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GSA - Mathematics - Ability Portion

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 to understand that a 5 mark part requires all steps written and explained.

Good luck for CSS 2025. You're gonna rock in sha Allah. :)

→ Questions

A)

$$\text{Mean} = \frac{\text{Sum of all values}}{\text{Number of all values}}$$

$$\Rightarrow \frac{9 + 8 + 10 + k + 12}{5} = 15$$

(1) → Sum of known values:

$$9 + 8 + 10 + k + 12 = 39$$

$$(2) \rightarrow \text{Equation: } \frac{39 + k}{5} = 15$$

(3) → Solving the equation:

$$39 + k = 15 \times 5$$

$$39 + k = 75$$

$$k = 75 - 39$$

$$\boxed{k = 36} \rightarrow \text{Value of } k$$

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6(b) • Mixture contains sugar solution and coloured water in ratio of 4:3.

→ Let's denote

i) Initial quantity of sugar solution as $4x$ liters

ii) Initial quantity of coloured water as $3x$ liters

• Total initial quantity of mixture is $4x + 3x = 7x$ liters

→ After 10 liters of coloured water is added

i) Quantity of sugar solution remains $4x$ liters

ii) Quantity of coloured water changes to $3x + 10$ liters

→ As per the information provided, the ratio of sugar solution to coloured water now becomes $\Rightarrow 4:5$

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→ Equation as per new ratio:

$$\frac{4x}{3x+10} = \frac{4}{5}$$

→ Solving the Equation

$$4x \times 5 = 4 \times (3x+10)$$

$$20x = 12x + 40$$

$$8x = 40$$

$$x = 5$$

→ Calculating Initial Quantity of Sugar Solution

• Initial Quantity of sugar

Solution is "4x", $x=5$

$$= 4(5) = 20$$

Thus, initial quantity of Sugar Solution in the mixture is **20 litres**

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6(c) Football's shape is that of a Sphere. Thus, to find the volume of the football, we use the formula of a sphere:

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

V: Volume
R: Radius \Rightarrow provided: 12cm
π : 3.142 (approx)

\rightarrow Calculating the volume with the provided information, using the formula:

$$V = \frac{4}{3} \times \pi \times (12)^3$$

$$V = \frac{4}{3} \times 3.142 \times 1728$$

$$V = \frac{4}{3} \times 3.142 \times 576$$

$$V = 12.568 \times 576$$

$$V = 7,239.16$$

The volume of the football is approximately **7,239.16 Cubic cm**

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6(a) Provided Series: $-10, -8, 6, 40, 102, ?$

→ Identifying The Pattern

i) Differences in Consecutive Terms

- $-8 - (-10) = 2$
- $6 - (-8) = 14$
- $40 - 6 = 34$
- $102 - 40 = 62$

ii) Examining differences between
The differences

2, 14, 34, 62

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12 20 28

└──┬──┬──┘

8

8

⇒ Differences form

a sequence that

increases by 8

• Next difference in the sequence should

be: $28 + 8 = 36$

iii) Adding difference to the last difference

$62 + 36 = 98$

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→ Add This result to The last term of the original sequence to find The missing term

$$102 + 98 = 200$$

The next number in The Sequence is 200

→ Question 7

(a) → Provided Equation: $20\% \text{ of } x = y$

→ Expanding The Equation:

$$\frac{20}{100} \times x = y$$

$$y = \frac{x}{5}$$

→ Finding value of $y\%$ of 20 in terms of x

$$i) \ y\% \text{ of } 20 = \frac{y}{100} \times 20$$

ii) Substituting y from earlier equation:

$$y\% \text{ of } 20 = \frac{x/5}{100} \times 20$$

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→ Simplifying The expression:

$$= \frac{x}{5 \times 100} \times 20$$

$$= \frac{x}{500} \times 20$$

$$= \frac{20x}{500} = \frac{x}{25}$$

Y% of 20 in terms of x is

$$\boxed{\frac{x}{25}}$$

7(b) → Denoting Monthly Salaries:

i) P and Q

• Average monthly salary = Rs. 5050

$$\Rightarrow \frac{p+q}{2} = 5050$$

$$\Rightarrow p+q = 10,100 \rightarrow \textcircled{1}$$

ii) Q and R

• Average monthly salary = Rs. 6250

$$\Rightarrow \frac{q+r}{2} = 6250$$

$$\Rightarrow q+r = 12,500 \rightarrow \textcircled{2}$$

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iii) P and R

• Average monthly salary is = Rs. 5200

$$\Rightarrow \frac{p+r}{2} = 5200$$

$$\Rightarrow p+r = 10,400 \rightarrow (3)$$

\Rightarrow Solving Equations (1, 2, 3)

$$(p+q) + (q+r) + (p+r) = 10,100 + 12,500 + 10,400$$

$$\Rightarrow 2p + 2q + 2r = 33,000$$

$$\Rightarrow p+q+r = \frac{33,000}{2} = 16,500$$

i) Subtracting equation $(p+q)$ from $(p+q+r)$

$$(p+q+r) - (p+q)$$

$$\Rightarrow 16,500 - 10,100$$

$$\cdot r = 6400$$

ii) Substituting r into equation (3): $p+r$

$$\Rightarrow p + 6400 = 10,400$$

$$\Rightarrow p = 10,400 - 6400 = 4000$$

Monthly Salary of P is **Rs. 4,000**

Date: _____

Q7(c) → Examining Probabilities of ~~Two~~ 2 Coin Toss

- i) Head-Head (HH) = $\frac{1}{4}$
 ii) Head-Tail (HT) = $\frac{1}{4}$
 iii) Tail-Head (TH) = $\frac{1}{4}$
 iv) Tail-Tail (TT) = $\frac{1}{4}$

→ Provided Information

- Total number of trials (coin tosses) = 500
- Number of times two heads occurred = 105
- Number of times one head occurred = 275
- Number of times no head occurred = 120

→ Calculating Probabilities

- i) Probability of getting 2 heads:

$$P(\text{Two Heads}) = \frac{105}{500} = \boxed{0.21}$$

- ii) Probability of getting 1 head:

$$P(\text{One Head}) = \frac{275}{500} = \boxed{0.55}$$

- iii) Probability of getting no heads:

$$P(\text{No heads}) = \frac{120}{500} = \boxed{0.24}$$

Date: _____

7(a) \rightarrow Let Jamie's Current Age be : x , and
Jamie's dad current age be : $4x$
(In 14 years) (Dad is 4 times older than Jamie)

- Jamie's age will be : $x + 14$
- Jamie's dad's age will be : $4x + 14$

\rightarrow As per provided information, in 14 years, Jamie's dad will be twice the age of Jamie:

$$4x + 14 = 2(x + 14)$$

\rightarrow Solving The Equation

$$i) \quad 4x + 14 = 2x + 28$$

$$4x - 2x = 28 - 14$$

$$2x = 14$$

$$x = 7$$

• Jamie's current age is $\boxed{7}$

\rightarrow Jamie's dad's current age :

$$4x, x = 7$$

$$\Rightarrow 4(7) = 28$$

Sum of Jamie's age and his dad's age is:

$$7 + 28 = \boxed{35}$$