Explore | Expand | Enrich

Time and work(work equivalence)

Points to remember

▪If a person can do a piece of work in **‘n’** days, then in one day, the person will do **‘1/n’** work. Conversely, if the person does **‘1/n’** work in one day, the person will require **‘n’** days to finish the work.

▪In questions where there is a comparison of work and efficiency, we use the formula

$\mathbf{M_1 D_1 H_1 E_1 / W_1 = M_2 D_2 H_2 E_2 / W_2}$, where

M = Number of workers

D = Number of days

H = Number of working hours in a day

E = Efficiency of workers

W = Units of work

▪In case we have more than one type of workers, then the formula modifies to

$\Sigma (M_i E_i) D_1 H_1 / W_1 = \Sigma (M_j E_j) D_2 H_2 / W_2$, where ‘i’ and ‘j’ may vary as per the number of workers.

▪If a person A is ‘n’ times more efficient than person B, then

Ratio of work done by A and B in one day (Ratio of efficiencies) = **n : 1**

Ratio of time taken by A and B = **1 : n**

▪Total work = No. of Days x Efficiency

▪If a group of people are given salary for a job they do together, their individual salaries are in the ratio of their individual efficiencies if they work for same number of days. Otherwise, salaries are divided in the ratio of units of work done.

Question: 01

Rock is twice as efficient as Sana and can finish a piece of work in 25 days less than Sana. Sana can finish this work in how many days?

A. 45 days
B. 30 days
C. 50 days
D. 53 days

Answer: C

Explanation:

Efficiency of Sana = 2: 1.

Rock will take 1/2 of time as compared to Sana.

Say, Sana takes 2x days and Rock takes x days. ∴ 2x – x = 25 ⇒ x = 25.

∴Sana takes 25 × 2 = 50 days to do the work.

Question: 02

A can do a piece of work in 10 days, and B can do the same work in 20 days. With the help of C, they finished the work in 4 days. C can do the work in how many days, working alone?

A. 20 days
B. 10 days
C. 40 days
D. 30 days

Answer: B

Explanation:

C alone will take 1/4– 1/10 – 1/20 = 2/20 = 1/10 ⇒ 10 days to complete the work.

Question: 03

Chetan is thrice as efficient as Mamta and together they can finish a piece of work in 60 days. Mamta will take how many days to finish this work alone?

A. 80 days
B. 160 days
C. 240 days
D. 320 days

Answer: C

Explanation:

Chethan is thrice as efficient as Mamta. Let, Mamta takes 3x days and Chetan takes x days to complete the work. ∴ 1/x + 1/3x = 1/60 ⇒ x = 80. ∴ Mamta will take 80 × 3 = 240 days to complete the work.

Question: 04

B can do a piece of work in 6 days. A alone can do it in 10 days. If both together can do the work in how many days?

A. 3.75 days
B. 4 days
C. 5 days
D. 6 days

Answer: A

Explanation:

1/6 + 1/10 = 8/30 = 4/15

15/4 = 3.75 days

Question: 05

A and B together can do a piece of work in 8 days. If A alone can do the same work in 12 days, then B alone can do the same work in?

A. 20 days
B. 16 days
C. 24 days
D. 30 days

Answer: C

Explanation:

B = 1/8 – 1/2 = 1/24 => 24 days

Question: 06

A can do a piece of work in 4 days. B can do it in 5 days. With the assistance of C they completed the work in 2 days. Find in how many days can C alone do it?

A. 10 days
B. 20 days
C. 4 days
D. 5 days

Answer: B

Explanation:

C = 1/2 - 1/4 - 1/5 = 1/20 => 20 days

Question: 07

A and B can do a piece of work in 8 days and 6 days respectively. They work together for 2 days and then A leaves. In how many days after that B will complete the work alone.

A. 2 days
B. 1 ½ days
C. 3 days
D. 3 ½ days

Answer: B

Explanation: 07

3/20 * 2 + (2 + x)/5 = 1

x = 1 ½ days

Question: 08

A can do a piece of work in 30 days. He works at it for 5 days and then B finishes it in 20 days. In what time can A and B together it?

A. 16 ⅔ days
B. 13 ⅓ days
C. 17 ⅓ days
D. 16 ½ days

Answer: B

Explanation: 08

5/30 + 20/x = 1

x = 24

1/30 + 1/24 = 3/40

40/3 = 13 1/3 days

Question: 09

A can do a piece of work in 10 days. He works at it for 4 days and then B finishes it in 9 days. In how many days can A and B together finish the work?

A. 6 days
B. 7 days
C. 8 days
D. 9 days

Answer: A

Explanation:

4/10 + 9/x = 1 => x = 15

1/10 + 1/15 = 1/6 => 6 days

Question: 10

A is half good a work man as B and together they finish a job in 14 days. In how many days working alone B finish the job?

A. 20 days
B. 21 days
C. 22 days
D. 23 days

Answer: B

Explanation:

WC = 1:2

2x + x = 1/14 => x = 1/42

2x = 1/21 => 21 days

Question: 11

A can do half the work in one day where as B can do it full. B can also do half the work of C in one day. Ratio in their efficiency will be?

A. 2:4:1
B. 4:2:1
C. 2:1:4
D. 1:2:4

Answer: D

Explanation: 11

WC of A: B = 1:2

B: C = 1:2

A: B: C = 1:2:4

Question: 12

A can do a piece of work in 12 days. He worked for 15 days and then B completed the remaining work in 10 days. Both of them together will finish it in.

A. 12 ½ days
B. 25 days
C. 6 days
D. 12 days

Answer: A

Explanation:

15/25 + 10/x = 1 => x = 25

1/25 + 1/25 = 2/25

25/2 = 12 1/2 days

Question: 13

A can do a half of certain work in 70 days and B one third of the same in 35 days. They together will do the whole work in.

A. 420 days
B. 120 days
C. 105 days
D. 60 days

Answer: D

Explanation:

A = 140 days

B = 105 days

1/140 + 1/105 = 7/420 = 1/60

=>60 days

Question: 14

A is 30% more efficient than B. How much time will they, working together, take to complete a job which A alone could have done in 23 days?

A. 11 days
B. 13 days
C. 16 days
D. 15 days

Answer: B

Explanation:

Ratio of times taken by A and B = 100 : 130 = 10 : 13.
Suppose B takes *x* days to do the work.
Then, 10 : 13 :: 23 : *x* =>*x*= *(23*13*)/10
x=299/10
A's 1 day's work =1/23
B's 1 day's work =10/299
(A + B)'s 1 day's work =(1/23+10/299)=1/13
Therefore, A and B together can complete the work in 13 days.

Question: 15

A and B can do a piece of work in 40 days, B and C can do it in 120 days. If B alone can do it in 180 days, in how many days will A and C do it together?

A. 20 days
B. 25 days
C. 35 days
D. 45 days

Answer: D

Explanation:

A and B can do (1/40)th of the work in a day.

B and C can do (1/120)th of the work in a day.

B alone can do (1/180)th of the work in a day.

Hence A alone does (1/40)-(1/180) = (180–40)/(40*180) = 140/(40*180) = (1/51.42857143)th of the work in a day.

And C alone does (1/120)-(1/180) = (180–120)/(120*180) = 60/(120*180) = (1/360)th of the work in a day.

So A and C can do (1/51.42857143) + (1/360) = (360 + 51.42857143)/ (51.42857143*360) = (411.42857143/51.42857143*360) = 1/45th of the work in a day.

So A and C can complete the work in 45 days.

THANK YOU