

Time And Work Ex-11.1

TIME AND WORK

Exercise - 11.1

- 1) Time taken by Rakesh to do a piece of work
= 20 days.

The work he can do in 4 days = $\frac{4}{20} = \frac{1}{5}$

$\therefore \Rightarrow \frac{1}{5}$ th work.

- 2) No. of days taken by Rohan for $\frac{1}{3}$ Painting = 6 days.

No. of days taken by Rohith to complete painting

$$= \frac{1}{3} \times 3 = 1 \text{ painting.}$$

$$\therefore 6 \times 3 = 18 \text{ days.}$$

- 3) Work done by Anil in 1 day = $\frac{1}{5}$
Work done by Ankur in 1 day = $\frac{1}{4}$

Thus work done together = $\frac{1}{5} + \frac{1}{4} = \frac{9}{20}$.
in one day.

$$1 \text{ day} = \frac{9}{20} \text{ work.}$$

$$\begin{aligned}\text{Total work done} &= 20/9 \text{ day} \\ &= 2 \frac{2}{9} \text{ day.}\end{aligned}$$

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4)

$W = \text{work done.}$

work done by mohan in 1 hour = $\frac{1}{9} W$

work done by mohan and sohan in 1 hour = $\frac{1}{4} W$

$$\text{work done by sohan in hrs.} = \frac{1}{4} - \frac{1}{9} = \frac{5}{36} W$$

$$\therefore \frac{36}{5} \text{ hrs} = W$$

Time taken to work done by sohan = $36/5$ hrs.

5)

$W = \text{work done}$

work done by Sita in 1 hour = $\frac{1}{9}$

work done by Mita in 1 hour = $\frac{1}{6}$

work done by Rita in 1 hour = $\frac{1}{12}$

$$\therefore \text{work done together} = \frac{1}{9} + \frac{1}{6} + \frac{1}{12} = \frac{13}{36}$$

$\therefore$ Hence time taken by them to work together
= $36/13$ hours

6)

w = work done.

work done by A in 1 hour = $\frac{1}{20} w$

work done by B in 1 hour = $\frac{1}{24} w$

work done by A, B and C = $\frac{1}{8} w$

$$\begin{aligned} \text{work done by C} &= \frac{1}{8} - [B + A] \\ &= \frac{1}{8} - \left[\frac{1}{20} + \frac{1}{24} \right] = \frac{1}{30} w. \end{aligned}$$

$\therefore$ Time taken by C = 30 hours.

7)

A and B can do a work in 1 day = $\frac{1}{18} w$

B and C can do a work in 1 day = $\frac{1}{24} w$

A and C can do a work in 1 day = $\frac{1}{36} w$

Now, Adding we get.

$$2(A+B+C)'s \cdot 1 \text{ day work} = \frac{1}{18} + \frac{1}{24} + \frac{1}{36} = \frac{1}{8}.$$

$$A+B+C = \frac{1}{8} \times 2 = \frac{1}{4}.$$

$\therefore$ Thus A, B, C can finish work together in 4 days.

8)

A and B's can 1 day's work = $\frac{1}{12}$

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

C and A's 1 day's work = $\frac{1}{20}$

Adding, we get.

$$2(A+B+C)'s \text{ 1 day's work} = \frac{1}{12} + \frac{1}{15} + \frac{1}{20}$$

$$= \frac{12}{60} = \frac{1}{5}$$

$$(A+B+C)'s \text{ 1 day's work} = \frac{1}{10}.$$

Now, A's 1 day's work = [A, B and C's 1 day work] -
[B and C's 1 day's work]

$$= \frac{1}{10} - \frac{1}{15} = \frac{2-1}{30} = \frac{1}{30}$$

$$\therefore \Rightarrow \frac{1}{10} - \frac{1}{15} = \frac{3-2}{30} = \frac{1}{30}$$

So, A alone can finish the work in 30 days.

9)

A, B, C can reap a field in $15\frac{3}{4}$ days.

B, C, D can reap a field in 14 days.

C, D, A can reap a field in 18 days.

D, A, B can reap a field in 21 days.

$$A, B \text{ and } C \text{'s } 1 \text{ day work} = \frac{1}{15\frac{3}{4}} = \frac{1}{\frac{63}{4}} = \frac{4}{63}.$$

$$B, C \text{ and } D \text{'s } 1 \text{ day work} = \frac{1}{14}$$

$$C, D \text{ and } A \text{'s } 1 \text{ day work} = \frac{1}{18}$$

$$D, A \text{ and } B \text{'s } 1 \text{ day work} = \frac{1}{21}$$

Adding up.

$$3[A+B+C+D] = \frac{4}{63} + \frac{1}{14} + \frac{1}{18} + \frac{1}{21}$$

$$= \frac{5}{21}$$

$$A+B+C+D = \frac{1}{3} \times \frac{5}{21} = \frac{5}{63}.$$

Thus, A, B, C and D can finish the work in $\frac{63}{5}$ days.
or = $12\frac{3}{5}$ days.

19)

A and B can polish the floors of building in 10 days.

A alone can do $\frac{1}{4}$ th of work in 12 days.

$$A \text{ and } B \text{'s work in } 1 \text{ day} = \frac{1}{10} \text{th}.$$

$$A \text{'s work in } 1 \text{ day} = \frac{1}{4} \times \frac{1}{12} = \frac{1}{48}.$$

$$B \text{'s one day work} = \frac{1}{10} - \frac{1}{48} = \frac{48-10}{480} = \frac{38}{480}$$

$$= \frac{19}{240}.$$

Thus B can finish work in $\frac{240}{19}$ days or $12\frac{12}{19}$ days.

11)

A and B's work in 1 day = $\frac{1}{20}$.

A alone can do $\frac{1}{5}$ th of work in 12 days.

A's 1 day work = $\frac{1}{5} \times \frac{1}{12} = \frac{1}{60}$.

B's one day work = $\frac{1}{20} - \frac{1}{60} = \frac{1}{30}$.

Thus B finishes the work in 30 days.

12)

A and B's one day work = $\frac{1}{10}$.

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

They work for 2 days = $\frac{2}{10} = \frac{1}{5}$.

Remaining work = $1 - \frac{1}{5} = \frac{4}{5} = \frac{8}{10}$

Remaining work done by B = $\frac{\frac{8}{10}}{\frac{1}{15}} = \frac{8}{10} \times 15 = \frac{120}{10} = 12$
(or) $12 \frac{1}{2}$ days

13)

$$A's \text{ one day work} = \frac{1}{40}$$

$$B's \text{ one day work} = \frac{1}{45}$$

$$\text{If They work together} = \frac{1}{40} + \frac{1}{45}$$

$$\begin{aligned} \text{They are work together for 10 days} &= 10 \left[\frac{1}{40} + \frac{1}{45} \right] \\ &= \frac{17}{36} \end{aligned}$$

$$\begin{aligned} \text{Remaining work left if B goes away} &= 1 - \frac{17}{36} \\ &= \frac{36-17}{36} = \frac{19}{36} \end{aligned}$$

$\therefore$ Remaining work done by A

$$1 \text{ day} \rightarrow \frac{1}{40}$$

$$x \rightarrow \frac{19}{36}$$

$$x \times \frac{1}{40} = 1 \times \frac{19}{36}$$

$$x = \frac{19 \times 40}{36}$$

$$= \frac{190}{9}$$

$$= 21 \frac{1}{9} \text{ days}$$

$$14) \text{ Asheesh work in 1 minute} = \frac{1}{20}$$

$$\text{Chinki work in 1 minute} = \frac{1}{25}$$

They paint doll together for 5 minutes.

Asheesh and chinki work together in 1 minute

$$= \left[\frac{1}{20} + \frac{1}{25} \right]$$

Asheesh and chinki work together in 5 minutes

$$= 5 \left[\frac{1}{20} + \frac{1}{25} \right] = \frac{9}{20}$$

$$\text{Remaining work} = 1 - \frac{9}{20} = \frac{20-9}{20} = \frac{11}{20}$$

Time ^{taken for} Remaining work done by Asheesh

$$= \frac{11}{20} \times 20 = 11 \text{ minutes.}$$

- 15 A and B can do a piece of work in 6 days and 4 days respectively. A started the work; worked at it for 2 days and then was joined by B. Find the total time taken to complete the work?

Sol. Given,

A can do a piece of work in 6 days

B can do a piece of work in 4 days

The amount of work completed by A in 1 day = $\frac{1}{6}$

The amount of work completed by B in 1 day = $\frac{1}{4}$

The amount of work completed by A in 2 days = $2 \times \frac{1}{6} = \frac{1}{3}$

The amount of work completed by both A and B in 1 day

$$= \frac{1}{6} + \frac{1}{4} = \frac{10}{24} = \frac{5}{12}$$

As B joined in the work after two days where A started to work.

$\frac{1}{3}$ part of work is completed by A.

Now A and B join together to complete the work remaining

i.e. $\frac{2}{3}$

$\therefore$ Time taken by both A and B to complete remaining work is

In one day $\frac{5}{12}$ amount of work is completed

$\frac{2}{3}$ amount of work is completed in 2 days

$$\therefore x = \frac{\frac{2}{3} \times 1}{\frac{5}{12}} = \frac{2 \times 12}{3 \times 5} = \frac{24}{15} = \frac{8}{5} \text{ days}$$

$$\therefore \text{The total time taken to complete a piece of work} \\ = 2 + \frac{8}{5} = \frac{18}{5} = 3\frac{3}{5} \text{ days.}$$

16. 6 men can complete the electric fitting in 7 days. How many days will it take if 21 men do the job.

Sol: Given,

The no of days taken to complete fitting = 7 days

The no of men = 6.

$\therefore$ The amount of electric fitting done by 1 men is $\frac{1}{6}$

The amount of work done by 6 men in 7 days = 42 units

The amount of work done by 21 men in 2 days = 42 units

$$\therefore 21 \times 2 = 42$$

$$\therefore 2 = 2$$

$\therefore$ The no of days taken to do the job by 21 men is

17. 8 men can do a piece of work in 9 days. In how many days will 6 men do it?

Sol: Given,

The no. of men = 8

The no of days taken to complete a piece of work by 8 men
= 9 days.

The amount of work done by 8 men in 9 days = 8×9
= 72 units

$$= \frac{750}{7} = 107 \frac{1}{7} \text{ pages.}$$

20. If 12 boys earn Rs 840 in 7 days, what will 15 boys earn in 6 days?

Sol. Given,

Amount earned by 12 boys in 7 days = 840/-

$$\text{Amount earned by 1 boy in 1 day} = \frac{840}{12 \times 7} = \frac{840}{84} = 10/-$$

$\therefore$ The amount earned by 15 boys in 6 days is

Since the amount earned by each boy in 6 days

$$\text{is } 6 \times 10 = 60/-$$

$$\therefore \text{The amount earned by 15 boys in 6 days is } = 60 \times 15 = 900/-$$

21. If 25 men earn Rs 1000 in 10 days, how much will 15 men earn in 15 days?

Sol. Given,

The amount earned by 25 men in 10 days = 1000/-

$$\begin{aligned} \text{The amount earned by 1 man in 1 day} &= \frac{1000}{25 \times 10} \\ &= 4/-, \end{aligned}$$

$$\therefore \text{The amount earned by 15 men in 15 days} = 15 \times 4 = 60/-$$

∴ the amount earned by 15 men in 15 days = 60×15
= 900/-

22. Working 8 hours a day, Ashu can copy a book in 18 days.
How many hours a day should he work so as to finish the work in 12 days?

Sol. Given,

Ashu is working 8 hours a day to copy a book in 18 days.

The amount of work required to complete the book =

$$8 \times 18 = 144 \text{ units.}$$

∴ Time required to spend in a day by Ashu to complete the work in 12 days is $x = \frac{144}{12} = 12 \text{ hours}$

∴ Time required to complete the book = 12 hours.

23. If 9 girls can prepare 135 garlands in 3 hours.
How many girls are needed to prepare 270 garlands in 1 hour?

Given,

The no. of garlands prepared by 9 girls in 3 hours = 135.

The no. of garlands prepared by 1 girl in 1 hour

$$= \frac{135}{9 \times 3} = \frac{135}{27} = 5$$

∴ The no. of girls required to make 1 garland = $\frac{1}{5}$ in 1 hour

∴ The no of girls required to prepare 270 garlands
in 1 hour = $270 \times \frac{1}{5} = 54$ girls.

24. A cistern can be filled by one tap in 8 hours,
and by another in 4 hours. How long will it take to
fill the cistern if both taps are opened together.

Sol: Given,

Time taken to fill a cistern by a tap = 8 hours.

Time taken to fill a cistern by another tap = 4 hours

Let,

The first tap be 'A', the second tap be B.

Amount of cistern filled by tap A in 1 hour = $\frac{1}{8}$

Amount of cistern filled by tap B in 1 hour = $\frac{1}{4}$.

Amount of cistern filled by both taps in 1 hour = $\frac{1}{4} + \frac{1}{8}$.

$$= \frac{3}{8}.$$

The remaining $\frac{5}{8}$ part of cistern will be filled in

$$= \frac{\frac{5}{8} \times 1}{\frac{3}{8}} = \frac{5}{3} \text{ hours}$$

∴ Amount of time taken to fill the cistern =

$$1 + \frac{5}{3} = \frac{8}{3} = 2\frac{2}{3} \text{ hours}$$

25. Two taps A and B can fill an overhead tank in 10 hours and 15 hours respectively. Both the taps are opened for 4 hours and then B is turned off. How much time will A take to fill the remaining tank?

Sol: Given,

Time taken by tap A to fill tank = 10 hours

Time taken by tap B to fill tank = 15 hours.

Amount of tank filled in 1 hour by tap A = $\frac{1}{10}$

Amount of tank filled in 1 hour by tap B = $\frac{1}{15}$.

Amount of tank filled by both taps in 4 hours

$$= 4 \left(\frac{1}{10} + \frac{1}{15} \right) = \frac{4 \times 25}{150} \\ = \frac{2}{3}$$

Remaining $\frac{1}{3}$ part of tank will be filled by tap A.

$\therefore \frac{1}{3}$ part of tank is filled by tap A in $\frac{1}{3} \times 10$

$$= \frac{10}{3} \text{ hours}$$

$$= 3\frac{1}{3} \text{ hours}$$

26. A pipe can fill a cistern in 10 hours. Due to a leak in the bottom it is filled in 12 hours. When the cistern is full, in how much time will it be emptied by the leak?

Sol: Given,

Time required to fill a cistern by a pipe = 10 hours

Amount of cistern filled in 1 hour = $\frac{1}{10}$

Time taken to fill the cistern when it is leaked = 12 hours

Amount of cistern filled in 1 hour when it is leaked
= $\frac{1}{12}$.

Total amount of cistern emptied due to leakage in one hour

$$= \frac{1}{10} - \frac{1}{12} = \frac{2}{120} = \frac{1}{60}$$

∴ To empty the whole cistern the time taken = 60 hours.

27. A cistern has two inlets A and B which can fill it in 12 hours and 15 hours. A outlet can empty the full cistern in 10 hours. If all the three pipes are opened together in the empty cistern, how much time will they take to fill the cistern completely?

21: Given,

Time taken to fill cistern with inlet A = 12 hours

Amount of cistern filled by A in 1 hour = $\frac{1}{12}$ part

Time taken to fill cistern with inlet B = 15 hours

Amount of cistern filled by B in 1 hour = $\frac{1}{15}$ part.

Time taken to empty the cistern by outlet = 10 hours.

Amount of cistern emptied in 1 hour = $\frac{1}{10}$ part.

∴ Total time taken to fill the cistern when all are

opened is

∴ The amount of cistern filled in 1 hour =

$$\frac{1}{12} + \frac{1}{15} - \frac{1}{10} = \frac{5+4-6}{60} \\ = \frac{3}{60} = \frac{1}{20}$$

∴ The time taken to fill whole cistern = 20 hours.

28. A cistern can be filled by a tap in 4 hours and emptied by an outlet pipe in 6 hours. How long will it take to fill the cistern if both the tap and pipe are opened together?

Sol: Given,

Time taken to fill a cistern by a tap = 4 hours

Amount of cistern filled in one hour = $\frac{1}{4}$ part

Time taken to empty cistern by a pipe = 6 hours

Amount of cistern emptied in one hour = $\frac{1}{6}$ part.

The amount of cistern filled in one hour by both are

$$\text{opened} = \frac{1}{4} - \frac{1}{6} = \frac{6-4}{24} = \frac{2}{24} = \frac{1}{12} \text{ part}$$

Time taken to fill the cistern when tap and pipe outlet are kept opened = 12 hours.