



**gradeup**

Sahi Prep Hai Toh Life Set Hai

# **TIME & WORK**

## **Part-1**

# Time & work

- 1 → Basics of Time & work I
- 2 → Basics of Time work II
- 3 → Previous Year Questions ↑↑ 30 Questions
- 4 → Previous Year + Pipes & Cistern
- No. of Questions → 60+



# Time & Work



A  $\rightarrow$  12 days

B  $\rightarrow$  15 days

A+B  $\rightarrow$  ?

Eg1. A can do a piece of work in 12 days whereas B can do the same work in 15 days. In how many days (A & B) together can do the same work if they are working together?

I<sup>st</sup>

Let work  $\rightarrow$  1 unit

A's 1 day work =  $\frac{1}{12}$  units

B's 1 day work =  $\frac{1}{15}$  unit

(A+B)'s 1 day work =  $\frac{1}{12} + \frac{1}{15} = \frac{9 \times 3}{60 \times 20}$

No. of day to complete work =  $\frac{1}{\frac{3}{20}} = \frac{20}{3}$  days

II<sup>nd</sup>

Work = 60 units

A  $\rightarrow$  5 ✓  
B  $\rightarrow$  4 ✓

$\frac{60}{9 \times 3} = \frac{20}{3}$  days



**Ans.**  $\frac{20}{3}$  Days

eg

A  $\rightarrow$  20 days (10)  
B  $\rightarrow$  25 days (8)  
C  $\rightarrow$  40 days (5)

work  $\rightarrow$  200

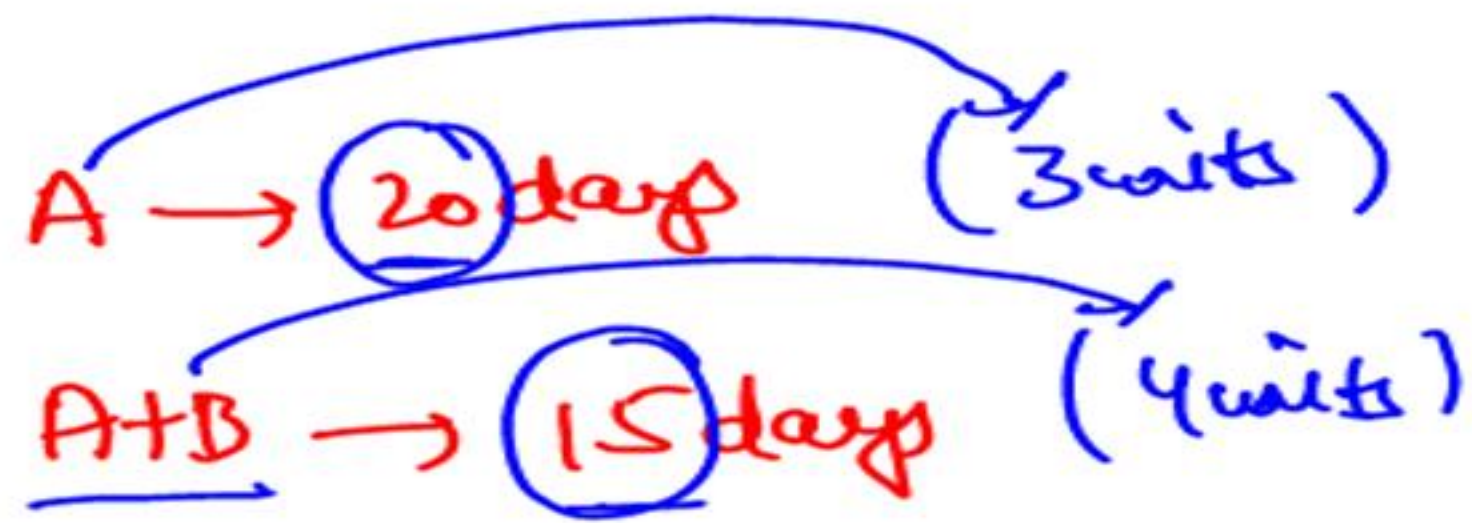
A+B+C  $\rightarrow$  ??

$$\frac{200}{23}$$

$$= 8 \frac{16}{23} \text{ days}$$







Eg2. If A can do a piece of work in 20 days whereas (A & B) together can do the same piece of work in 15 days. In how many days B alone can do the same work?

Sol<sup>n</sup>

Work  $\rightarrow$  60 units

B  $\rightarrow$  1 unit/day

$$\text{No. of days} \rightarrow \frac{60}{1} = 60 \text{ days}$$

**Ans. 60 Days**

Eg

$$A \rightarrow \underline{30} \text{ days } (10)$$

$$\text{Work} = 300 \text{ units}$$

$$B \rightarrow \underline{80} \text{ days } (6)$$

$$A+B+C \rightarrow \underline{12} \text{ days } (25)$$

$$\begin{matrix} 10 & 6 \end{matrix}$$

$$C \rightarrow ??$$

$$\frac{\cancel{300} 100}{93}$$

$$= 33\frac{1}{3} \text{ days}$$

Sol<sup>n</sup>work  $\rightarrow$  60 units

$$\underline{A+B} = 3 \text{ units} \quad \text{--- (1)}$$

$$\underline{B+C} = 5 \text{ units} \quad \text{--- (2)}$$

$$C+A = 4 \text{ units} \quad \text{--- (3)}$$

---


$$2(A+B+C) = 12 \text{ units}$$

$$\underline{A+B+C} \rightarrow \underline{6 \text{ units/day}}$$

$$A = 1 \text{ unit/day}$$

$$B = 2$$

$$C = 3$$

Eg3.  $(A+B) \rightarrow \underline{20} \text{ days } (3)$   
 $(B+C) \rightarrow \underline{12} \text{ days } (5)$   
 $(C+A) \rightarrow \underline{15} \text{ days } (4)$

- (i)  $A+B+C \rightarrow ?? \quad \frac{60}{6} = 10 \text{ days}$   
 (ii)  $A \rightarrow ?? \quad \frac{60}{1} = 60 \text{ days}$   
 (iii) Most efficient  $\rightarrow ??$



C



**Ans. (i)  $A + B + C \rightarrow 10$  days**  
**(ii)  $A \rightarrow 60$  days**  
**(iii) Most efficient  $\rightarrow C$**



$$A+B \rightarrow \underline{30} \text{ days } (7)$$

$$B+C \rightarrow \underline{35} \text{ days } (6)$$

$$C+A \rightarrow \underline{42} \text{ days } (5)$$

$$\text{Work} = 210 \text{ units}$$

$$(i) A+B+C \rightarrow ?? \frac{210}{9} = \underline{\underline{\frac{70}{3} \text{ days}}}$$

$$(ii) B \rightarrow ?? \frac{210}{4} \Rightarrow 52.5 \text{ days}$$

(iii) Least efficient C

$$A+B = 7$$

$$B+C = 6$$

$$C+A = 5$$

$$2(A+B+C) = 18$$

$$A+B+C = \underline{\underline{9 \text{ units}}}$$

$$B = 4$$

$$C = 2$$

$$A = 3$$

work  $\rightarrow$  60  
 $A \rightarrow 12 \text{ days } (5)$

$B \rightarrow 15 \text{ days } (4)$

Eg4 (i). A can do a work in 12 days, whereas B can do the same work in 15 days. If they work on alternate days starting with A, in how many days the work will be completed?

A }  
 B }

2 days  $\rightarrow$  9 units

12 days  $\rightarrow$  54 units

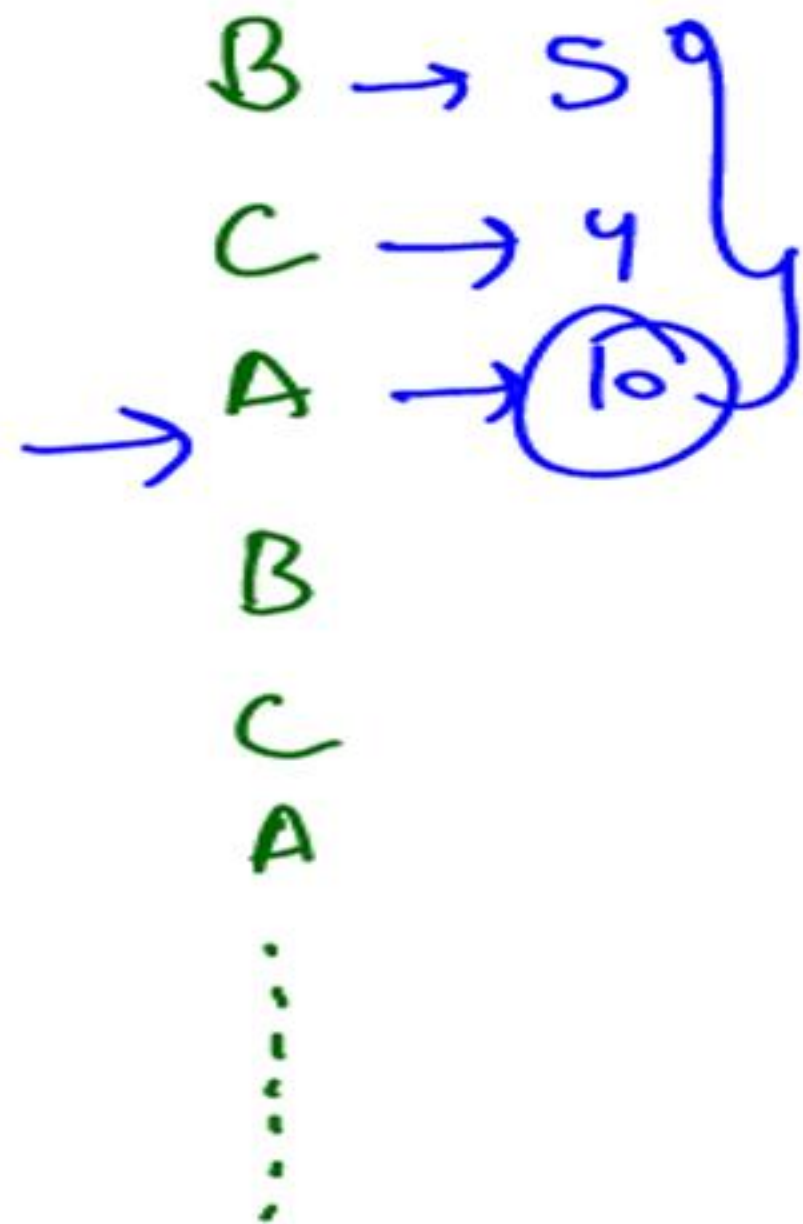
13 days  $\rightarrow$  59 units

$13 \frac{1}{4} \text{ days}$

⋮

**Ans.**  $13\frac{1}{4}$  *days*





$A \rightarrow \underline{20} \text{ days } (10)$

Work = 200

$B \rightarrow \underline{40} \text{ days } (5)$

$C \rightarrow \underline{50} \text{ days } (4)$

$3 \text{ days} \rightarrow \underline{19} \text{ units}$

$30 \text{ days} \rightarrow 190$

$31 \text{ day} \rightarrow 195$

$32 \text{ days} \rightarrow 199$

$32 \frac{1}{10} \text{ days}$





Eg4 (ii).

A  $\rightarrow$  15 days (8) work = 120  
 B  $\rightarrow$  20 days (6)  
 C  $\rightarrow$  40 days (3)

A  
 B  
 C  
 A  
 B  
 C

In how many days work will be completed?

3 days  $\rightarrow$  17 units

21 days  $\rightarrow$  119

$21 \frac{1}{8}$  days

**Ans.**  $21\frac{1}{8}$  days

Eg4 (iii).

A → 12 hours (5) } A  
 B → 15 hours (4) } 9 a.m.  
 C → 20 hours (3) }

B  
10 a.m. C  
11 a.m.

At what time the work will be completed?

Work → 60 units

2:50 pm

I<sup>st</sup>

9am - 10am

10am - 11am

A (5)

(A+B) (9) ✓

60 - 14 = 46 units

$\frac{46 \times 23}{12 \times 6}$

$3 \frac{5}{6}$  hours

3 hours 50 min

Ans. 2:50 PM

 $\text{II}^{\text{nd}}$ A  $\rightarrow$  9am XB  $\rightarrow$  10am  $X-1$ C  $\rightarrow$  11am  $X-2$ Sol<sup>n</sup>

let X hours

A  $\rightarrow$  12 hours (5) work = 60  
withB  $\rightarrow$  15 hours (4)C  $\rightarrow$  20 hours (3)2:50pm

$$5X + 4(X-1) + 3(X-2) = 60$$

$$12X = 70$$

$$X = \frac{35}{6} \quad \underline{\underline{\text{Show 50 min}}}$$



fill

empty

Sol<sup>n</sup>

$$A \rightarrow \underline{15} \text{ hours } (4 \text{ l/h})$$

$$B \rightarrow \underline{20} \text{ hours } (-3 \text{ l/h})$$

$$\text{Capacity} = 60 \text{ litres}$$

$$\frac{60}{1} = \underline{60 \text{ hours}}$$

Eg5. Pipe A can fill a tank in 15 hours whereas Pipe B can empty the same tank in 20 hours. If both the pipes are operating simultaneously, in how many hours, the tank gets filled?



Ans. 60 Hours

eg fill A  $\rightarrow$  50 hrs

empty B  $\rightarrow$  100 hrs

fill C  $\rightarrow$  200 hrs (S)

empty D  $\rightarrow$  500 hrs (-2)

(A+B+C+D)  $\rightarrow$  ??

Capacity = 1000

$$\frac{1000}{13}$$



$$\text{Work} = \underline{120 \text{ units}}$$

$$A \rightarrow \underline{30 \text{ days}} \left( \underline{4 \text{ units/day}} \right) \quad \text{V. Imp}$$

$$\text{destroy } B \rightarrow \underline{40 \text{ days}} \left( -3 \text{ units/day} \right)$$

Eg6. A can do a work in 30 days whereas B can destroy the same work in 40 days. If they are working on alternate days starting with A, in how many days the work will be completed?

A }  
B }

A

B

⋮

$$2 \text{ days} \rightarrow 1 \text{ unit}$$

$$232 \text{ days} \leftarrow \underline{116 \text{ units}} (120 - 4)$$

$$\underline{233 \text{ days}}$$

$$\begin{array}{r} +4 \\ \hline 120 \text{ units} \end{array}$$

Note :- Unitary Method can ~~be~~ used till (Total work - Positive work)



eg  $A \rightarrow 25 \text{ days } (8)$   $\text{Work} = \underline{\underline{200}}$

destroy  $B \rightarrow 40 \text{ days } (-5)$

A

B

A

B

⋮

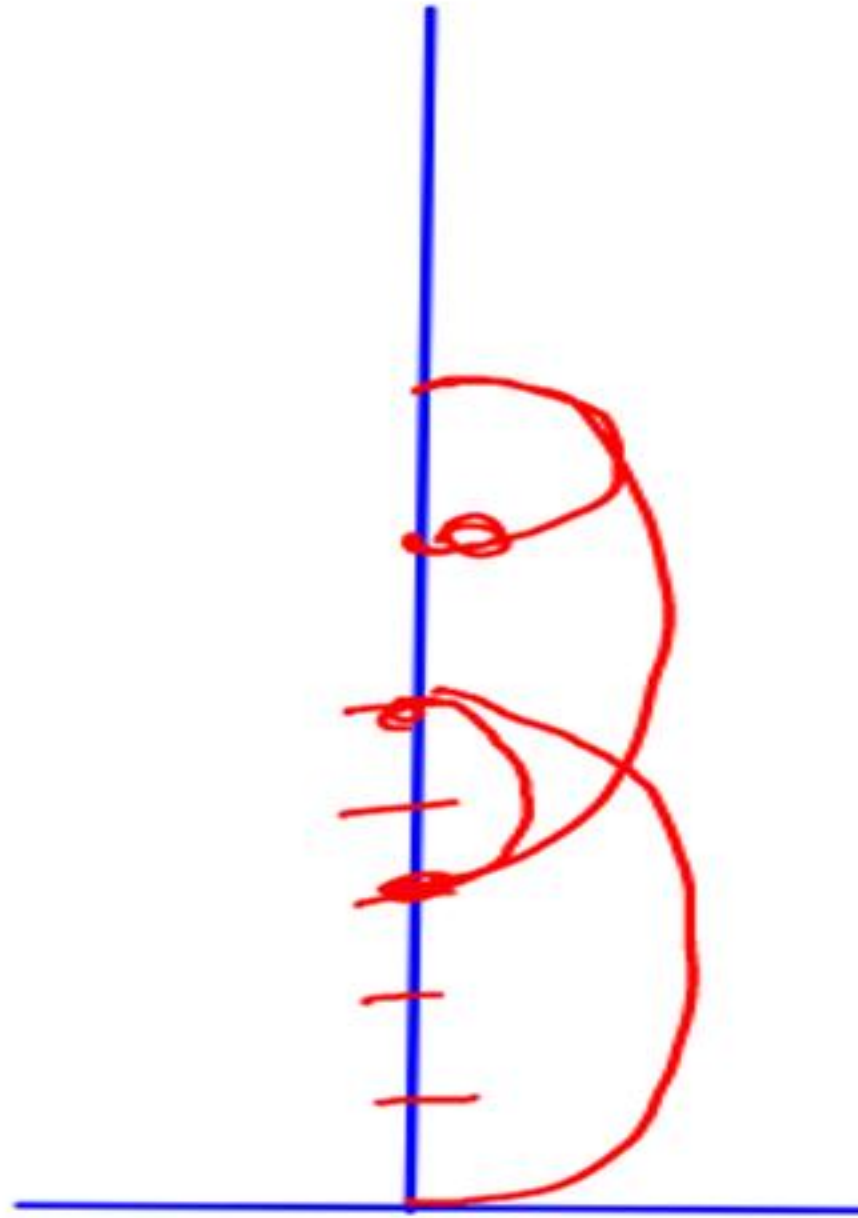
$2 \text{ days} \rightarrow 3 \text{ units}$   
 $128 \text{ days} \rightarrow 192 \text{ units}$   $\times 64$

$129 \rightarrow \frac{+8}{200}$

$200 - 8 = 192$

129 days ✓





Eg. A monkey climbing up a greased pole, ascends 5 meters & slips down 2 meters in alternate minutes. If the pole is 35 meters high, then how many minutes will monkey take to reach the top?

1 min  $\rightarrow$  +5m

1 min  $\rightarrow$  -2m

$$35 - 5 = 30 \text{m}$$

2 min  $\rightarrow$  3 meters

2 min  $\rightarrow$  30 meters

3 min  $\rightarrow$  35 meters





# CONCEPT OF EFFICIENCY

Efficiency  $\rightarrow$  speed

A's efficiency is 3 times of B's efficiency.

$$\begin{aligned} \underline{A} &= \underline{3} \text{ unit/day} \\ \underline{B} &= \underline{1} \text{ unit/day} \end{aligned}$$

$$A = 1 \text{ day}$$

$$B = 3 \text{ days}$$

Efficiency  
work  
wages  
Time

A

x

x

x

y

:

:

:

:

B

y

y

y

x

Wages & work

A : B

work  $\rightarrow$   $x : y$

wage  $\rightarrow$   $x : y$



I<sup>st</sup>A  $\rightarrow$  3 units/day <sup>(x-60)</sup> daysB  $\rightarrow$  1 unit/day <sup>x</sup> days

Eg7 (i). A is three times efficient worker than B and is therefore, able to complete a work in 60 days earlier than B. The number of days that A and B together will take ~~the~~ to complete the work, is:

$$3(x-60) = 1 \cdot x$$

$$2x = 180$$

$$\underline{\underline{x = 90}}$$

- ~~(a) 22½~~  
(c) 27½

- (b) 25  
(d) 30

A  $\rightarrow$  30 days <sup>(3)</sup>B  $\rightarrow$  90 days <sup>(1)</sup>

(A+B)  $\rightarrow$   $\frac{90}{4}$

\* A is thrice as efficient as B

Ind better

A

B

Gap

1 day

3 days

2 day

30 days

90 days

60 days

$$A+B \rightarrow \frac{90}{4} = 22\frac{1}{2} \text{ days}$$

**Ans. (a)**

Eg7 (ii). A does half as much work as B in one sixth of the time. If together they take 10 days to complete a work, how much time will B take to do it alone?

(a) 70 days

(b) 30 days

(c) 40 days

(d) 50 days

PYQ of SSC