

Dos and Don'ts for General Science & Ability Paper

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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

Subject:

General Science & Ability

What is Radioactivity? Differentiate b/w

Natural and Artificial Radioactivity

1. A 5 mark 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.

1- Introduction

2- Definition of Radioactivity

3- Types of Radioactivity

3.1- Natural Radioactivity

3.2- Artificial Radioactivity

4- Comparison Table

5- Conclusion

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.

Discovered in the late 19th century,

6. In ability portion, give explanation for analytical ability question in words. You need to understand that a 5 mark part requires all steps written and explained.

it represents the spontaneous emission of particles or electromagnetic radiation from the unstable nuclei of certain

Good luck for CSS 2026. You're gonna rock in sha Allah. :)

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atoms. This process results in the transformation of one element into another and is central to both natural and artificially induced nuclear reactions.

2- RADIOACTIVITY

Radioactivity is a spontaneous disintegration of unstable atomic nuclei accompanied by the emission of alpha particles, β particles (β^-), and γ (gamma) particles. The process was first discovered by Henri Becquerel in 1896 and later extensively studied by Marie and Pierre Curie.

3- TYPES OF RADIOACTIVITY

Radioactivity can be broadly classified into two types:

3.1 - Natural Radioactivity:

Natural Radioactivity refers to the emission of radiation from naturally occurring isotopes without any human intervention.

If difference is asked, mention it by drawing a line

i- Characteristics:

- found in elements such as uranium-238, thorium-232, and potassium-40.
- occurs in nature spontaneously.
- commonly found in rocks, soil, water and even in the human body.
- contributes to the earth's internal heat.

ii- Examples:

- Uranium decay into thorium and ultimately lead.
- Carbon-14 used in Radiocarbon dating.

3.2- ARTIFICIAL RADIOACTIVITY

Artificial Radioactivity (Induced) is the process in which stable isotopes are made radioactive by human intervention typically through nuclear reaction in reactors or particle accelerations

i- Characteristics:

Induced by bombarding stable nuclei with neutrons, protons, or other particles created in laboratories or nuclear reactors widely used in medicine (e.g) cancer, Radiotherapy), agriculture and industry.

ii- Example:

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- Technetium - 99m used in medical imaging.
- Cobalt - 60 used in cancer treatment

4. COMPARISON TABLE

Feature	Natural Radio	Artificial Radio
Origin	Occurs naturally	Man-made
Elements	Uranium, Thorium Radon	Technetium - 99m, Cobalt 60
Process	Spontaneous nuclear Decay	Induced by Particle bombardment
Control	Cannot be controlled	Can be controlled
Application	Radiometric dating, Geological studies	medicine, Industrial - Radiography

5 - Conclusion

Radioactivity, whether natural or artificial, plays a vital role in enhancing human knowledge & improving quality of life while natural Radioactivity occurs spontaneously, artificial Radioactivity has allowed scientist to harness and control nuclear phenomena for particles application

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What is dengue fever? Discuss its Causes, Symptoms, modes of transmission and Preventive Measures:

Outline of this question:

- 1 - introduction
- 2 - Definition of Dengue fever
- 3 - Causes of dengue fever
- 3.1 - Contributing factors include
- 4 - Symptoms of Dengue fever
- 5 - Mode of transmission
- 6 - Preventive measure
- 7 - conclusion

1. INTRODUCTION

Dengue fever is a mosquito-borne viral infection that poses a significant public health threat particularly in tropical and subtropical regions. With increasing urbanization, climate change, and global travel, the evidence of dengue has surged in recent decades, making it a priority for disease prevention and control efforts worldwide.

2- Dengue fever

Dengue fever is an acute viral illness caused by the dengue virus, which is transmitted primarily by the *Aedes aegypti* mosquito. The disease manifests with high fever, severe cases, bleeding and organ impairment.

3- Causes of Dengue

The primary causes of dengue fever is infection by any one of the 4 dengue virus serotypes (DENV-1, DENV-2, DENV-3, DENV-4), all of which belong to the *Flaviviridae* family.

3.1- Contributing factors:

- Presence of *Aedes aegypti* specially *Aedes aegypti*
- Poor sanitation and stagnant water which serve as breeding grounds.
- Climate conditions: such as warm and humid water
- Inadequate Public health infrastructure: In densely populated areas.

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4- Symptoms of Dengue

- Sudden high-grade fever (up to 104°F)
- Severe headaches, especially behind the eyes
- Muscles and joint pain (breakbone fever)
- Skin Rash appearing a few days after ^{onset} fever
- Nausea and vomiting
- Mild bleeding (e.g., nosebleeds, gum bleeding)
- In severe cases: Dengue haemorrhagic fever or dengue shock syndrome, leading to internal bleeding, low platelet count, and even death if untreated.

5- Modes of Transmission

Mosquito bite:

The virus is primarily transmitted to humans through the bite of an infected female *Aedes aegypti*.

5.2- Human-mosquito-human cycle:

When a mosquito bites a dengue-infected person, it becomes a carrier and can transmit the virus to others.

5.3- Rare transmission Routes:

Blood transfusion, organ transplant, and from mother to fetus during pregnancy or childbirth.

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6- Preventive measures

6.1 - elimination of mosquito breeding sites

Remove stagnant water from pots, tires, containers, drains,

6.2 - use of mosquito repellents & nets

especially during early morning and

6.3- late afternoon hours when Aedes mosquitoes are most active.

Wearing Protective Clothing:

long sleeves & pants Reduce skin exposure.

Community engagement

educating the public about dengue symptoms and preventive practice

begging and fumigation

especially in outbreak-prone areas

Add diagram

7- Conclusion

Dengue fever remains a significant public health concern, particularly in developing countries like Pakistan. Its prevention requires a multi-pronged approach involving individual responsibility, community participation, and government-led initiatives for mosquito control and public health education.

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The sum of three consecutive Prime Numbers is 159, find the Numbers:

Solution:

Let P_1, P_2, P_3

$$P_1 + P_2 + P_3 = 159$$

$$(43 + 47 + 53 = 143)$$

$$47 + 53 + 59 = 159$$

So:

$$P_1 = 47$$

$$P_2 = 53$$

$$P_3 = 59$$

How??

The perimeter of a circle having a radius 6 cm is equal to?

Solution:

$$R = 6 \text{ cm}$$

$$\text{Circumference} = 2\pi R$$

Substitute of given value of R :

$$= 2 \times \pi \times 6$$

$$= 12\pi$$

$$= 12 \times 3.14$$

$$= 37.699 \text{ cm} \approx 37.70 \text{ cm}$$

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The sum of two numbers is 23, and product is 132. Find the numbers.

Solution:

Let's 2 numbers x & y .

$$x + y = 23 \quad \text{--- (1)}$$

$$xy = 132 \quad \text{--- (2)}$$

From equation (1)

$$y = 23 - x$$

(3) and (2)

$$x(23 - x) = 132$$

$$23x - x^2 = 132$$

$$x^2 - 23x + 132 = 0 \quad \text{--- (3)}$$

$$11 \times 12 = 132, \quad 11 + 12 = 23$$

So,

$$x^2 - 11x - 12x + 132 = 0$$

$$x(x - 11) - 12(x - 11) = 0$$

$$(x - 11)(x - 12) = 0$$

$$x = 11, \quad x = 12$$

2 11 and 12

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A man buys a car for Rs. 70 million after getting a discount of 20%. What was the marked price of the car?

Solution:

$$x \text{ Selling price} = 80\% \text{ of } x \\ = 0.8x$$

We are given

$$0.80x = 70 \text{ million}$$

Now solve for x :

$$x = \frac{70}{0.80}$$

$$x = 87.5 \text{ million}$$

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Differentiate b/w star & a planet. How does a star become a black hole?

Outline of the question:

1- Difference b/w star and planet

2- How a star becomes a black hole

(i) Stellar evolution

(ii) collapse of massive stars

(iii) Supernova explosion

(iv) formation of black hole

3- conclusion:

1- Difference

Feature	Star	Planet
Definition	A star is a luminous celestial body that generates light and heat through nuclear fusion.	A planet is a non-luminous celestial body that orbits a star.
Light emission	Emits its own light due to nuclear reaction	Does not emit light; reflects light from a star
Example	The Sun	Earth, Mars, Jupiter.

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Energy Source	Powered by nuclear fusion of hydrogen into helium	Has no internal source of energy.
Temp.	extremely high (millions of degrees in core)	Much cooler compared to star
Size & mass	(much bigger and more massive)	Relatively small, less mass

2-How to become a ^{Stars} Black Holes?

Stellar evolution:

A star spends most of its life fusing hydrogen into helium in its core (main sequence). when Hydrogen is exhausted, the core contracts and outer layers expand (Red giant)

Collapse of Massive stars:

If the star is massive enough (typically more than 20-25 times the mass of the sun), fusion cannot counter-balance gravity after the Supernova stage.

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Supernova explosion;

The outer layers of blown away in a massive explosion when the balance between gravity and outward pressure from fusion break down, the star collapses under its own gravity. This collapse can trigger a supernova.

3. Conclusion

Stars and planets, though both fundamental components of the universe differ profoundly in their nature & role. While stars are luminous powerhouses of energy, planets are dependent bodies that orbit them. The death of a massive star can lead to one of the most mysterious phenomena in the cosmos - the formation of a black hole - demonstrating the dynamic & powerful forces at play in the universe.