Time and Work

Rule:

If A can do a piece of work in n days, then The work done by A in one day = 1/n

Rule:

Chocolate Rule or unitary method

Rule:

Whosoever is more efficient will take less time

Rules and Tricks:

Rule 1: Universal Rule

This rule can be used in almost every problems.

- If M₁ persons can do W₁ work in D₁ days and M₂ persons can do W₂ works in D₂days then we can say
 - $M_1D_1W_2 = M_2D_2W_1$
- If the persons work T_1 and T_2 hours per day respectively then the equation gets modified to $M_1D_1T_1W_2 = M_2D_2T_2W_1$
- If the persons has efficiency of E₁ and E₂ respectively then,

$$M_1D_1T_1E_1W_2 = M_2D_2T_2E_2W_1$$

Rule:

If A can do a piece of work in X days and B can do the same work in Y days, then both of them working together will do the same work in

XY days.

X + y

Rule:

Two persons A and B, working together, can complete a piece of work in X days. If A, working alone, can complete the work in Y days, then B, working alone, will complete the work in

XY days.

Y - X

 salary must be divided according to efficiency i.e number of Chocolates consumed

- IF A can complete a task in x days
- B Can Complete same task in y days
- C can Complete same task in z days
- Then in how many days A' and B' and C' will complete the same task
- No of days = 1/((A'/Ax) + (B'/By) + (C'/Cz))
- Where A 'B 'C 'new set of persons
- A B C previous corresponding set of persons
- x y z Corresponding number of days

PIPES & CISTERNS

✓ If a pipe can fill a tank in x hours, then

Part of tank filled in 1 hour =
$$\frac{1}{x}$$

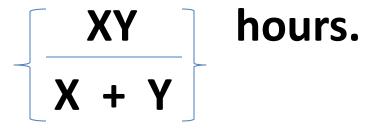
✓ If a pipe can empty a tank in y hours, then

Part of tank emptied in 1 hour =
$$\frac{1}{y}$$

Rules and Tricks:

Rule 1:

Two pipes A and B can fill (or empty) a cistern in X and Y hours respectively, while working alone. If both the pipes are opened together, then the time taken to fill (or empty) the cistern is given by



- Chocolate Rule or unitary method
- Every time outlet pipe is mentioned efficiency will come with negative sign

Rule 4:

A pipe can fill a cistern in x hours. Because of a leak in the bottom, it is filled in y hours. If it is full, the time taken by the leak to empty the cistern is



TIME & DISTANCE



✓ Speed, Time and Distance

Speed =
$$\frac{Distance}{Time}$$
 Time = $\frac{Distance}{Speed}$

Distance = Speed
$$x$$
 Time

✓ km/hr to m/sec conversion:

$$a \text{ km/hr} = a \times \frac{5}{18} \text{ m/sec}$$

✓ m/sec to km/hr conversion:

a m/sec = a x
$$\frac{18}{5}$$
 km/hr



- ✓ If the ratio of speeds of A and B is a : b, then the ratio of the time taken by them to cover the same distance will be $\frac{1}{a}:\frac{1}{b}$ or b : a
- ✓ Suppose a man covers a certain distance at x km/hr and an equal distance at y km/hr, then the average speed of whole journey = $\frac{2xy}{x+y}$ km/hr

Average Speed = Total Distance / Total Time

- S1/S2 = Square root of T2 /Square Root T1
- (only to be used when after crossing each other is mentioned in statement)

PROBLEM ON TRAINS

- ✓ Time taken by a train of length I meters to pass a pole or standing man or signal post is equal to the time taken by the train to cover I meters.
- ✓ Time taken by a train of length I meters to pass a stationary object of length b meters is equal to the time taken by the train to cover (I + b) meters.
- ✓ Suppose two trains are moving in same direction at u m/s and v m/s, where u>v, then their relative speed will be (u v) m/s.
- ✓ Suppose two trains are moving in opposite direction at u m/s and v m/s, then their relative speed will be (u + v) m/s.

Time taken by two trains to cross each other if moving in same direction

$$T=D/S=(L1+L2) / (S1-S2)$$
 S1>S2

If moving in opposite direction

$$T = D/S = (L1 + L2) / (S1 + S2)$$

L1= Length of first Train & S1= Speed of First Train

L2= Length of Second Train & S2= Speed of second Train

BOATS & STREAMS

✓ Downstream / Upstream

- In water, the direction along the stream is called Downstream and the direction against the stream is called Upstream.
- ✓ If the speed of a boat in still water is u km/hr and the speed of stream in v km/hr, then
 - Speed Downstream = (u + v) km / hr
 - Speed Upstream = (u v) km / hr
- ✓ If the speed downstream is a km/hr and speed upstream is b km/hr, then:
 - Speed in still water = $\frac{1}{2}$ (a + b) km/hr
 - Rate of stream = $\frac{1}{2}$ (a b) km/hr