# General Ability

## Q#1

### (a) Solution:

5 black socks

3 green socks

Two socks are picked one after the other

Possibility of both the socks are black:

Probability of first black sock ($P_1$) = $\frac{5}{8}$ — (i)

Probability of second black sock ($P_2$) = $\frac{4}{7}$ — (i)

Probability of both black socks (P) = $\frac{5}{8} \times \frac{4}{7} = \frac{20}{56} = \frac{5}{14}$

So, Probability that both socks are black is $\frac{5}{14}$.

(b) Solution:

(i) Least number which is exactly divisible by 12, 15, and 20?

| | |
|---|---|
| 2 | 12, 15, 20 |
| 2 | 6, 15, 10 |
| 3 | 3, 15, 5 |
| 5 | 1, 5, 5 |
| | 1, 1, 1 |

$2 \times 2 \times 3 \times 5 = 60$

So, 60 is that least number.

(ii) Largest number of 4-digits divisible by 12, 15 and 18.?

| | |
|---|---|
| 2 | 12, 15, 18 |
| 2 | 6, 15, 9 |
| 3 | 3, 15, 9 |
| 3 | 1, 5, 3 |
| 5 | 1, 5, 1 |
| | 1, 1, 1 |

$2 \times 2 \times 3 \times 3 \times 5 = 180$

4-digits are 9999

$$180 \overline{)9999} \quad 55$$

900

999

900

99 Remainder

9999 − 99

= 9900

So, largest number of 4-digits is 9900.

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(c) **Solution:**

Let's assume that numerator is $x$ and denominator is $y$

According to the statement, the sum of numerator and denominator of a fraction is 30

$$x + y = 30$$

If 2 is added to numerator and 2 is subtracted to denominator

then, $\frac{x+2}{y-2} = \frac{2}{3}$ → (i)

Fraction = ?

If, $x + y = 30$

$x = 30 - y \rightarrow$ (ii)

Then, putting the value of $x$ in eq (i)

$$\frac{x+2}{y-2} = \frac{2}{3}$$

$$\frac{(30-y)+2}{y-2} = \frac{2}{3}$$

$$3(30-y)+2) = 2(y-2)$$

$$90 - 3y + 6 = 2y - 4$$

$$96 - 3y = 2y - 4$$

$$96 + 4 = 2y + 3y$$

$$100 = 5y$$

$$y = \frac{100}{5} = 20$$

By putting the value of $y$ in eq (ii), it becomes

$$x = 30 - y$$

$$= 30 - 20$$

$$x = 10$$

So, $\frac{x}{y} = \frac{10}{20} = \frac{1}{2}$ is the fraction

## (d) Probability Sampling:

It is a sampling technique in which every member of a population has a known, non-zero chance of being selected for inclusion in a sample. It ensures that the sample is representative of the population, allowing researchers to generalize their findings with a high degree of reliability.

Example: Random selection sampling, Sytematic sampling and stratified sampling.

Discuss these in more detail

## Non-Probability Sampling:

It is a sampling technique where not all individuals in a population have a chance of being selected. The selection process relies on the researcher's judgment, convenience or specific criteria, rather than randomization.

Example: Purposire sampling, Quota Sampling, Judgmental sampling.

# Q#2

Attempt and upload a single qs at a time for evaluation

## (a) Solution:

Let's assume the nomerator is $x$ and denominator is $y$.

According to given statement, the denominator of a fraction is 2 more then numerator, so,

$$y + 2 = x$$

$$y = x - 2 \rightarrow (i)$$

IF the numerator and denominator is increased by 4, then

$$\frac{x+4}{y+4} = \frac{8}{10} \longrightarrow (ii)$$

Original fraction = ?

Putting the value of $y$ from eq(i) in eq (ii)

$$\frac{x+4}{x-2+4} = \frac{8}{10}$$

$$10(x+4) = 8(x-2+4)$$

$$10x + 40 = 8x - 16 + 32$$

$$10x - 8x = 16 - 40$$

$$2x = -24$$

$$x = \frac{-24}{2}$$

$$x = -12$$

Putting value of $x$ in eq (i)

$$y = x - 2$$

$$= -12 - 2$$

$$y = -14$$

So, fraction is $\frac{x}{y} = \frac{-12}{-14} = \frac{6}{7}$

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(b) **Solution:**

A contracter pays to a worker
for each day = 20
Fine for absent day = 10
After 60 days, he paid Rs. 300
Absent days of worker = ?

Let's assume, the worker was
absent for days = $x$

So, Working days − Absent days $x$
Pay for each day − Absent days $x$
fine for absent days = Total pay

$= 60 - x \times 20 - x \times 10 = 300$

$= 60 - 20x - 10x = 300$

$= 60 - 30x = 300$

$= 60 - 300 = 30x$

$= -240 = 30x$

$= x = \frac{-240}{30}$

$= x = 8$

So, the worker was absent for 8 days.

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(c) **Solution:**

According to given statement, 50 hens, 45 goats, 8 horses and some farmers.

Total number of feet be 224 more than number of heads

Number of farmers = ?

Let's number of farmers = $x$

Then,

Total number of feets =

$2 \times 50 + 4 \times 45 + 4 \times 8 + 2 \times x$

$100 + 180 + 32 + 2x$

$312 + 2x \rightarrow$ Feets

Total number of heads =

$50 + 45 + 8 + x$

$103 + x \rightarrow$ Heads

If total feet more than total heads by 224 then,

$312 + 2x + 224 = 103 + x$

$536 + 2x = 103 + x$

$536 - 103 = x - 2x$

$433 = -x$

$x = 433$

So, number of farmers are 433

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(d) **Solution:**

Trees = 17956

Let's assume total rows are x and number of trees in each row are also x

So, number of trees in a row x

total number of rows = 17956

$x \times x = 17956$

$x^2 = 17956$

$x = \sqrt{17956}$

$x = 6\sqrt{481}$

$= 6 \times 22$

$= 132$ round about

Total number of trees in one row will be 134.

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## Q#3

(a) **Solution:**

2 years ago average age of five members = 16 years

After a baby, average age same

Present age of baby = $x$

Let's assume five members age today is $x_1, x_2, x_3, x_4, x_5$

2 years ago, there average age = $x_1-2, x_2-2, x_3-2, x_4-2, x_5-2$

$$\text{Average age} = \frac{x_1-2+x_2-2+x_3-2+x_4-2+x_5-2}{5}$$

$$16 = \frac{x_1+x_2+x_3+x_4+x_5-10}{5}$$

$16 \times 5 + 10 = x_1 + x_2 + x_3 + x_4 + x_5$

$90 = x_1 + x_2 + x_3 + x_4 + x_5$

After baby,

Average age = 16

$$16 = \frac{x_1 + x_2 + x_3 + x_4 + x_5 + x}{6}$$

$16 \times 6 = 90 + x$

$96 - 90 = x$

$6 = x$

So, present age of baby is 6 years.

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(b) **Solution:**

Jahangir's share = Rs 100000

Tahir's share = 150000 Rs

Malik's share = 175000 Rs

Share of Malik = ?

Annual profit = Rs 46000

Jahangir : Tahir : Malik.

~~100000~~ : ~~150000~~ : ~~175000~~

~~20~~ ~~30~~ ~~35~~

4 6 7

4 : 6 : 7

Total = 17 parts

17 parts = 46000

1 part = $\frac{46000}{17}$

= 274 approx.

Malik's share = 7 x 274

= Rs 1918

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(d) **Solution:**

Sultan distributes pens among A, B, C, D in the ratio of

$\frac{1}{2} : \frac{1}{4} : \frac{1}{5} : \frac{1}{7}$

Total number of pens = ?

$\frac{1}{2} \times 140 : \frac{1}{4} \times 140 : \frac{1}{5} \times 140 : \frac{1}{7} \times 140$

70 : 35 : 28 : 20

A : B : C : D

So, total pens = 70 + 35 + 28 + 20

= 153 pens

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(c) **Solution:**

G has to pay = Rs. 440 to A after

Time = 1 year

Rate of interest = 10%

$$= \frac{\text{Amount} \times 100}{100 + R \times T}$$

$$= \frac{440 \times 100}{100 + 10 \times 1}$$

$$= \frac{44000}{110}$$

$$= 400$$

Then, A pay 220 Rs to G and defer the payment for 2 years, So,

$$= 220 + \frac{220 \times 100}{100 + 400}$$

$$= 220 + \frac{22000}{500}$$

$$\frac{4400 + 11}{20} = \frac{4411}{20}$$

$$= 220.5$$

# Q#6

(a) **Solution:**

Speed of boy = 20 km/hr

Relative Speed = 50 km/hr

Length of train = ?

Time = 20 seconds

$$\text{Speed} = \frac{\text{distance}}{\text{Time}}$$

Distance = Speed × Time

Speed of train = 50 km/hr − 20 km/hr

S = 30 km/hr

Distance = 30 × 20 × 60 × 60

= 2160,000 m

So, the length of train is **2160,000m**

(b) **Solution:**

Train P = S = 85 km/hr

Train Q = S = 70 km/hr

Length of P = 120m

Length of Q = 240m

Time = ?

Time taken by $P = t = \frac{d}{s}$

$$t = \frac{120}{85}$$

$$t = 1.4 \text{ hr}$$

Time taken by $Q = \frac{240}{70}$

$$t = 3.4 \text{ hr}$$

Time taken by P to cross Q =

$$t\ 3.4 - 1.4 = 2 \text{ hr}$$

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(d) **Solution:**

WORLD = 231518124

Then, TIME = 209135

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(e)

## Mechanical Ability:

It refers to a person's capacity to understand, operate, and work with machines, tools, and physical systems. It involves technical skills, problem-solving, and the ability to visualize how mechanical systems work.

Example: A technician repairing a car engine, An engineer designing a bridge.

## Social Ability:

It refers to a person's capacity to interact effectively with other, build relationships, and navigate social environments. It involves emotional intelligence, communication skills and interpersonal understanding.

Example: Mediating conflicts, negotiating deals.

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## Q#5

(a) **Solution:**

$\Delta ABC \sim \Delta PQR$

Value of $x = ?$

$$\frac{5}{3.75} = \frac{4}{x} = \frac{6}{4.5}$$

$5x = 4 \times 3.75$

$x = \frac{4 \times 3.75}{5}$

$x = 3$

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(b) **Solution:**

Perimeter of the square = 160m

One side $= \frac{160}{4} = 40m$

Area of the square = side x side

$= 40 \times 40$

$= 1600m^2$

Perimeter of the rectangle = 160m

Area of the rectangle = $l \times w$

As Area of rectangle is less than square by 100, So,

$l \times w = 1600 - 100 = 1500m^2 \rightarrow (i)$

Perimeter of the rectangle =

$2(l + w) = 160$

$l + w = \frac{160}{2} = 80m$

$w = 80 - l \rightarrow (ii)$

Put value of w in eqn (i)

$$l \times (80 - l) = 1500$$

$$80l - l^2 = 1500$$

$$l^2 - 80l + 1500 = 0$$

By factorization method:

$$(l - 50)(l - 30) = 0$$

Thus, Length of rectangle is

$l = 50m$ or $l = 30m$.

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(c) **Solution:**

$$\text{Simple interest} = \frac{PRT}{100}$$

$P = 5000$ Rs

$R = 6\%$

Time = 5th feb to 19th April, 2015

$= 24 + 31 + 19$

$= 74$ days

$= 74 \times 24$

$= 1776$ hr

$$\text{Simple interest} = \frac{5000 \times 6 \times 1776}{100}$$

$$= 532,800$$

(d) **Solution:**

Let $x$ be the number of litre in vessel

After first drawing and filling

Alcohol $= (x-10)\,l$

Water $= 10\,l$

Then, for the second drawing, the water and alcohol will be drawn in the ratio they are present in the vessel

Mixture $= x-10 : 10$

$$\text{Alcohol} = \left(\frac{x-10}{x-10+10}\right) \times 10l$$

$$\text{Water} = \left(\frac{10}{x-10+10}\right) \times 10l$$

$$\text{Alcohol} = \left(\frac{x-10}{x}\right) 10$$

$$\text{Water} = \left(\frac{10}{x}\right) 10$$

$$\text{Alcohol left in vessel} = (x-10) - \left(\frac{x-10}{x}\right) 10$$

$$= x - 10 - \left(1 - \frac{10}{x}\right) 10$$

$$= x - 10 - \left(10 - \frac{100}{x}\right)$$

$$= x - 10 - 10 + \frac{100}{x} =$$

$$= x - 20 + \frac{100}{x}$$

Water in the vessel $= 10 - \frac{100}{x}$

$$= 10 - \frac{100}{x} + 10$$

$$= 100 - \frac{100}{x}$$

$$\frac{x - 20 + \frac{100}{x}}{100 - \frac{100}{x}} = \frac{49}{32}$$

$$\frac{x - 20}{100} = \frac{49}{32}$$

$$32x - 640 = 4900$$

$$x = \frac{4900 + 640}{32}$$

$$x = 173.125$$

(vi) Extra attempt of any question or any part of the attempted question will not be considered.

**Q.1**

**(a)** In a drawer there are 5 black socks and 3 green socks. Two socks are picked randomly one after the other without replacement. What is the possibility that both the socks are black? **(5)**

**(b)** **(i)** Find the least number which is exactly divisible by 12, 15, and 20. **(2.5 + 2.5)**

**(ii)** Find the largest number of 4-digits divisible by 12, 15 and 18.

**(c)** The sum of numerator and denominator of a fraction is 30. If 2 is added to numerator and 2 is subtracted from denominator, then it becomes 2/3. Find the fraction. **(5)**

**(d)** Define (i) Probability Sampling. (ii) Non-Probability Sampling **(2.5 + 2.5)**

**Q.2**

**(a)** The denominator of a fraction is 2 more than numerator. If the numerator as well as denominator is increased by 4, the fraction becomes 8/10. Find the original fraction. **(5)**

**(b)** A contractor pays Rs. 20 to a worker for each day and the worker forfeits Rs. 10 for each day if he is idle. At the end of 60 days, the worker gets Rs. 300. Find for how many days the worker was idle? **(5)**

**(c)** In a farm, along with 50 hens, there were 45 goats and 8 horses and some farmers. If total number of feet be 224 more than number of heads, then find the number of farmers. **(5)**

**(d)** A gardener wants to plant 17956 trees and arranges them in such a way that there are as many rows as there are trees in a row. What is the number of trees in a row? **(5)**

**Q.3**

**(a)** 2 years ago, the average age of a family of 5 members was 16 years. After a baby is born, the average age of family is the same today. Find the present age of the baby. **(5)**

**(b)** Jahangir, Tahir and Malik started a business by investing Rs.1,00,000, Rs. 1,50,000 and Rs. 1,75,000 respectively. Find the share of Malik, out of an annual profit of Rs. 46,000. **(5)**

**(c)** "G" has to pay Rs.440 to "A" after 1 year. "A" asks "G" to pay Rs.220 in cash and defer the payment of Rs.220 for 2 years. If the rate of interest is 10% per annum, in this mode of payment? **(5)**

**(d)** If Sultan distributes his pens in the ratio of 1/2:1/4:1/5:1/7 between his four friends A, B, C and D, then find the total number of pens Sultan should have? **(5)**

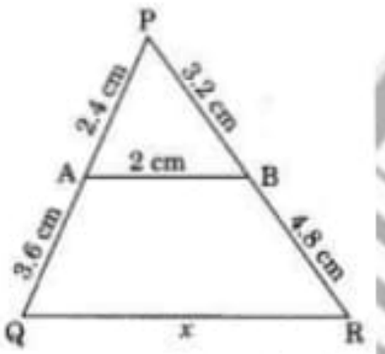
**Q.4**

**(a)** If Rs 1050 is divided into three parts, proportional to 1/3:3/4:4/6, then what is the first part? **(5)**

(b) Two pipes can fill a tank in 6 hours and 8 hours respectively while a third pipe empties the full tank in 12 hours. If all the three pipes operate simultaneously, in how much time will the tank be filled? **(5)**

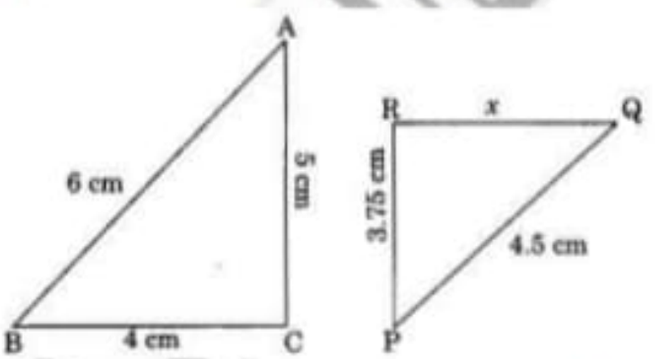
(c) A can lay railway track between two given stations in 16 days and B can do the same job in 12 days. With help of C, they did the job in 4 days only. Then, C alone can do the job in? **(5)**

(d) In the given figure, value of $x$ (in cm) is? **(5)**




**Q.5**

(a) In the given figure $\Delta ABC \sim \Delta PQR$. The value of $x$ is? **(5)**




(b) The perimeter of rectangle and a square are 160m each. The area of the rectangle is less than that of the square by 100 square meters. The length of the rectangle is? **(5)**

(c) Find the simple interest on Rs. 5000 at 6 % per annum for the period from 5th Feb to 19th April, 2015. **(5)**

(d) 10 gallons are drawn from a container full of alcohol and filled with water again. 10 gallons of mixture are again drawn and the container is filled with water again. If the ratio of alcohol and water left in the container is 49:32, then find how much quantity does the container hold? **(5)**

**Q.6**

(a) A boy runs opposite to that of train at a speed of 20 km/hr. If the relative speed between train and the boy running in opposite direction is 50 km/hr. What is the length of train, if it takes 20 seconds to cross the boy, when he is at rest? **(5)**

(b) Two trains P and Q move in same direction with a speed of 85 km/hr and 70 km/hr respectively. If train P is 120 m long and train Q is 240 m, then find taken by train P to cross the train Q? **(5)**

(c) Define the following: (i) Mechanical Ability (ii) Social Ability **(2.5 + 2.5)**

(d) If "WORLD" is to 231518124. Then "TIME" is to? **(5)**