

**GS FOUNDATION (2023-24) BOOKLET 19**  
**&**  
**CSAT FOUNDATION 1.0 (2023-24) BOOKLET 18**  
**Time and Work**

---

## Contents

Introduction .....	2
Time and Work Problems .....	2
1) Efficiency and time: Inverse relation .....	2
2) Work Finished in a Day .....	2
3) Work Finished Together.....	2
4) Finding Individual Efficiency Given Combined Efficiency.....	2
Pipe and Tank Problems.....	3
5) Tank filled together.....	3
6) Tank Getting Filled and Emptied at the Same Time.....	3
7) PYQs .....	4

## Introduction

This topic deals with two types of problems: time and work and pipes and tank problems. This is extremely simple topic wherein all you have to focus on is how much work a person does in a single day or how much tank is getting filled or emptied in an hour and rest is simply calculations with fractions.

## Time and Work Problems

### 1) EFFICIENCY AND TIME: INVERSE RELATION

- Basic idea is that, more efficient person will finish work earlier. If A finishes work in 10 days and B finishes the same work in 15 days, then A is more efficient than B. In fact, A is 33.33% more efficient than B (how)

### 2) WORK FINISHED IN A DAY

- If a person finishes some work in 'n' days then he/she finishes  $\frac{1}{n}$  work in a single day.

### 3) WORK FINISHED TOGETHER

- If A finishes work in 'n' days and B finishes same work in 'm' days. How much time would it take for them to finish the work together?

As above: A finishes  $\frac{1}{n}$  work in 1 day and B finishes  $\frac{1}{m}$  work in 1 day. Thus, together in 1 day they finish:  $(\frac{1}{n} + \frac{1}{m})$  work

Thus, to finish total work they will require:  $\frac{1}{\frac{1}{n} + \frac{1}{m}}$  days

- How about work done together by 3 persons?

### 4) FINDING INDIVIDUAL EFFICIENCY GIVEN COMBINED EFFICIENCY

If A and B together finish the work in 't' days. 'A' alone finishes a work in 'n' days. How much time would it take for B alone to finish the work?

Extension of same idea:

- Together they finish  $\frac{1}{t}$  work in 1 day Out of which  $\frac{1}{n}$  is done by A. So, the rest be done by B.
- So, B does  $\frac{1}{t} - \frac{1}{n}$  work in 1 day. Consequently, it'll take  $\frac{1}{\frac{1}{t} - \frac{1}{n}}$  Days for B to finish the work alone.

Q. A can do a piece of work in 10 days and 'B' can do the same work in 15 days. How long will they take to finish the work, if both work together?

- A. 5 days
- B. 6 days
- C. 8 days

D. 10 days

Q. A and B can do a piece of work together in 9 days; B and C can do it together in 12 days while C and A can do it together in 18 days. Calculate the number of days in which A, B and C working together can finish this work.

- A. 4 days
- B. 8 days
- C. 10 days
- D. 12 days

A and B undertook to do a piece of work for 4500. 'A' alone could do it in 8 days and B alone in 12 days. With the assistance of C, they finished the work in 4 days. Find C's share of money if each one gets money in proportion of amount of work they did.

- A. Rs. 750
- B. Rs. 900
- C. Rs. 1200
- D. Rs. 1500

### Pipe and Tank Problems

This topic is very similar to time and work topic. Same concepts are extended here.

- If a pipe fills full tank in 't' hours, how much tank would it fill in 1 hour?  $-\frac{1}{t}$  is the part of tank filled in an hour
- Similarly, if some leak is emptying the tank in 'e' hours, how much tank is being emptied per hour?  $-\frac{1}{e}$  tank is getting emptied per hour

### 5) TANK FILLED TOGETHER

If two pipes are filling the tank together wherein, A fills tank alone in  $t_1$  hours and B alone fills it in  $t_2$  hours. How much time would it take for them to fill the tank together?

### 6) TANK GETTING FILLED AND EMPTIED AT THE SAME TIME

If one pipe is filling the tank and other is emptying it at the same time. The filling pipe alone would fill it in  $t_1$  hours and emptying tank alone would empty it alone in  $t_2$  hours. How much time would it take for tank to get filled fully?

- Filling pipe fills  $\frac{1}{t_1}$  tank in 1 hour
- Emptying tank empties  $\frac{1}{t_2}$  tank in 1 hour
- Together:  $\frac{1}{t_1} - \frac{1}{t_2}$  tank gets filled in 1 hour
- Time needed to fill the tank:  $\frac{1}{\frac{1}{t_1} - \frac{1}{t_2}}$  hours

- **NOTE:** If there are multiple pipes at work simultaneously, for every filling pipe you'll have  $\frac{1}{t_i}$  in the per hour expression and for every emptying pipe, you'll have  $-\frac{1}{t_i}$

Q. A tank is connected to three pipes – Pipe A, B and C. Pipe A can fill the tank in 6 hours, B can fill the tank in 8 hours and pipe C can empty the full tank in 12 hours. How much time will it take to fill the tank if all pipes are started together?

- A. 3 hours 30 minutes
- B. 4 hours 48 minutes
- C. 5 hours
- D. 6 hours 12 minutes

## 7) PYQS

CSE 2023: A, B, C working independently can do a piece of work in 8, 16 and 12 days respectively. A alone works on Monday, B alone works on Tuesday, C alone works on Wednesday; A alone, again works on Thursday and so on.

Consider the following statements:

1. The work will be finished on Thursday.
2. The work will be finished in 10 days.

Which of the above statements is/are correct?

- (a) 1 Only (b) 2 Only (c) Both 1 and 2 (d) Neither 1 nor 2

CSE 2022: 24 men and 12 women can do a piece of work in 30 days. In how many days can 12 men and 24 women do the same piece of work?

- (a) 30 days
- (b) more than 30 days
- (c) Less than 30 days or more than 30 days
- (d) Data is inadequate to draw any conclusion

CSE 2021: A man completes  $\frac{7}{8}$  of a job in 21 days. How many more days will it take him to finish the job if quantum of work is further increased by 50%

- (a) 24
- (b) 21
- (c) 18
- (d) 15

CSE 2020: A person x can complete 20% of work in 8 days and another person Y can complete 25% of the same work in 6 days. If they work together, in how many days will 40% of the work be completed?

- (a) 6
- (b) 8
- (c) 10
- (d) 12

CSE 2017: P works thrice as fast as Q, whereas P and Q together can work four times as fast as R. If P, Q and R together work on a job, in what ratio should they share the earnings?

- (a) 3 : 1 : 1
- (b) 3 : 2 : 4
- (c) 4 : 3 : 4
- (d) 3 : 1 : 4

CSE 2016: Ram and Shyam work on a job together for four days and complete 60% of it. Ram takes leave then and Shyam works for eight more days to complete the job. How long would Ram take to complete the entire job alone?

- (a) 6 days
- (b) 8 days
- (c) 10 days
- (d) 11 days

CSE 2016: W can do 25% of a work-in 30 days, X can do  $\frac{1}{4}$  of the work in 10 days, Y can do 40% of the work in 40 days and Z can do  $\frac{1}{3}$  of the work in 13 days. Who will complete the work first?

- (a) W
- (b) X
- (c) Y
- (d) Z

CSE 2015: Two pipes A and B can independently fill a tank completely in 20 and 30 minutes respectively. If both the pipes are opened simultaneously, how much time will they take to fill the tank completely?

- (a) 10 minutes
- (b) 12 minutes
- (c) 15 minutes
- (d) 25 minutes

## 8) COMPREHENSION

Pharmaceutical patents grant protection to the patentee for the duration of the patent term. The patentees enjoy the liberty to determine the price of medicines, which is time-limited to the period of monopoly, but could be unaffordable to the public. Such patent protection offered to the patentees is believed to benefit the public over the longer term through innovations and research and development (R&D), although it comes at a cost, in the nature of higher prices for patented medicine. The patent—provide the patentee with a legitimate mechanism to get returns on the costs incurred in innovation and research.

Q. Based on the above passage, the following assumptions have been made:

1. Patent protection given to patentees puts a huge burden on public's purchasing power in accessing patented medicines.
2. Dependence on other countries for pharmaceutical products is a huge burden for developing and poor countries.
3. Providing medicines to the public at affordable prices is a key goal during the public health policy design in many countries.
4. Governments need to find an appropriate balance between the rights of patentees and the requirements of the patients.

Which of the above assumptions are valid?

- (a) 1 and 2 (b) 1 and 4 (c) 3 and 4 (d) 2 and 3

The paradox of choice is illustrated by the story of Buridan's ass. Jean Buridan, the 14th century philosopher, wrote about free will and the inability to choose due to numerous choices and uncertainties. In the story, a donkey stands between two equally appealing stacks of hay. Unable to decide which to eat, it starves to death. Changes in technology and innovations such as smart phones and tablets only exacerbate our glut of choices. Constant connectivity and overconsumption of real-time data and social media can leave little room for self-reflection and rest, making decisions more difficult. Life is about choices. Many people are overwhelmed with attractive life choices, yet find themselves unhappy and anxious.

Q. Which one of the following statements best reflects the most logical message implied by the above passage?

- (a) Modern technology enfeebls societal structure and makes life difficult.
- (b) Modern life is full of uncertainties and endless difficult choices.
- (c) We are influenced by the opinion of others and have no courage to follow our own convictions.
- (d) In our lives, having too few choices may not be a good thing, but having too many can be equally as difficult.