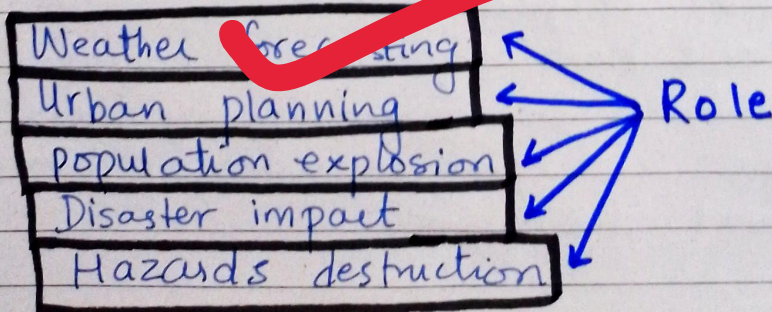
Role of GIS in environmental Science:

GIS:

“Geographic information system is a computer system and it is capable of capturing, storing, analyzing, displaying information with geographic reference according to the location.”

Role in Environmental Science:

It plays a crucial role in the field of environmental science like by;

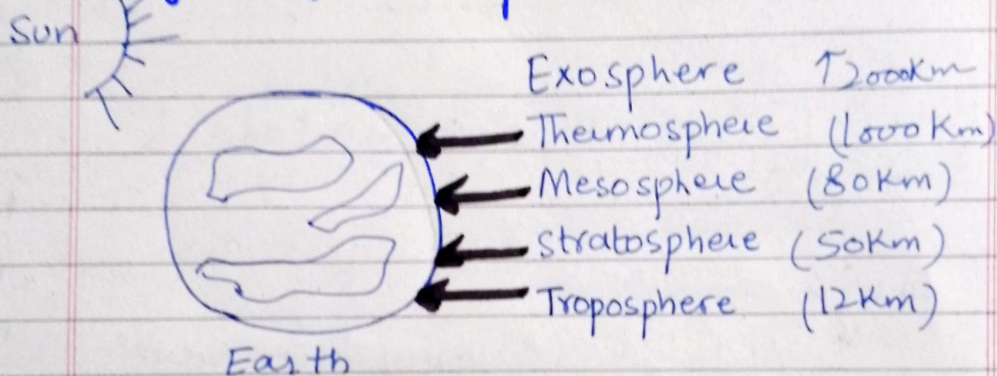


c. The "atmosphere is the blanket of Earth" justify your opinion?

Atmosphere:

"The earth is surrounded by a thin layer of gas is called atmosphere."

Layers of Atmosphere:



Atmosphere is the blanket of Earth:

Yes, atmosphere acts as the blanket of Earth because these major five layers of the atmosphere protect the earth as a blanket from the hazardous sun radiations and reflect or absorb most of them before reaching to the Earth surface where the life exist. Most of the solar harmful radiations are dismantled by these layers and play a role of blanket around the earth.

d. Define the following:

Hydrometer:

"The meter that we used to measure the level of the water is called the hydrometer."

Use in ocean, sea, rivers, dams water measurement.

Light year:

"Light year is the distance travel by the light from the sun in one year in a vacuum."

5.8×10^{12} miles is the speed of light year.

Eye of cyclone:

The eye wall of cyclone is
"When a cyclone made from the air pressures a cloud is made above the ground level it has an opening point on its center above in the cloud."

Deep focus:

"When the tectonic plates collides with each other not above the ground deep beneath the earth surface there is more seismic waves at that point called deep focus."

Epicentre:

"When the earthquake occur deep in the earth surface at deep focus point same location above the earth"

Surface of that location is
called the epicenter."