

Day: _____ Section-1

Q2/ @ Yes, I agree that data is the new oil because in today's world, data has become a valuable resource just like oil in the past. Companies and governments use data to make decisions, improve services, and earn profits.

Examples:

- ① Websites like amazon and ebay use customer data to suggest products
- ② Platforms such as Facebook, instagram use data to show ads that match user's interests.
- ③ Google maps uses data from millions of users to show traffic updates.
- ④ The expanding universe can be compared to a blowing balloon. When you blow air into a balloon, its surface stretches, and every point moves away from the others. Similarly, galaxies in the universe are moving away from each other as space itself expands. The galaxies are not moving through space, rather, space itself is stretching just like the surface of the balloon.
- ⑤ A balanced diet means eating all types of food in the right amount, including carbohydrates,

Do's 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, spread your part fairly.
2. Manage your time wisely – you have about 35 minutes per full question, which comes down to around 7 minutes for each 5-mark part. Stick to this to avoid rushing late.
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.

Here's a brief key/sample to your ability questions

Q.6

a) Candy ratio problem

Given: Packets in flavors Apple, Berry, Cherry, Date = 3 : 6 : 2 : 5

Asked: If Apple candies exceed Date candies by 86, how many berry candies are there?

Note (consistency check): The ratio shows Apple = 3 parts and Date = 5 parts, so Date is larger than Apple in the ratio. The statement "Apple candies exceed Date candies by 35" contradicts ratio (Apple cannot exceed Date if ratio is 3:5). Two ways to handle this:

1. The problem truly intends Apple - Date = 35, that's impossible with the given ratio (would require negative common factor).

2. Most likely the intended meaning is Date exceeds Apple by 35 (i.e. Date - Apple = 35), will solve using reasonable assumption.

So let's assume common factor = k, Apple = 3k, Date = 5k.

Solution: Date - Apple = 35 $\Rightarrow 5k - 3k = 35 \Rightarrow 2k = 35 \Rightarrow k = 17.5$

Berry = $6 \times 17.5 = 105$.

Answer: 105 Berry candies.

(If you consider the other wording exactly as written, note that it is inconsistent with the ratio.)

b) Camera discount + tax

Given: Original price = ₹200, Discount = 25% off, After discount, 6% tax applied.

Asked: Total amount paid.

Formula / Steps: Discount amount = 25% of 200 = 0.25×200 .

Discounted price = 200 - discount.

Tax = 6% of sale price.

Total = sale price + tax.

Solution (digit by digit):

Discount = $200 \times 0.25 = 50$.

Sale price = $200 - 50 = 150$.

Tax = $150 \times 0.06 = 9$.

Total paid = $150 + 9 = 159$.

Answer: ₹159.00

c) Bicycle travel time

Given: Distance = 36 km, speed = 18 km/hr, start time = 1:00 PM.

Asked: Arrival time.

Formula: Time = Distance / Speed.

Solution: Time = $36 / 18 = 2$ hours. Start 1:00 PM + 2 hours = 3:00 PM.

Answer: 3:00 PM.

d) Unsolvable math terms

i. STATISTICS

ii. GAMBLER

Q7.

Given: Radius of sphere = 4 cm.

Asked: Volume of sphere.

Formula: $V = \frac{4}{3}\pi r^3$

Now, let's plug in the values:

Volume = $\frac{4}{3} \times \pi \times (4)^3 = \frac{4}{3} \times \pi \times 64$

$= \frac{256}{3} \pi \approx 268.08$

Answer: The volume of the sphere is approximately 1437.33 cm³

(b) Five friends' savings (total Rs. 25,000; ratio 1:2:3:4:5)

Given: Total = Rs. 25,000, Ratio = 1 : 2 : 3 : 4 : 5

Asked: Smallest share (the "1" part).

Formula: Sum of ratio parts = $1+2+3+4+5 = 15$. Smallest = $(1/15) \times \text{total}$.

Solution: Smallest = $\frac{1}{15} \times 25,000 = 1666.67$

Answer: Rs. 1666.67 (rounded).

(c) Spot the error / Complete the series

i. Sequence: 2, 6, 18, 54, 162, 486.

Given / Asked: Which number doesn't fit?

Analysis: Each term is $\times 3$ of previous: $2 \times 3 = 6, 6 \times 3 = 18, \dots, 162 \times 3 = 486$. All terms follow the geometric rule.

Answer: None – all numbers fit the $\times 3$ pattern.

ii. Sequence: 3, 5, 7, 11, 13, ...

Given / Asked: Next number.

Analysis: These are consecutive prime numbers starting at 3: 3, 5, 7, 11, 13, 17 (note 9 is not prime, it's skipped).

(d) Triangle with sides 5 cm, 12 cm, 13 cm, find all three angles.

Given: Sides = 5, 12, 13. Note: $\rightarrow$ right triangle. Hypotenuse = 13 cm.

Asked: All three angles.

Formula / Steps: Right triangle $\rightarrow$ one angle = 90° . Other angles found by trigonometry.

Let angle opposite side 5, angle opposite side 12. Then:

$\sin A = \frac{5}{13} \Rightarrow A \approx 22.62^\circ$

$\sin B = \frac{12}{13} \Rightarrow B \approx 67.38^\circ$

Answer: Angles = $22.62^\circ, 67.38^\circ, 90.00^\circ$ (to two decimal places)

Q No. 8 (a) To find the total distance walked by the hiker and the distance from the start, let's break it down

1. Right triangle path:

- Leg 1: 7 km and 24 km

- Hypotenuse: $\sqrt{7^2 + 24^2} = \sqrt{49 + 576} = \sqrt{625} = 25$ km.

- Total distance = 7 + 24 + 25 = 56 km.

2. "Additional walking":

- 10 km straight

- 5 km after turning 90°

Total distance walked = 56 km (from 1) + 10 km + 5 km = 71 km.

To find the distance from the starting point, let's assume the hiker starts at (0,0). After walking the triangle (7 km north and 24 km east), the hiker's position would be (24, 7). Then, adding 10 km straight (assuming east) puts them at (34, 7). Finally, walking 5 km towards a friend in a first position of (34, 12).

Distance from the start = $\sqrt{(34)^2 + (12)^2} = \sqrt{(1156 + 144)} = \sqrt{1300} \approx 36.06$ km.

Therefore, the hiker walked a total distance of 71 km and is approximately 36.06 km away from the starting point.

(b) Let's denote the amount each sibling receives as A, B, C, D, E, and F.

Given the ratios:

$A : B = 1/8 \Rightarrow A = B/8 \Rightarrow AB = 1/2$

$B : C = 3/4 \Rightarrow B = 3C/4 \Rightarrow BC = 3/1$

$C : D = 4/5 \Rightarrow C = 4D/5 \Rightarrow CD = 4/5$

$D : E = 2/3 \Rightarrow D = 2E/3 \Rightarrow DE = 2/3$

$E : F = 1/2 \Rightarrow E = F/2 \Rightarrow EF = 1/2$

To find the overall ratio, we'll express each in terms of a common variable. Let's use C.

$B : C = 3/4 \Rightarrow B = 3C/4$

$A : B = 1/2 \Rightarrow A = (1/2)B = (1/2)(3C/4) = (3/8)C$

$C : D = 4/5 \Rightarrow D = 5C/4$

$D : E = 2/3 \Rightarrow E = (2/3)D = (2/3)(5C/4) = (5/6)C$

$E : F = 1/2 \Rightarrow F = 2E = 2(5/6)C = (5/3)C$

Now, let's express the ratios in terms of C:

$A : B : C : D : E : F = (3/8)C : (3/4)C : C : (5/4)C : (5/6)C : (5/3)C$

To simplify, multiply each ratio by 8:

$A : B : C : D : E : F = 3 : 6 : 8 : 10 : 20 : 26$

Combine like terms:

$A : B : C : D : E : F = 3 : 6 : 8 : 10 : 20 : 26$

The total parts are $3 + 6 + 8 + 10 + 20 + 26 = 73$.

Given the total amount is Rs. 9000, each part is worth:

$9000 / 73 \approx 123.29$

Now, calculate each sibling's share:

$A = 3 \text{ parts} \times 123.29 = \text{Rs. } 369.87$

$B = 6 \text{ parts} \times 123.29 = \text{Rs. } 739.74$

$C = 8 \text{ parts} \times 123.29 = \text{Rs. } 986.32$

$D = 10 \text{ parts} \times 123.29 = \text{Rs. } 1232.90$

$E = 20 \text{ parts} \times 123.29 = \text{Rs. } 2465.80$

$F = 26 \text{ parts} \times 123.29 = \text{Rs. } 3205.54$

The amounts each sibling receives are:

A: Rs. 369.87

B: Rs. 739.74

C: Rs. 986.32

D: Rs. 1232.90

E: Rs. 2465.80

F: Rs. 3205.54

(c) To find the total surface area and volume of the rectangular box, we'll use the formulas:

Total Surface Area = $2(lb + bh + lh)$

Volume = $l \times b \times h$

Given dimensions:

- Length (l) = 4 m

- Width (b) = 3 m

- Height (h) = 4 m

Calculate:

Total Surface Area = $2(4 \times 3 + 3 \times 4 + 4 \times 4)$

$= 2(12 + 12 + 16)$

$= 2(40) = 80 \text{ m}^2$

The total surface area of the rectangular box is 80 m², and its volume is 192 m³

(d) Family consumption + Anna

Given: Family of 8 (men and women equal in number – 4 men and 4 women). Men average = 72 kg, total men = 288 kg. Women average = 50 kg, total women = 200 kg. After Anna (a woman) joins, how much more food is needed?

Formula / Steps:

Total before Anna = 288 + 200 = 488 kg.

Total after Anna = new average $\times$ new count = $67 \times 9 = 603$ kg.

Anna's amount = 603 - 488 = 115 kg.

Solution: 603 - 488 = 115 kg.

Answer: Anna ate 115 kg.

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Fats, proteins, vitamins, minerals and water, to keep body healthy and strong.

Deficiencies: Vitamin A: causes night blindness and weak immunity.

Vitamin D: Causes weak bones, rickets in children, and osteomalacia in adults.

Vitamin E: leads to muscle weakness and problems in vision and nervous system.

④ GPS: Global positioning system works through a network of satellites orbiting earth. A GPS receiver gets signals from at least four satellites. By calculating the time taken for the signals to reach, the receiver determines its exact location on earth.

Fiber optic: It is a thin glass or plastic wire that transmits data as light signals. It allows very fast and clear communication over long distances.

2D: Measured using signals from 3 satellites

3D: Measured using signals from 4 satellites

Q3. @ Cells form organelles to perform specific functions efficiently and to maintain organization within the cell. Each organelle carries out a unique job, just like different departments in office.

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Mitochondria: It is the powerhouse of the cell. It is double membranous and self replicating organelle. At mitochondria, the process of cellular respiration takes place and as a result, of the synthesis of ATP takes place.

- ⑥ Doping: The process of adding small amount of impurities to a pure semi-conductor like silicon, etc to improve its electrical conductivity.

Types of semiconductor:

- ① Intrinsic: A semi-conductor in its pure form.
e.g. silicon, germanium, etc.
- ② Extrinsic: When impurity is added to a pure semiconductor. Any doped semiconductor is extrinsic.
Further divided into N-type (negative) and P-type (positive).

© Merits of volcanic eruption:

- Adds minerals and nutrients to the soil, making it more fertile.
- Creates new landforms like islands and mountains.
- Provides geothermal energy sources.

Demerits:

- Causes loss of life and property due to lava, ash, and gases.

Day: _____

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- Leads to air ~~pollution~~ and affects ~~climate~~ temporarily.
- Destroys crops and vegetation, displacing people and animals.

④ Dengue: It is a viral infection transmitted by the bite of infected mosquitoes, primarily the *Aedes aegypti* mosquito.

Causative agents: The causative agent is dengue virus, a flavivirus transmitted to humans.

Symptomology:

- High fever
- severe headache and joint pain.
- Nausea, vomiting, and skin rash
- In severe cases: bleeding, low platelet count, and organ failure.

Remedies:

- Community cleanliness and awareness help control the spread.
- Prevent mosquito bites by using repellents, nets, and removing stagnant water.
- No specific cure; treatment focuses on rest, fluids, and pain relief.

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Section-II

Date: _____

Q7/ ②

$$d = 14 \text{ cm}$$

$$\pi = \frac{22}{7}$$

$$V = ?$$

sol/

$$V = \frac{4}{3} \pi r^3$$

$$= \frac{4}{3} \times \frac{22}{7} \times (14)^3$$

$$= \frac{88}{27} (2744)$$

$$= \frac{241,472}{27} = 11498.66 \text{ cm}^3$$

⑧

$$5 \text{ friends} = 25000$$

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

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

sol/

$$1+2+3+4+5 = 15$$

$$= \frac{25000}{15} = 1,666.67$$

smallest ~~red~~ share is of ratio 1 ie, 1,666.67

⑨

$$(i) 2, 6, 18, 54, 162, 486$$

There is no error in this series as all are multiplied by 3 to get the next number.

$$(ii) 3, 5, 7, 11, 13, 17 ?$$

All are prime numbers.

Day: _____

① sides: 5 cm, 12 cm, 13 cm.

3 angles = ?

sol/ Triangle check = $5^2 + 12^2$

$$= 169 = 13^2$$

So, it is a right angled triangle

= longest side 13 cm = 90° Angle A = 5 cm, Angle B = 12 cm, Angle C = 90°

$$\sin A = \frac{5}{13}$$

$$A \approx 22.62^\circ$$

$$B = 90^\circ - 22.62$$

$$B = 67.38^\circ$$

$$A = 22.6^\circ$$

$$B = 67.38^\circ$$

$$C = 90^\circ$$

Q6/8 Apples, berry, cherry, date = 3:6:2:5

sol/

Apple candies exceed date candies by 35

$$-3x + 5x = 35$$

$$+2x = 35$$

$$x = 17.5$$

Berry candies = $6x$

$$= 6(17.5)$$

$$= 105$$

Day: _____

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⑥ $OP = \$200$

off / discount = 25%

Tax = 6%

sol

$$OP \times \frac{\text{discount rate}}{100} = \text{discount price}$$

$$DP = \frac{200 \times 25\%}{100}$$

$$= \$50$$

$$\$200 - 50 = \$150$$

$$\text{Plus } 6\% = \frac{36}{100} \times 150 = \$9$$

$$\text{So, } \$150 + \$9 = \$159$$

⑦ $d = 36 \text{ km}$

$$s = 18 \text{ km/hr}$$

start time = 1 pm

reach time = ?

sol

$$\text{Time} = \frac{d}{s} = \frac{36}{18} = 2 \text{ hours}$$

$$1:00 \text{ pm} + 2 \text{ hours} = 3:00 \text{ pm}$$

⑧

① Statistics

② Algebra