



SSC - CHSL

←—————→
COMBINED HIGHER SECONDARY LEVEL

STAFF SELECTION COMMISSION

VOLUME – V

Arithmetic



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TIME & WORK

Work :- Any amount of job done in order to achieve something in respect of time is called work.

Time :- It is the duration of time taken to complete the work.

Efficiency :- It is the amount of work done in a day or a month or an hour.

Formula :-

$$\text{Total Work} = \text{Time} \times \text{Efficiency}$$

$$\text{Time} = \frac{\text{Total Work.}}{\text{Efficiency.}}$$

$$\text{Efficiency} = \frac{\text{Total work}}{\text{Time}}$$

PRACTICE EXAMPLES

BASIC QUESTIONS TYPE

Q.1 A can do a work in 20 days, B can do the same work in 10 days. so in how many days can A and B do it together?

sol:

Basic:-

Let the work is x

Work done by A in 20 Days is x
 Work done by A in 1 Day is $\frac{x}{20}$
 Work done by B in 10 Days is x
 Work done by B in 1 Day is $\frac{x}{10}$

So: Efficiency of A = $\frac{x}{20}$ } Work done
in a day
is efficiency
of a person
 \therefore Efficiency of B = $\frac{x}{10}$

$$\begin{aligned} \text{Total Time} &= \frac{\text{Total work}}{\text{Total Efficiency}} \\ &= \frac{x}{\frac{x}{20} + \frac{x}{10}} \end{aligned}$$

$$= \frac{x}{\frac{x+2x}{20}} = \frac{x}{\frac{3x}{20}} = \frac{20}{3} = 6\frac{2}{3} \text{ days}$$

Formula:-

Time taken by A = 20 Days = t_1
 Time taken by B = 10 Days = t_2 .

$$= \frac{t_1 \times t_2}{t_1 + t_2}$$

$$= \frac{20 \times 10}{20 + 10} = \frac{200}{30} = 6\frac{2}{3} \text{ days.}$$

TRICK

A - 20 Days $\frac{20}{20} = 1$ ← efficiency of A
 B - 10 Days $\frac{20}{10} = 2$ ← efficiency of B
 20 - Total work

$$\begin{aligned} \text{Time} &= \frac{\text{Total work}}{\text{efficiency of B}} \\ &= \frac{20}{1+2} = \frac{20}{3} \\ &= 6\frac{2}{3} \text{ Days} \end{aligned}$$

Q. 2 A can do the work in 42 days. A and B together can complete the same work in 14 days then in how many days can B complete the same work?

sol:

$$\begin{array}{l}
 A - 42 \text{ days} \xrightarrow{1} \\
 A+B - 14 \text{ days} \xrightarrow{3} \\
 \hline
 42 - T.W
 \end{array}$$

efficiency of B = $(A+B) - A = 3 - 1 = 2$.
 B's time = $\frac{42}{2} = 21 \text{ Days}$.

Q. 3 A man, a woman and a child can complete the work in 5 days while the woman alone can complete the same work in 12 days and a child can complete the work in 20 days then how much will be taken by man if he does it alone?

sol:

$$\begin{array}{l}
 \text{Man} + \text{Woman} + \text{Child} - 5 \xrightarrow{12} \\
 \text{Woman} - 12 \xrightarrow{5} \\
 \text{Child} - 20 \xrightarrow{3} \\
 \hline
 60
 \end{array}$$

Man's efficiency = $12 - (5+3) = 4$
 Man's time = $\frac{60}{4} = 15 \text{ days}$.

Q. 4 X and Y can together do a work in 12 days, Y and Z in 15 days and, Z and X in 20 days then in how many days will X, Y and Z do it together?

sol:

$$\begin{array}{l}
 X+Y - 12 \text{ Days} \xrightarrow{5} \\
 Y+Z - 15 \text{ Days} \xrightarrow{4} \\
 Z+X - 20 \text{ Days} \xrightarrow{3} \\
 \hline
 60
 \end{array}$$

Efficiency of X, Y, Z

$$X + Y + Y + Z + Z + X = 5 + 4 + 3$$

$$2(X + Y + Z) = 12$$

$$X + Y + Z = \frac{12}{2} = 6$$

Q. 5 Sunita and Anita working alone can do a piece of work in 8 and 12 days respectively. If Sunita, Anita and Ravita do it together can do it in 4 days then in how many days will Ravita do it alone?

Sol: 24 Days

Q. 6 Nitesh and Pawan can do a job together in 18 days, Pawan and Sumit can do it together in 27 days, Sumit and Nitesh can do the same work in 36 days then in how many days will Sumit finish it if he works alone?

Sol: 216 days

Q. 7 A and B can together do a work in 30 days, B and C do the same job in 36 days while C and A do it in 45 days, so in how many days can A alone, B alone and C alone do it separately?

Sol: 72 days, $51\frac{3}{7}$ days, 120 days

ALTERNATE DAY TYPE:

Q. 8 A can do a piece of work in 20 days, B can do the same job in 25 days. If they work alternatively and A starts the work then in how many days will the whole work be finished?

Sol:

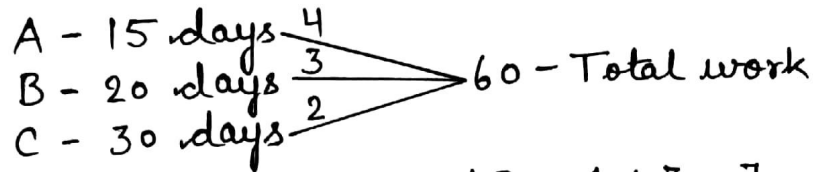
$$\begin{array}{r}
 A - 20 \text{ Days} \xrightarrow{5} \\
 B - 25 \text{ Days} \xrightarrow{4} \quad \quad \quad 100
 \end{array}$$

$$\begin{array}{r}
 1^{\text{st}} \text{ day work by A} - 5 \\
 2^{\text{nd}} \text{ day work by B} - 4 \\
 \hline
 2 \text{ days work} \quad \quad \quad 9 \\
 \downarrow \times 11 \quad \quad \quad \downarrow \times 11 \\
 22 \text{ days} \quad \quad \quad 99
 \end{array}$$

Remaining work = $100 - 99 = 1$
 Next day work will be done by A, so time = $\frac{1}{5}$ days
 Total time = $22 \text{ days} + \frac{1}{5} \text{ days} = 22\frac{1}{5} \text{ days}$

Q. 9 A, B and C can do a piece of work in 15, 20 and 30 days respectively. A starts the work and work till the work finishes while B + C helps A in alternate days term in how many days will the work be finished?

sol:



1^{st} day work done by A and B - $4 + 3 = 7$
 2^{nd} day work done by A and C - $4 + 2 = 6$

$\frac{2 \text{ days work}}{\downarrow \times 4}$
 8 days

$\frac{13}{\downarrow \times 4}$
 52

Remaining work = $60 - 52 = 8$

Next day work done by A and B = $7 \times 1 = 7$

Remaining work = $8 - 7 = 1$

Next day work done by A and C = $\frac{1}{6}$ days

Total Time = $8 + 1 + \frac{1}{6}$
 $= 9\frac{1}{6}$ days

Q. 10 A can do a piece of work in 20 days, B can do the same job in 25 days. If they work alternatively and B starts the work then in how many days will the whole work be finished?

sol: $22\frac{1}{4}$ DAYS

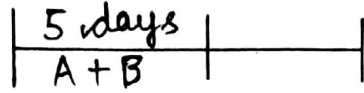
Q. 11 A, B and C can do a work in 12, 15 and 20 days respectively. A starts the work and work till the end while B and C helps A every day. In how many days will the work be finished?

sol: $7\frac{1}{3}$ DAYS

WORK LEFT BEFORE AND AFTER:

Q. 12 A can do a work in 15 days while B can do the same work in 25 days. They started the work together but after 5 days A left the work so in how many days B finishes the remaining work?

sol:



$$\begin{array}{l}
 A - 15 \text{ days} \xrightarrow{5} \\
 B - 25 \text{ days} \xrightarrow{3}
 \end{array}
 \rightarrow 75$$

5 days	Remaining work
A + B = 8 × 5 = 40	75 - 40 = 35
	B's time = $\frac{35}{3} = 11\frac{2}{3}$ days

Q. 13 A can do a piece of work in 45 days, B can do same work in 40 days. They started the work together but after some time A left the work. If the total work is finished in 32 days then after how many days did A leave the job?

sol:

$$\begin{array}{l}
 A - 45 \text{ days} \xrightarrow{8} \\
 B - 40 \text{ days} \xrightarrow{9}
 \end{array}
 \rightarrow 360 - \text{Total work}$$

B did the work for whole time
 So work done by B = $32 \times 9 = 288$
 Remaining work = $360 - 288 = 72$
 A's Time = $\frac{72}{8} = 9$ Days.

Q. 14 A can do a job 20 days and B can do it in 24 days, C can do it in 30 days. If they start the work together but A left the work 5 days after the start of work and C left the work 6 days before the completion of work then in how many days will the whole work be finished?

sol:

Basic:

$$\begin{array}{l}
 A - 20 \text{ days} \xrightarrow{6} \\
 B - 24 \text{ days} \xrightarrow{5} \\
 C - 30 \text{ days} \xrightarrow{4}
 \end{array}
 \rightarrow 120 \text{ T.W}$$

5 days A + B + C	B + C = $15 = 1\frac{6}{9}$ days	6 days B
$5 \times 15 = 75$	$= 120 - (75 + 30) = 15$	$6 \times 5 = 30$

$$\text{Total time} = 5 + 1\frac{6}{9} + 6 = 12\frac{2}{3} \text{ days}$$

TRICK:

Total work
 - (efficiency of person who left \times Time after how much time person left)
 + (efficiency of person who left \times Time before how much time person left)

(Total work) \div (Sum of efficiency of people who worked)

$$\begin{array}{r}
 120 \\
 - 30 = 5 \times 6 \\
 + 24 = 6 \times 4 \\
 \hline
 114 = \frac{114}{5+4} = 12 \frac{2}{3} \text{ days.}
 \end{array}$$

Q. 15 A can do a work in 8 days, B can do the same in 16 days and C can do it in 24 days. They start the work together and A works till the end but C left the job 2 days before the completion of the work and B left the job one day after the C leaves the job. In what time will the whole work be finished?

Sol:

$$\begin{array}{r}
 A - 8 \frac{6}{3} \\
 B - 16 \frac{2}{2} \\
 C - 24
 \end{array}
 \rightarrow 48$$

$$\begin{array}{r}
 48 \\
 + 04 = 2 \times 2 \\
 + 03 = 3 \times 1 \\
 \hline
 55 \\
 \underline{6+3+2} = \frac{55}{11} = 5 \text{ days.}
 \end{array}$$

Q. 16 A do a job in 10 days. B do it in 15 days, they start the work together then after how many days B left the job if the complete job is finished in 8 days?

Sol: 3 DAYS

Q. 17 X can do a work in 30 days, Y can do the same work in 40 days, Z can do the same 20 days. If X left the work after 4 days of starting. Z left the work 1 day before the end of work. So in how many days will the work be finished?

Sol: $12 \frac{2}{9}$ DAYS

RATIO BASED QUESTION:

Q. 18 Ratio of efficiency of A and B is 5 : 7. If A can do a work in 21 days then in how many days will B finish the work alone?

sol: Basic:

$$\begin{array}{l} A : B \\ 5 : 7 \end{array}$$

$$\begin{array}{l} \text{so, efficiency of A} = 5x \\ \text{efficiency of B} = 7x \end{array}$$

$$\text{Total work} = 5x \times 21 = 105x$$

$$B's \text{ time} = \frac{\text{Total work}}{\text{efficiency}} = \frac{105x}{7x} = 15 \text{ days}$$

#TRICK

A : B	}	When total work is same, then efficiency $\times \frac{1}{\text{time}}$
efficiency 5 : 7		
time - 7 : 5		
$\times 3 \downarrow$		
21		$\times 3 \downarrow$
		15 days

Q. 19 The working capacity of A is 50% more than B. If A can complete a work in 12 days then in how many days can B complete this work alone?

sol:

A	:	B	
150	:	100	
3	:	2	- efficiency
2	:	3	- time
$\times 6 \downarrow$		$\times 6 \downarrow$	
12		18	days

Q. 20 The working efficiency of X is 60% more than Y. If they work together can complete it in 7 days then in how many days will Y finish it?

sol: $18\frac{1}{5}$ DAYS

Q. 21 The ratio of efficiency of A and B is 3 : 4. Time taken by B is 9 days then in how much time will A complete the total work?

sol: 12 DAYS

MDH BASED QUESTIONS:

Q. 22 in these type of questions, we compare things with other, one point is totally given examiner and in another point, something is missing and we have to find that.

sol:

Formula:

$$\frac{M_1 D_1 H_1 \times \text{Other}}{W_1} = \frac{M_2 D_2 H_2 \times \text{Other}}{W_2}$$

M - Man/Woman/child/person.

D - Days

H - Hours

W - Work

Q. 23 16 persons can complete a work in 10 days then how many persons are required to complete this work in 40 days?

sol:

$$\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$$

$$\frac{16 \times 10}{1} = \frac{x \times 40}{1}$$

$$x = 4 \text{ Days.}$$

Q. 24 20 men do $\frac{3}{5}$ of the work in 450 days then how many persons are required to complete the remaining work in 75 days?

sol:

$$\frac{20 \times 450}{\frac{3}{5}} = \frac{x \times 75}{(1 - \frac{3}{5})}$$

$$\frac{20 \times 450 \times 5}{3} = \frac{x \times 75 \times 5}{2}$$

$$80 \text{ men} = x$$

∴ Total quantity of any work is 1 in itself.

Q. 25 280 women can complete $\frac{3}{2}$ work in 80 days then how many women are required to complete $\frac{7}{2}$ work in 40 days?

sol: 240 WOMEN

Q. 26 20 children can complete 2 works in 40 days, working 8 hours per day. so 40 children can do 1 work in how many days, if they work 4 hours per day?

Sol: 20 DAYS

OR - AND TYPE QUESTIONS:

Q. 28 If 4 men or 5 women can complete a work in 43 days then in how many days 3 men and 7 women can complete it?

Sol: Basic - 1

If 4 men work then work = $4m \times 43$ — (1)

If 5 women work then work = $5w \times 43$ — (2)

$$\text{eq}^n \text{ (1)} = \text{eq}^n \text{ (2)}$$

$$4m \times 43 = 500 \times 43$$

$$\frac{M}{W} = \frac{5}{4} \quad \text{or.} \quad 4m = 500$$

$$1m = \frac{5}{4}w, \quad 1w = \frac{4}{5}m$$

Let consider eqⁿ (1) total work then:

Time taken by 3 men and 7 women.

$$= \frac{4m \times 43}{3m + 7w} = \frac{4m \times 43}{3m + 7 \times \frac{4}{5}m} \quad \left\{ 1w = \frac{4}{5}m \right.$$

$$\therefore \frac{4m \times 43}{15m + 28m} = \frac{4m \times 43 \times 5}{43m}$$

$$\frac{\quad}{5} = 20 \text{ days.}$$

Basic-2

$4m = 500$ (It is found in Basic-1)

$$1m = \frac{500}{4}$$

Let's consider total work eqⁿ (2) from Basic-1 then,

TRICK / BEST METHOD

$$4m = 500$$

$$m : w$$

$$5 : 4$$

Apply MDH formula.

$$4m \times 43 = (3m + 7w) \times x$$

$$4 \times 5 \times 43 = (3 \times 5 + 7 \times 4) \times x$$

$$x = 20 \text{ Days.}$$

Or. \therefore {Choose one from all "OR" related data

$$5w \times 43 = (3m + 700) \times x$$

$$5 \times 4 \times 43 = (3 \times 5 + 7 \times 4) \times x$$

$$x = 20 \text{ days.}$$

$$\begin{aligned}
 \text{Time taken by 3 men and 7 Women} &= \frac{500 \times 43}{3M + 700} \\
 &= \frac{500 \times 43}{3 \times \frac{5}{4} W + 700} \\
 &= \frac{500 \times 43}{\frac{4300}{4}} = 20 \text{ days.}
 \end{aligned}$$

Formula method:

$$\begin{array}{rcl}
 4m = 500 & \text{---} & 43 \text{ days} - \textcircled{1} \\
 3m + 700 & \text{---} & x \text{ days} - \textcircled{2}
 \end{array}$$

Let's multiply eqⁿ ① all data and divide by sum of cross multiplies of number.

$$= \frac{4 \times 5 \times 43}{28 + 15} = \frac{4 \times 5 \times 43}{43} = 20 \text{ days}$$

Q. 29 If 4 men or 6 women or 8 children can do a job in 39 days then in how many days can 1 man and 1 woman and 1 child complete it?

sol:

$$4m = 600 = 8C$$

$$m : 00 : C$$

$$6 \times 8 : 4 \times 8 : 4 \times 6$$

$$6 : 4 : 3$$

$$4m \times 39 (1m + 1w + 1c) \times x$$

$$4 \times 6 \times 39 (6 + 4 + 3) \times x$$

$$24 \times 39^3 = 13 \times x = 72 \text{ days} = x$$

Q. 30 3 men or 5 women can complete $\frac{3}{4}$ th part of the job in 40 days then in how many days 5 men and 7 women can complete the whole work?

sol: $17 \frac{9}{13}$ DAYS

Q. 31 3 men or 6 women or 12 children can complete $\frac{4}{7}$ th part of the job working 4 hours a day in 30 days. Then in how many days can 2 men and 5 women and 2 children complete $\frac{2}{7}$ th part of the job working 3 hours a day?

Sol: 12 DAYS

MORE TIME TAKEN TYPE QUESTIONS:

Q. 32 salman alone takes 4 more days than taken by salman and rushid together while doing a work, rushid alone takes 9 more days than taken by salman and rushid together. what is the time taken by salman and rushid while working together?

Sol:

Basic:

Let's consider time taken by salman and Rushid is x

so:

Salman - $x+4$ ($x+9$)

Rushid - $x+9$ ($x+4$)

$(x+9)(x+4)$ - Total work

Time taken by salman and rushid

$$\therefore \frac{(x+9)(x+4)}{x+9+x+4} = x$$

$$\frac{x^2+9x+4x+36}{2x+13} = x$$

$$x^2+13x+36 = 2x^2+13x$$

$$2x^2 - x^2 = 36$$

$$x^2 = 36$$

$$x = 6 \text{ days.}$$

TRICK-

Multiply the more no. of days of both people and underroot that, we will get the time taken by both.

$$\Rightarrow \sqrt{4 \times 9} = 6 \text{ days.}$$

Q. 33 A takes 36 more days than taken by A and B together, B takes 64 more days than taken by A and B together, what is the time taken by A alone in doing the complete work?

Sol: 84 DAYS

Q. 34 X takes 16 more days than taken by X and Y together, Y takes 25 more days than taken by X and Y together. what is the time taken by Y alone in doing the complete work?

Sol: 45 DAYS

WORK & WAGES

Wages are distributed on the basis of work done by Person. If the work is same for all then it is distributed on the basis of their Efficiency.

When work done is different for all then

$$\text{Wages} \propto \text{work done.}$$

When work done is same for all then

$$\text{Wages} \propto \text{Efficiency.}$$

PRACTICE EXAMPLES

Q.1 sunil can do a piece of work in 20 days while suresh can do the same work in 30 days. if they finish the work together and at the end of the month they get Rs. 15000. what is the part of sunil in this amount?

sol: Basic:

$$\begin{array}{l}
 \text{Sunil - 20 days} \\
 \text{Suresh - 30 days}
 \end{array}
 \begin{array}{l}
 \nearrow 3 \\
 \searrow 2
 \end{array}
 \begin{array}{l}
 \\
 \\
 \end{array}
 \begin{array}{l}
 \\
 60 - \text{Total Work.}
 \end{array}$$

Total time when they work together = $60/5 = 12$ dys.

Work done by Sunil : Work done by Suresh.

$$12 \times 3 \quad : \quad 12 \times 2$$

$$36 \quad : \quad 24$$

$$\text{Amount for 60 works} = 15000$$

$$\text{Amount for 1 work} = \frac{15000}{6}$$

Amount for Sunil's 36 works

$$= \frac{15000}{6} \times 36 = 9000 \text{ ₹}$$

Q. 2 A, B and C are employed to do a job in Rs. 522. If A and B together do the $\frac{23}{29}$ part of the work, B and C together do the $\frac{15}{29}$ part of the work. Find the share of A in this amount?

sol:
Basic Let total work is x

Work done by A and B = $\frac{23}{29}x$ - (1)

Work done by A = (A+B) - B
 $= \frac{23}{29}x - \frac{9}{29}x$

Work done by B and C = $\frac{15}{29}x$ - (2)

A = $\frac{14x}{29}$

Add Eqn (1) and Eqn (2)

A+B+B+C = $\frac{23}{29}x + \frac{15}{29}x$

Work done by C = (B+C) - B

C = $\frac{15x}{29} - \frac{9x}{29} = \frac{06x}{29}$

A + 2B + C = $\frac{38x}{29}$

A : B : C

$\frac{14x}{29} : \frac{9x}{29} : \frac{06x}{29}$

(A + 2B + C) - (A + B + C) = $\frac{38x}{29} - x$

B = $\frac{9x}{29}$

Share of A = $522 \times \frac{14}{29} = 18 \times 14 = 252 \text{ ₹}$

Q. 3 A, B and C together complete a work on the contract of Rs. 729. If A and B together complete $\frac{17}{27}$ part of the work. Then how much money C gets?

sol: Let total work is 27

A and B together do = $\frac{17}{27} \times 27 = 17$

Work done by C = (A+B+C) - (A+B)

= 27 - 17 = 10

Money C gets = $729 \times \frac{10}{27} = 270 \text{ ₹}$

Q. 4 A, B and C together complete a contract in Rs. 289. A and B together do $\frac{11th}{17}$ part of the contract, B and C together do the $\frac{19th}{17}$ part of the contract. what is the part of B in the amount gotten by all of these?

Sol: 51

Q. 5 A and B together can complete a work in 18 days while A alone can do that in 36 days. if at the end of the month they get Rs 25 from their work. what is the share gotten by both separately?

Sol: 112.5, 112.5

Q. 6 A and B together can complete a work in 18 days while A alone can do that in 36 days. if at the end of the month they get Rs. 225 from their work. what is the share gotten by both separately?

Sol:

$$x : y : z$$

$$\text{Ratio of wages} = 3 : 5 : 2$$

$$x : y : z$$

$$\text{Ratio of } 3 \times 10 : 5 \times 12 : 2 \times 15$$

Total wages:

$$30 : 60 : 30 = 120$$

$$\downarrow \times 20$$

$$1200 \text{ ₹}$$

$$\downarrow \times 20$$

$$2400 \text{ ₹}$$

Q.7 X, Y and Z completed a work costing Rs. 2400. X worked for 10 days and Y for 12 days and Z for 15 days. If their wages are in the ratio of 3 : 5 : 2, how much amount will be received by Y?

sol:

$$\begin{array}{l} \text{Ratio of wages} = \end{array} \begin{array}{ccc} X & : & Y & : & Z \\ 3 & : & 5 & : & 2 \end{array}$$

$$\begin{array}{l} \text{Ratio of total wages} \end{array} \begin{array}{ccc} X & : & Y & : & Z \\ 3 \times 10 & : & 5 \times 12 & : & 2 \times 15 \\ 30 & : & 60 & : & 30 = 120 \\ & & \downarrow \times 20 & & \downarrow \times 20 \\ & & 1200 \text{ ₹} & & 2400 \text{ ₹} \end{array}$$

Q.8 A can do a work in 19 days and B can do it in 57 days. They start working together but after 5 days B left the work and remaining work is done by A alone. For this work they get Rs. 5700 then how much amount will B get out of total amount?

sol:

$$\begin{array}{l} \text{A - 19 days} \\ \text{B - 57 days} \end{array} \begin{array}{c} \nearrow 3 \\ \searrow 1 \end{array} \begin{array}{c} 57 \\ 57 \end{array}$$

B work for 5 days, so work done by B = $1 \times 5 = 5$

work done by A = $57 - 5 = 52$

work of A \propto work of B

$$52 : 5 = 57$$

$$\begin{array}{cc} \downarrow \times 100 & \downarrow \times 100 \end{array}$$

$$500 \text{ ₹} \quad 5700 \text{ ₹}$$

Q. 9 A does a work for 4 days and B does it for 5 days, if they both have equal efficiency and for their work they get Rs. 810 then what will be the share of A in that amount?

Sol: 360

Q. 10 A and B can do a work in 25 days and 20 days respectively. B starts the work and after 5 days, A replaces B. Find the share of A in Rs. 6000 after the completion of the work?

Sol: 4500

PIPE & CISTERN

Pipe and Cistern topic is based on the same concept of time and work. Here only difference is work is done by pipe and there it was done by human being. In this topic, we consider filling pipe with '+' sign and emptying pipe with '-' sign:-

Capacity of cistern → It is the maximum power of holding or containing liquid in the cistern.

Efficiency of pipe :- →

It is the quantity of liquid flows through pipe or hole in respect of an hour or a minute or a second.

Time :- It is the period of time taken to fill a certain amount of liquid.

$$\text{Efficiency of pipe} \times \text{Time} = \text{Total capacity}$$

$$\text{Efficiency of pipe} = \frac{\text{Total Capacity}}{\text{Time}}$$

$$\text{Time} = \frac{\text{Total capacity}}{\text{Efficiency of pipe}}$$