

Averages

Date _____
Page _____

1) first five multiple of 3 : 3, 6, 9, 12, 15

$$\text{Average} = \frac{3+6+9+12+15}{5}$$

$$= \frac{45}{5} = 9 \text{ } //$$

2)

$$\underline{a_1+a_2+a_3+a_4+a_5+a_6} = 3.95 - \textcircled{1}$$

$$\frac{a_1+a_2}{2} = 3.4 \quad \& \quad \frac{a_3+a_4}{2} = 3.85$$

$$\cancel{a_5+a_6} \quad a_1+a_2 = 6.8 - \textcircled{1} \quad a_3+a_4 = 7.70 - \textcircled{11}$$

$$\frac{a_5+a_6}{2} = A$$

$$a_5+a_6 = 2A - \textcircled{IV}$$

putting the value of eqⁿ \textcircled{I} , \textcircled{II} & \textcircled{IV} in eqⁿ $\textcircled{1}$

$$6.8 + 7.7 + 2A = 3.95 + 6$$

$$14.5 + 2A = 23.7$$

$$2A = 9.2$$

$$A = 4.6$$

$$\boxed{a_5+a_6 = 4.6}$$

Q3)

$$\frac{T_1 + T_2 + T_3 + T_4 + T_5 + T_6 + T_7 + T_8 + T_9 + T_{10}}{10} = 38.9$$

$$\frac{T_1 + T_2 + \dots + T_6}{6} = 42 \quad \frac{T_7 + T_8 + T_9 + T_{10}}{4} = A$$

$$T_1 + T_2 + \dots + T_6 = 252 \quad T_7 + T_8 + T_9 + T_{10} = 4A$$

$$\frac{T_1 + T_2 + T_3 + T_4 + T_5 + T_6 + T_7 + T_8 + T_9 + T_{10}}{10} = 38.9$$

$$252 + 4A = 389$$

$$4A = 137$$

$$A = \frac{137}{4} = 34.25 //$$

Q4)

$$\frac{S_1 + S_2 + S_3 + \dots + S_{40}}{40} = 15 \quad \frac{N_1 + N_2 + \dots + N_{10}}{10} = 10A$$

$$\frac{S_1 + S_2 + S_3 + \dots + S_{40} + N_1 + N_2 + N_3 + N_4 + N_5 + N_6 + N_7 + N_8 + N_9 + N_{10}}{50} = 15.02$$

$$S_1 + S_2 + S_3 + \dots + S_{40} = 600$$

$$N_1 + N_2 + \dots + N_{10} = 10A$$

$$\frac{600 + 10A}{50} = 15.02$$

$$600 + 10A = 15.00 \text{ or } 15.50$$

$$10A = 75.00 \text{ or } 76.00 - 600$$

$$A = \frac{160}{10}$$

$$\boxed{A = 15.1}$$

$$\boxed{A = 16}$$

Q5) Given: $a_1 + a_2 + \dots + a_{16} = 80.25$

$$w_1 + w_2 + \dots + w_{16} = 50.25$$

$$= 5.16$$

$$a_1 + a_2 + \dots + a_{16} = 4.5 \times 15$$

$$w_1 + w_2 + \dots + w_{16} = 50.25 \times 16$$

$$= 80.4$$

$$a_1 + a_2 + \dots + a_{16} = 80.45 \times 17$$

$$= 361.2$$

$$\text{Total weight} = 80.4 + 361.2$$

$$= 441.6$$

$$\text{Average of all boys} = \frac{441.6}{24}$$

$$= 18.38$$

Q6) Let the 5 consecutive no. be

$$x, x+2, x+4, x+6, x+8$$

do,

$$x + \frac{x+2+x+4+x+6+x+8}{5} = 61$$

$$5x + 20 = 61 \times 5$$

$$5x = 305 - 20$$

$$x = \frac{285}{5}$$

$$x = 57$$

do, The lowest number is ($x=57$)

The highest number is ($x+8 = 57+8 = 65$)

A/Q

$$\text{difference} = 65 - 57$$

~~8~~

Q7)

$$\frac{a_1 + a_2 + a_3 + a_4 + a_5 + a_6 + a_7}{7} = 3$$

$$\frac{a_1 + a_2 + a_3 + a_4}{4} = 4$$

$$a_1 + a_2 + a_3 = 16 - a_4 - \text{QD}$$

$$\frac{a_4 + a_5 + a_6 + a_7}{4} = 4$$

$$a_5 + a_6 + a_7 = 16 - a_4$$

$$\frac{a_1 + a_2 + a_3 + a_4 + a_5 + a_6 + a_7}{7} = 3$$

$$(16 - a_4) + a_4 + (16 - a_4) = 21$$

$$16 + 16 - a_4 = 21$$

$$32 - 21 = a_4$$

$$\boxed{a_4 = 11}$$

~~(Q8)~~ given:

$$\frac{a_1 + a_2 + a_3 + \dots + a_{30}}{30} = 9 \quad \text{--- (1)}$$

$$\frac{a_1 + a_2 + a_3 + \dots + a_{30} + T_1}{31} = 10 \quad \text{--- (2)}$$

so,

$$a_1 + a_2 + a_3 + \dots + a_{30} = 9 \times 30$$

$$a_1 + a_2 + a_3 + \dots + a_{30} = 270 \quad \text{--- (1)}$$

Putting the value of eqⁿ (1) in eqⁿ (2)

$$\frac{a_1 + a_2 + a_3 + \dots + a_{30} + T_1}{31} = 10$$

$$270 + T_1 = 10 \times 31$$

$$T_1 = 310 - 270$$

$$\boxed{T_1 = 40 \text{ --- (2)}}$$

Q9) Given:

$$\frac{2+7+6+2x+y}{4} = 5 - \cancel{6} - \cancel{18+2y}$$

$$18 + 2y$$

$$\frac{18+1+6+2x+y}{4} = 10 - \cancel{11}$$

In eqn ①

$$\frac{2+7+6+2x}{4} = 5$$

$$\frac{15+2x}{4} = 5$$

$$15+2x = 20$$

$$2x = 5$$

Putting the value of ~~eqn~~ x in eqn ②

$$\frac{18+1+6+2x+y}{4} = 10$$

$$5$$

$$\frac{18+1+6+5+y}{4} = 10$$

$$5+$$

$$20+y = 50$$

$$y = 30$$



Q10) given:

$$\underbrace{a_1 + a_2 + a_3 + \dots + a_{16}}_{16} = A - \textcircled{1}$$

$$\underbrace{a_1 + a_2 + a_3 + \dots + a_{16} + 8\frac{7}{9}}_{17} = A + 3 - \textcircled{11}$$

from eq "1"

$$\underbrace{a_1 + a_2 + a_3 + \dots + a_{16}}_{16} = A$$

$$a_1 + a_2 + a_3 + \dots + a_{16} = 16A - \textcircled{111}$$

putting the eqn $\textcircled{111}$ in eq "11"

$$\underbrace{a_1 + a_2 + a_3 + \dots + a_{16} + 8\frac{7}{9}}_{17} = A + 3$$

$$16A + 8\frac{7}{9} = 17A + 51$$

$$A = 3\frac{6}{9}$$

Average till 16thinning = $3\frac{6}{9}$

Average after 17thinning = $A + 3 = 3\frac{6}{9} + 3$

$$= 3\frac{6}{9} + 3 = 39\frac{1}{9}$$

(Q11) given:

$$\frac{a_1 + a_2 + \dots + a_{50} = 36}{50}$$

$$a_1 + a_2 + \dots + a_{50} = 1800$$

difference between the correct & incorrect
observed"

$$48 - 23 = 25$$

$$\text{corrected total sum} = 1800 + 25 \\ = 1825$$

$$\text{New mean} = \frac{1825}{50}$$

$$= 36.5 //$$

(Q12) given:

$$\frac{R_1 + R_2 + \dots + R_{10} = 32}{10} \quad - ①$$

$$R_1 + R_2 + \dots + R_{10} + R_{11} = 32 + 4$$

$$\frac{R_1 + R_2 + \dots + R_{10} + R_{11} = 36}{11} \quad - ②$$

from eqn ①

$$\frac{R_1 + R_2 + \dots + R_{10} = 32}{10}$$

$$R_1 + R_2 + \dots + R_{10} = 320 \quad - ③$$

Putting eqⁿ (11) in eqⁿ (1)

$$\frac{R_1 + R_7 + \dots + R_{10} + R_{11}}{11} = 36$$

$$320 + R_{11} = 396$$

$$R_{11} = 76$$

Q 13)

Given

$$\frac{a_1 + a_2 + a_3 + a_4 + a_5 + 80}{6} = A \quad \text{--- (1)}$$

$$a_1 + a_2 + a_3 + a_4 + a_5 + b_1 = A - 3 \quad \text{--- (11)}$$

From eqⁿ (1)

$$a_1 + a_2 + a_3 + a_4 + a_5 + 80 = 6A$$

$$a_1 + a_2 + a_3 + a_4 + a_5 = 6A - 80 \quad \text{--- (11)}$$

Putting eqⁿ (11) in eqⁿ (11)

$$\frac{a_1 + a_2 + a_3 + a_4 + a_5 + b_1}{6} = A - 3$$

$$b_1 + 6A - 80 = 6A - 18$$

$$b_1 = 62$$

124)

The no. are

11, 22, 33, 44, 55, 66, 77, 88, 99

$$\text{Average} = \frac{11+22+33+44+55+66+77+88+99}{9}$$

$$= \frac{495}{9}$$

Average = 55

125)

$$a_1 + a_2 + a_3 + a_4 + a_5 + a_6 = x \quad (1)$$

6

$$\frac{a_1 + a_2 + a_3}{3} = y$$

$$\frac{a_4 + a_5 + a_6}{3} = z$$

$$a_1 + a_2 + a_3 = 3y \quad (ii)$$

$$a_4 + a_5 + a_6 = 3z \quad (iii)$$

Putting eqⁿ (ii) & (iii) in eqⁿ (1)

$$\underline{a_1 + a_2 + a_3 + a_4 + a_5 + a_6 = x}$$

6

$$3y + 3z = 6x$$

$2x = y + z$

Q 16) Given

$$\underline{P_1 + P_2 + P_3 + P_4 + P_5 + 8P_6 + P_7 + 8s = A - ①}$$

$$\underline{P_1 + P_2 + P_3 + P_4 + P_5 + P_6 = P_7 + 92} = 84$$

$$P_1 + P_2 + P_3 + P_4 + P_5 + P_6 + P_7 + 92 = 8498$$

$$P_1 + P_2 + P_3 + P_4 + P_5 + P_6 + P_7 = \cancel{672}^{580} - ②$$

Putting eqⁿ ② in eqⁿ ①.

$$\underline{P_1 + P_2 + P_3 + P_4 + P_5 + P_6 + P_7 + 8s = A}$$

$$\underline{\cancel{672}^{580} + 85 = A} =$$

$$A = \cancel{757}^{665} / 1$$

Q17) Let captain be C & youngest player be a₁₀

$$\underline{a_1 + a_2 + a_3 + a_4 + a_5 + a_6 + a_7 + a_8 + a_9 + a_{10} + C} = 28$$

11

$$\begin{array}{l|l|l} \underline{a_1 + a_2 + a_3} = 25 & \underline{a_4 + a_5 + a_6} = 28 & \underline{a_7 + a_8 + a_9} = 30 \\ \hline 3 & 3 & 3 \\ a_1 + a_2 + a_3 = 75 & a_4 + a_5 + a_6 = 84 & a_7 + a_8 + a_9 = 90 \end{array}$$

∴

$$C = a_{10} + 11$$

$$\underline{a_1 + a_2 + a_3 + a_4 + a_5} = 28$$

11

$$75 + 84 + 90 + a_{10} + 11 + a_{10} = 308$$

$$260 + 2a_{10} = \frac{308}{260}$$

$$2a_{10} = 48$$

$$a_{10} = 24$$

The age of youngest player $\Rightarrow a_{10} = 24$

$$\text{Captain age} = a_{10} + 11$$

$$= 24 + 11 = 35$$

18)

$$\underline{a_1 + a_2 + a_3 + a_4 + a_5} = 17$$

5

$$a_1 + a_2 + a_3 + a_4 + a_5 = 85$$

Age after 3 years

$$a_1 + 3 + a_2 + 3 + a_3 + 3 + a_4 + 3 + a_5 + 3 = 85 + 15$$

$$\underline{a_1 + a_2 + a_3 + a_4 + a_5} =$$

$$a_1 + a_2 + a_3 + a_4 + a_5 = 85 + 15$$

$$a_1 + a_2 + a_3 + a_4 + a_5 = 100 \quad - \textcircled{1}$$

Total ~~average~~^{age} after body bo.

To

Now,

$$a_1 + a_2 + a_3 + a_4 + a_5 + b_1 = 17$$

6

$$a_1 + a_2 + a_3 + a_4 + a_5 + b_1 = 102$$

$$100 + b_1 = 102$$

$$b_1 = 02$$

Hence, body age is 2 years

(Q19)

$$a_1 + a_2 + \dots + a_{50} = 38$$

$$\text{So, } a_1 + a_2 + \dots + a_{50} = 50$$

$$a_1 + a_2 + \dots + a_{50} = 1900$$

now

new no. which are discarded are

$$45 \text{ & } 55$$

$$\text{So, } 45 + 55 = 100$$

so,

$$1900 - 100$$

$$= 1800$$

$$\text{New, average} = \frac{1800}{48}$$

(Q20)

5 consecutive no. are

$$(a, a+1, a+2, a+3, a+4)$$

average

$$\frac{a + a+1 + a+2 + a+3 + a+4}{5} = b$$

$$5$$

$$5a + 10 = 5b$$

$$a+2 = b$$

$$b = a+2$$

Q consecutive no. starting with $a+2$

$$(a+2), (a+2+1), (a+2+2), (a+2+3), (a+2+4) \\ (a+2+5), (a+2+6), (a+2+7), (a+2+8), \cancel{(a+2+9)}$$

$$\text{Average} = \frac{a+2 + a+3 + a+4 + a+5 + a+6 + a+7 + a+8 + a+9}{9} \\ + a+10 + \cancel{a+11}$$

$$\frac{9a+54}{9}$$

$$\text{Average} = a+6 \\ = a+2+4 \\ = b+4$$

Q2) Let the no. of boys be B & girls be G

$$\text{Total age of boys} = 16.4B$$

$$\text{Total age of girls} = 15.4G$$

$$\text{Average age of the class} = 15.8$$

$$\frac{16.4B + 15.4G}{B+G} = 15.8$$

$$16.4B + 15.4G = 15.8B + 15.8G$$

$$0.6B = 0.4G$$

$$\frac{B}{G} = \frac{0.4}{0.6} = \frac{0.2}{0.3}$$

$$B:G = 2:3$$

Q 22)

$$\frac{a_1 + a_2 + \dots + a_{50}}{50} = 30$$

$$a_1 + a_2 + \dots + a_{50} = 1500$$

~~Sum of 20 nos number discarded.~~

$$= 35 + 40$$
$$= 75$$

$$1500 - 75$$

$$= 1425$$

New Average = $\frac{1425}{18}$

$$= 21.68\ldots$$

Q 23)

$$\frac{a_1 + a_2 + \dots + a_{20}}{20} = 0$$

$$a_1 + a_2 + \dots + a_{20} = 0$$

$$a_1 + a_2 + \dots + a_{19} = 0$$

at most, 19 no. can be greater than zero
& 20th no. will be the negative sum of
these 19 positive numbers

Ans: 19

Q24

$$a_1 + a_2 + a_3 + a_4 + a_5 + a_6 + a_7 + a_8 = \cancel{96} 12 \times 8 \\ = 96$$

$$\underline{a_1 + a_2 + \dots + a_8} = A$$

$$a_9 = A + 8$$

$$\frac{a_1 + a_2 + \dots + a_8 + a_9}{9} = A$$

$$96 + 8A + 8 = 9A$$

$$8A = 104$$

$$A = 13$$

$$a_9 = 13 + 8 \\ = 21$$

Hence,

$$\begin{aligned} \text{Total money spent} &= a_1 + a_2 + a_3 + a_4 + a_5 + a_6 \\ &\quad + a_7 + a_8 + a_9 \\ &= 96 + 21 \\ &= 117 // \end{aligned}$$

(Q25)

$$\underbrace{a_1 + a_2 + \dots + a_{24}}_{24} = 35$$

$$a_1 + a_2 + \dots + a_{24} = 35 \times 7$$

$$\underbrace{a_1 + a_2 + \dots + a_{24} + T_1}_{25} = 35 \times 4$$

$$a_1 + a_2 + \dots + a_{24} + T_1 = 35 \times 4 \times 7.5$$

$$840 + T_1 = 860$$

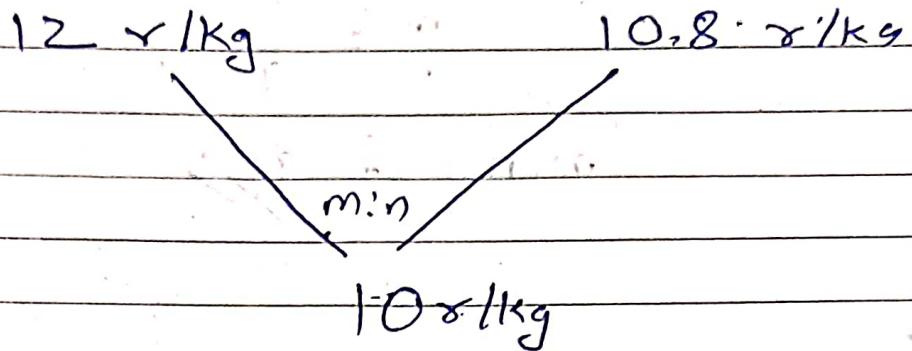
$$T_1 = 20$$

Hence, Teacher weight is 20 kg

Mixtures & Alligations

Date _____
Page _____

Q1)



$$12m + 10.8n = 10(m+n)$$

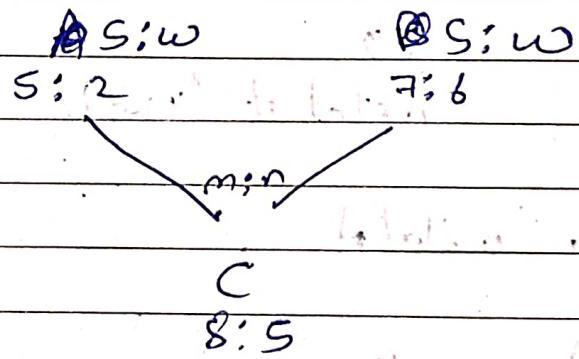
$$12m + 10.8n = 10m + 10n$$

$$2m = 0 - 0.8n$$

$$\frac{m}{n} = \frac{-0.8}{2}$$

Hence it is not possible

Q2)



For dprit

$$\frac{5}{7}m + \frac{7}{13}n = \frac{8}{13}(m+n)$$

$$\frac{65m+49n}{91} = \frac{8}{13}(m+n)$$

$$65m + 49n = 56m + 56n$$

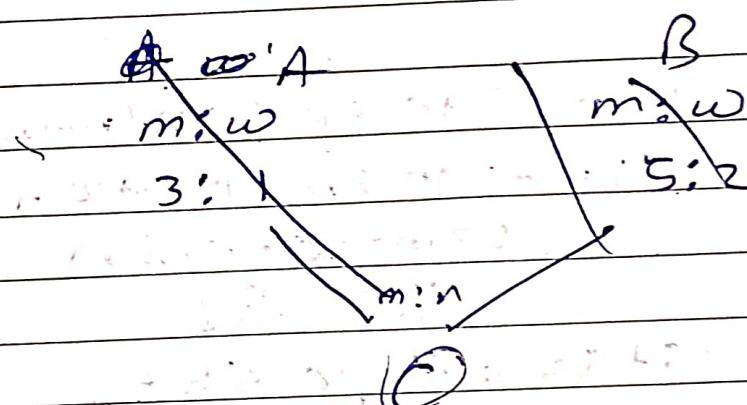
$$65m - 56m = 56n - 49n$$

$$9m = 7n$$

$$\frac{m}{n} = \frac{7}{9}$$

$$m:n = 7:9$$

(Q3)



(Q4)

metal A (4 kg)

metal B (5 kg)

copper in metal A

copper in metal A

$$\frac{4 \times 1}{5} = \frac{4}{5}$$

$$= 0.8$$

$$\frac{5 \times 1}{5} = \frac{5}{5}$$

$$= 0.833$$

zinc in metal A

$$4 - 0.8 = 3.2$$

zinc in metal B

$$5 - 0.833 = 4.167$$

The resultant ratio

$$= \frac{(0.8 + 0.833)}{(3.2 + 4.167)}$$

$$= \frac{1.633}{7.367}$$

$$= \frac{49}{221}$$

$$49:221 //$$

Q5)

w

m

$$0 \propto 1$$

$$12 \propto 1$$

$$a:b$$

w m

$$8 \propto 1$$

$$0xa + 12b = 8(a+b)$$

$$12b = 8a + 8b$$

$$4b = 8a$$

$$1b = 2a$$

$$\frac{a}{b} = \frac{1}{2}$$

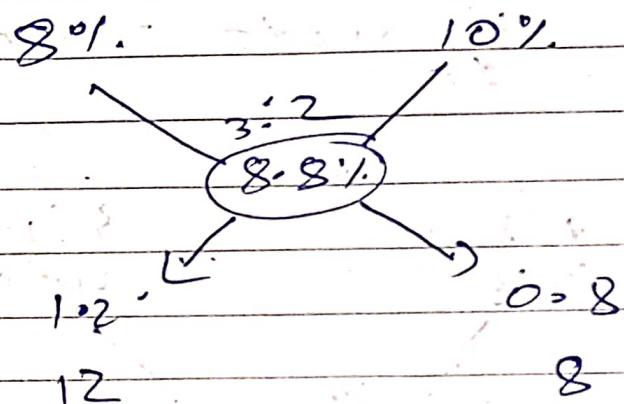
$$a:b = 1:2 //$$

Q6b

Total sum lent = 4000

Average interest = 352

$$\text{Average interest \%} = \frac{352}{4000} \times 100 \\ = \frac{88}{100} = 8.8\%$$



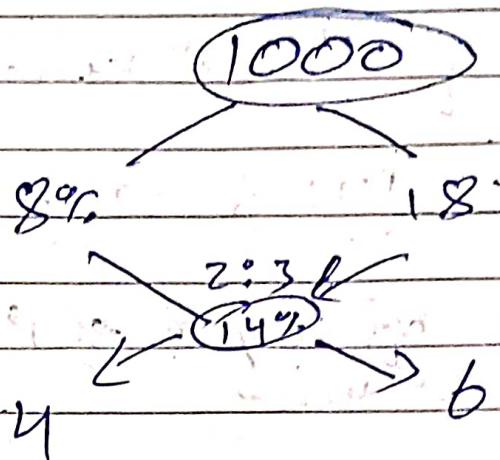
$$8.7 : 90\% \Rightarrow 12 : 8 \\ 3 : 2$$

~~352~~ The deer lent at 8%.

~~$\frac{352 \times 4000}{5} = 28000$~~

$$\frac{352 \times 8000}{8} = 28000$$

Q7)



$$8\% : 18\% \Rightarrow 4 : 6$$

$$2 : 3$$

for 18%.

$$\frac{3}{8} \times 1000$$

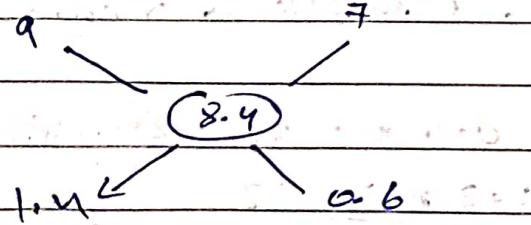
$$600 //$$

Q8)

SP of 1kg mixture = 9.24

Grain % = 10%

CP of 1kg mixture = $9.24 \times \frac{10}{11}$



Ratio of 1st & 2nd kind

$$14:6 \Rightarrow 7:3$$

Let a kg of sugar of 1st be mixed with
27 kg of 2nd kind

$$7:3 = a:27$$

$$\frac{7}{3} = \frac{a}{27}$$

$$a = 7 \times 27 \\ 3$$

$$a = 63 \text{ kg}$$

(Q10)

$$\begin{bmatrix} 60 \text{ l} \\ m/w \end{bmatrix}$$

$$2:3$$

$$\text{milk} = \frac{2}{5} \text{ of } 60 \quad \text{water} = 60 - 24 \\ - 36 \text{ l}$$

$$= 24 \text{ l}$$

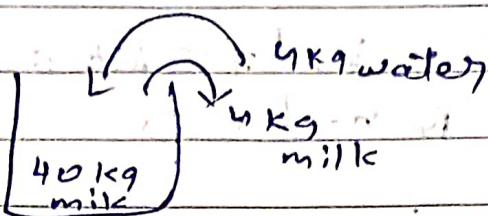
For every 1 l of the mixture that we remove,
we add 0.6 l milk & remove 0.6 water

$$24 + 0.6x = 36 - 0.6x$$

$$1.2x = 12$$

$$\boxed{x = 10 \text{ l}}$$

Q11)



That means 10% of milk is taken out
so

$$40 \text{ } 10\% \text{ of } 40 = \frac{1}{10} \times 40$$

after 1st time

$$= 4$$

$$\text{milk} = 40 - 4$$
$$= 36$$

2nd time

milk get replaced =

~~milk~~ $\frac{10}{100} \times 36$

$$= 3.6$$

$$\text{milk} = 36 - 3.6$$

$$= 32.4$$

3rd time

milk get replaced = $\frac{10}{100} \times 32.4$

$$= 3.24$$

$$\text{milk} = 32.4 - 3.24$$

$$= 29.16$$

After all the process the concentration of milk
in the container is 29.16%

(2) (c) initially A had $7x$ & B had $5x$

after withdraw

$$A = 7x - \frac{7}{4}x^3$$

$$= 7x - \frac{21}{4}$$

$$B = 5x - \frac{5}{4}x^3 + 9$$

$$= 5x - \frac{15}{4} + 9$$

$$\frac{7x - 21}{4} = \frac{7}{9}$$

$$5x - \frac{15}{4} + 9$$

$$\frac{28x - 21}{20x - 15 + 36} = \frac{7}{9}$$

$$252x - 189 = 140x + 147$$

$$112x = 336$$

$$x = \frac{336 + 68}{112}$$

$$= 3$$

do $A = 7x$
 $= 21$

13)

S:C

5:1

S:C

7:2

m:n

S1b

80% of silver

20% of copper

80:20

4:1

$$\frac{5}{6}m + \frac{7}{9}n$$

~~2~~

$$\frac{5}{6}m + \frac{7}{9}n = \frac{4}{5}(m+n)$$

$$\frac{15m+14n}{18} = \frac{4}{5}(m+n)$$

$$75m + 70n = 72m + 72n$$

$$3m = 2n$$

$$\frac{m}{n} = \frac{2}{3}$$

$$m:n = 2:3$$

Q) 21b & 31b

14)

gain % = 20%

Ratio of profit to cost price = $\frac{20}{100}$

$$= \frac{1}{5} \therefore 1:5 //$$

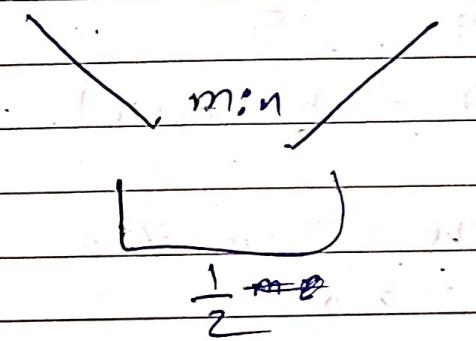
15)

A (m:n)

4:3

B (m:n)

2:3



So,

$$\frac{4}{7}m + \frac{2}{5}n = \frac{1}{2}(m+n)$$

$$\frac{20m+14n}{35} = \frac{1}{2}(m+n)$$

$$40m+28n = 35m+35n$$

$$5m = 7n$$

$$\frac{m}{n} = \frac{7}{5} \text{ or } 7:5 //$$

16)

Total milk contain in mixture = $\frac{3}{5} \text{ of } 20$
 $= 12 \text{ l}$

do water = 8 l

Now,

 1^{st} withdrawal

water milk: $12 - 6 = 6$

after replacement

milk = $10 + 6$
 $= 16$

 2^{n} withdrawal

milk = $16 - 8$
 $= 8$

after replacement

milk = $10 + 8$
 $= 18 \text{ l}$

water = $20 - 18$
 $= 2 \text{ l}$

do m : w = 18 : 2

= 9 : 1 //

17)

Total Petrol = 200 l

1st withdrawl

$$\begin{aligned}\text{Petrol} &= 200 - 40 \\ &= \cancel{1} \cancel{6} 0\end{aligned}$$

2nd withdrawl

$$\begin{aligned}\text{Petrol} &= 160 - 36 \\ &= \cancel{1} \cancel{2} 4\end{aligned}$$

3rd withdrawl

$$\begin{aligned}\text{Petrol} &= \cancel{1} \cancel{2} 4 - 28.8 \\ &= \cancel{1} \cancel{0} 2 - 4\end{aligned}$$

4^m withdrawl

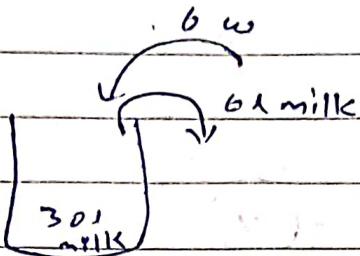
$$\begin{aligned}\text{Petrol} &= \cancel{1} \cancel{0} 2 - 23.04 \\ &= 92.16\end{aligned}$$

Hence, Petrol will be ~~92.16~~ 81.92

$$\begin{aligned}\text{Kerosene} &= 200 - 92.16 \\ &= \cancel{1} \cancel{0} 7.84\end{aligned}$$

$$\begin{aligned}\text{Kerosene} &= 200 - 81.92 \\ &= 118.08 \text{ l}\end{aligned}$$

18)



1st withdrawl

$$\text{milk} = 30 - 6$$

$$= 24$$

2nd withdrawl

$$\text{milk} = 24 - 4.8$$

$$= 19.2$$

3rd withdrawl

$$\text{milk} = 19.2 - 3.84$$

$$= 15.36$$

Hence, milk = 15.36 l //

19)

$$\text{head} = 200$$

$$\text{legs} = 580$$

Let number of pigeon be x & rabbit be y .

So,

$$x + y = 200 \quad \text{(i)}$$

Ø

$$2x + 4y = 580$$

$$x + 2y = 290 \quad \text{(ii)}$$

from eqⁿ ①

$$x = 200 - y \quad \text{--- (11)}$$

putting ② the value of x in eqⁿ ⑪

$$x + 2y = 290$$

$$200 - y + 2y = 290$$

$$y = 90$$

$$x = 200 - 90$$

$$\boxed{x = 110}$$

~~number of pigeon = 110~~

(20) Total mixture = 729

$$\text{milk} = \frac{7}{9} \times 729 = 567 \text{ l}$$

$$\text{water} = \frac{2}{9} \times 729 = 162 \text{ l}$$

If all water is added

$$\frac{567}{162+x} = \frac{7}{3}$$

$$1701 = 1134 + 7x$$

$$567 = 7x$$

$$\boxed{x = 81}$$

(2) Let the distance travel by foot be x

do

$$x + 90 - x = 90 \quad \text{---(1)}$$

& Time required

$$q = \frac{x}{8} + \frac{90-x}{17}$$

$$\frac{17x + 720 - 8x}{136} = 9$$

$$17x + 720 - 8x = 1224$$

$$9x = 456$$

$$x = 56$$

distance travelled through foot = 56 km //

(22) Let the price of 3rd class be x

do,

$$\frac{126 + 135 + 2x}{1+1+2} = 153$$

$$126 + 135 + 2x = 150 \quad 153$$

4

$$261 + 2x = 612$$

$$2x = 351$$

$$x = 175.5$$