



# **SNS COLLEGE OF TECHNOLOGY**

## **An Autonomous Institution**

### **Coimbatore-35**



Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade  
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## **DEPARTMENT OF CIVIL ENGINEERING**

### **23GET276 – VQAR II**

II YEAR/ IV SEMESTER

### **UNIT 1 – QUANTITATIVE ABILITY III**

### **TOPIC – TIME AND WORK**



# TIME AND WORK



## 1. Work from Days:

If A can do a piece of work in  $n$  days, then A's 1 day's work =  $\frac{1}{n}$ .

## 2. Days from Work:

If A's 1 day's work =  $\frac{1}{n}$ , then A can finish the work in  $n$  days.

## 3. Ratio:

If A is thrice as good a workman as B, then:

Ratio of work done by A and B = 3 : 1.

Ratio of times taken by A and B to finish a work = 1 : 3.



# TIME AND WORK



A can do a work in 15 days and B in 20 days. If they work on it together for 4 days, then the fraction of the work that is left is :

- A.  $\frac{1}{4}$
- B.  $\frac{1}{10}$
- C.  $\frac{7}{15}$
- D.  $\frac{8}{15}$

**Answer:** Option D

**Explanation:**

$$\text{A's 1 day's work} = \frac{1}{15} ;$$

$$\text{B's 1 day's work} = \frac{1}{20} ;$$

$$(\text{A} + \text{B})\text{'s 1 day's work} = \left( \frac{1}{15} + \frac{1}{20} \right) = \frac{7}{60}$$

$$(\text{A} + \text{B})\text{'s 4 day's work} = \left( \frac{7}{60} \times 4 \right) = \frac{7}{15}$$

$$\text{Therefore, Remaining work} = \left( 1 - \frac{7}{15} \right) = \frac{8}{15}$$



# TIME AND WORK



A can lay railway track between two given stations in 16 days and B can do the same job in 12 days. With help of C, they did the job in 4 days only. Then, C alone can do the job in:

- A.  $9\frac{1}{5}$  days
- B.  $9\frac{2}{5}$  days
- C.  $9\frac{3}{5}$  days
- D. 10

**Answer:** Option C

**Explanation:**

$$(A + B + C)\text{'s 1 day's work} = \frac{1}{4}$$

$$A\text{'s 1 day's work} = \frac{1}{16}$$

$$B\text{'s 1 day's work} = \frac{1}{12}$$

$$\therefore C\text{'s 1 day's work} = \frac{1}{4} - \left( \frac{1}{16} + \frac{1}{12} \right) = \left( \frac{1}{4} - \frac{7}{48} \right) = \frac{5}{48}$$

$$\text{So, C alone can do the work in } \frac{48}{5} = 9\frac{3}{5} \text{ days.}$$





# TIME AND WORK



A, B and C can do a piece of work in 20, 30 and 60 days respectively. In how many days can A do the work if he is assisted by B and C on every third day?

- A. 12 days
- B. 15 days
- C. 16 days
- D. 18 days

**Answer:** Option B

**Explanation:**

$$\text{A's 2 day's work} = \left( \frac{1}{20} \times 2 \right) = \frac{1}{10}$$

$$(\text{A} + \text{B} + \text{C})\text{'s 1 day's work} = \left( \frac{1}{20} + \frac{1}{30} + \frac{1}{60} \right) = \frac{6}{60} = \frac{1}{10}$$

$$\text{Work done in 3 days} = \left( \frac{1}{10} + \frac{1}{10} \right) = \frac{1}{5}$$

Now,  $\frac{1}{5}$  work is done in 3 days.

$\therefore$  Whole work will be done in  $(3 \times 5) = 15$  days.



## TIME AND WORK



A alone can do a piece of work in 6 days and B alone in 8 days. A and B undertook to do it for Rs. 3200. With the help of C, they completed the work in 3 days. How much is to be paid to C?

- A. Rs. 375
- B. Rs. 400
- C. Rs. 600
- D. Rs. 800

**Answer:** Option B

**Explanation:**

$$\text{C's 1 day's work} = \frac{1}{3} - \left( \frac{1}{6} + \frac{1}{8} \right) = \frac{1}{3} - \frac{7}{24} = \frac{1}{24}$$

$$\text{A's wages : B's wages : C's wages} = \frac{1}{6} : \frac{1}{8} : \frac{1}{24} = 4 : 3 : 1.$$

$$\therefore \text{C's share (for 3 days)} = \text{Rs.} \left( 3 \times \frac{1}{24} \times 3200 \right) = \text{Rs. 400.}$$



# TIME AND WORK



A can do a piece of work in 4 hours; B and C together can do it in 3 hours, while A and C together can do it in 2 hours. How long will B alone take to do it?

- A. 8 hours
- B. 10 hours
- C. 12 hours
- D. 24 hours

**Answer:** Option C

**Explanation:**

$$\text{A's 1 hour's work} = \frac{1}{4} ;$$

$$(\text{B} + \text{C})\text{'s 1 hour's work} = \frac{1}{3} ;$$

$$(\text{A} + \text{C})\text{'s 1 hour's work} = \frac{1}{2} .$$

$$(\text{A} + \text{B} + \text{C})\text{'s 1 hour's work} = \left( \frac{1}{4} + \frac{1}{3} \right) = \frac{7}{12}$$

$$\text{B's 1 hour's work} = \left( \frac{7}{12} - \frac{1}{2} \right) = \frac{1}{12}$$

$\therefore$  B alone will take 12 hours to do the work.





# TIME AND WORK



A can do a certain work in the same time in which B and C together can do it. If A and B together could do it in 10 days and C alone in 50 days, then B alone could do it in:

- A. 15 days
- B. 20 days
- C. 25 days
- D. 30 days

**Answer:** Option C

**Explanation:**

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

$$C\text{'s 1 day's work} = \frac{1}{50}$$

$$(A + B + C)\text{'s 1 day's work} = \left( \frac{1}{10} + \frac{1}{50} \right) = \frac{6}{50} = \frac{3}{25} \dots (i)$$

$$A\text{'s 1 day's work} = (B + C)\text{'s 1 day's work} \dots (ii)$$

$$\text{From (i) and (ii), we get: } 2 \times (A\text{'s 1 day's work}) = \frac{3}{25}$$

$$\Rightarrow A\text{'s 1 day's work} = \frac{3}{50}$$

$$\therefore B\text{'s 1 day's work} = \left( \frac{1}{10} - \frac{3}{50} \right) = \frac{2}{50} = \frac{1}{25}$$

So, B alone could do the work in 25 days.





## TIME AND WORK

A can finish a work in 18 days and B can do the same work in 15 days. B worked for 10 days and left the job. In how many days, A alone can finish the remaining work?

- A. 5
- B.  $5\frac{1}{2}$
- C. 6
- D. 8

**Answer:** Option C

**Explanation:**

$$\text{B's 10 day's work} = \left( \frac{1}{15} \times 10 \right) = \frac{2}{3}$$

$$\text{Remaining work} = \left( 1 - \frac{2}{3} \right) = \frac{1}{3}$$

Now,  $\frac{1}{18}$  work is done by A in 1 day.

$$\therefore \frac{1}{3} \text{ work is done by A in } \left( 18 \times \frac{1}{3} \right) = 6 \text{ days.}$$



# TIME AND WORK

A and B can together finish a work 30 days. They worked together for 20 days and then B left. After another 20 days, A finished the remaining work. In how many days A alone can finish the work?

- A. 40
- B. 50
- C. 54
- D. 60

**Answer:** Option D

**Explanation:**

$$(A + B)'s\ 20\ day's\ work = \left( \frac{1}{30} \times 20 \right) = \frac{2}{3}$$

$$\text{Remaining work} = \left( 1 - \frac{2}{3} \right) = \frac{1}{3}$$

Now,  $\frac{1}{3}$  work is done by A in 20 days.

Therefore, the whole work will be done by A in  $(20 \times 3) = 60$  days.



# TIME AND WORK

P can complete a work in 12 days working 8 hours a day. Q can complete the same work in 8 days working 10 hours a day. If both P and Q work together, working 8 hours a day, in how many days can they complete the work?

- A.  $5\frac{5}{11}$
- B.  $5\frac{6}{11}$
- C.  $6\frac{5}{11}$
- D.  $6\frac{6}{11}$

**Answer:** Option A

**Explanation:**

P can complete the work in  $(12 \times 8)$  hrs. = 96 hrs.

Q can complete the work in  $(8 \times 10)$  hrs. = 80 hrs.

$\therefore$  P's 1 hour's work =  $\frac{1}{96}$  and Q's 1 hour's work =  $\frac{1}{80}$

$(P + Q)$ 's 1 hour's work =  $\left(\frac{1}{96} + \frac{1}{80}\right) = \frac{11}{480}$

So, both P and Q will finish the work in  $\left(\frac{480}{11}\right)$  hrs.

$\therefore$  Number of days of 8 hours each =  $\left(\frac{480}{11} \times \frac{1}{8}\right) = \frac{60}{11}$  days =  $5\frac{5}{11}$  days.





# TIME AND WORK



10 women can complete a work in 7 days and 10 children take 14 days to complete the work. How many days will 5 women and 10 children take to complete the work?

- A. 3
- B. 5
- C. 7
- D. Cannot be determined
- E. None of these

**Answer:** Option C

**Explanation:**

$$1 \text{ woman's 1 day's work} = \frac{1}{70}$$

$$1 \text{ child's 1 day's work} = \frac{1}{140}$$

$$(5 \text{ women} + 10 \text{ children})'s \text{ day's work} = \left( \frac{5}{70} + \frac{10}{140} \right) = \left( \frac{1}{14} + \frac{1}{14} \right) = \frac{1}{7}$$

∴ 5 women and 10 children will complete the work in 7 days.





## TIME AND WORK

Ravi and Kumar are working on an assignment. Ravi takes 6 hours to type 32 pages on a computer, while Kumar takes 5 hours to type 40 pages. How much time will they take, working together on two different computers to type an assignment of 110 pages?

- A. 7 hours 30 minutes
- B. 8 hours
- C. 8 hours 15 minutes
- D. 8 hours 25 minutes

**Answer:** Option C

**Explanation:**

$$\text{Number of pages typed by Ravi in 1 hour} = \frac{32}{6} = \frac{16}{3}$$

$$\text{Number of pages typed by Kumar in 1 hour} = \frac{40}{5} = 8$$

$$\text{Number of pages typed by both in 1 hour} = \left( \frac{16}{3} + 8 \right) = \frac{40}{3}$$

$$\begin{aligned} \therefore \text{Time taken by both to type 110 pages} &= \left( 110 \times \frac{3}{40} \right) \text{ hours} \\ &= 8\frac{1}{4} \text{ hours (or) 8 hours 15 minutes.} \end{aligned}$$



# TIME AND WORK

A, B and C can complete a piece of work in 24, 6 and 12 days respectively. Working together, they will complete the same work in:

- A.  $\frac{1}{24}$  day
- B.  $\frac{7}{24}$  day
- C.  $3\frac{3}{7}$  days
- D. 4 days

**Answer:** Option C

**Explanation:**

**Formula:** If A can do a piece of work in  $n$  days, then A's 1 day's work =  $\frac{1}{n}$ .

$$(A + B + C)\text{'s 1 day's work} = \left( \frac{1}{24} + \frac{1}{6} + \frac{1}{12} \right) = \frac{7}{24}$$

**Formula:** If A's 1 day's work =  $\frac{1}{n}$ , then A can finish the work in  $n$  days.

So, all the three together will complete the job in  $\left( \frac{24}{7} \right)$  days =  $3\frac{3}{7}$  days.



# TIME AND WORK



Sakshi can do a piece of work in 20 days. Tanya is 25% more efficient than Sakshi. The number of days taken by Tanya to do the same piece of work is:

- A. 15
- B. 16
- C. 18
- D. 25

**Answer:** Option B

**Explanation:**

Ratio of times taken by Sakshi and Tanya = 125 : 100 = 5 : 4.

Suppose Tanya takes  $x$  days to do the work.

$$5 : 4 :: 20 : x \Rightarrow x = \left( \frac{4 \times 20}{5} \right)$$

$\Rightarrow x = 16$  days.

Hence, Tanya takes 16 days to complete the work.





# TIME AND WORK



A and B can complete a work in 15 days and 10 days respectively. They started doing the work together but after 2 days B had to leave and A alone completed the remaining work. The whole work was completed in :

- A. 8 days
- B. 10 days
- C. 12 days
- D. 15 days

**Answer:** Option C

**Explanation:**

$$(A + B)\text{'s 1 day's work} = \left( \frac{1}{15} + \frac{1}{10} \right) = \frac{1}{6}$$

$$\text{Work done by A and B in 2 days} = \left( \frac{1}{6} \times 2 \right) = \frac{1}{3}$$

$$\text{Remaining work} = \left( 1 - \frac{1}{3} \right) = \frac{2}{3}$$

Now,  $\frac{1}{15}$  work is done by A in 1 day.

$$\therefore \frac{2}{3} \text{ work will be done by a in } \left( 15 \times \frac{2}{3} \right) = 10 \text{ days.}$$

Hence, the total time taken = (10 + 2) = 12 days.





# TIME AND WORK



A works twice as fast as B. If B can complete a work in 12 days independently, the number of days in which A and B can together finish the work in :

- A. 4 days
- B. 6 days
- C. 8 days
- D. 18 days

**Answer:** Option A

**Explanation:**

Ratio of rates of working of A and B = 2 : 1.

So, ratio of times taken = 1 : 2.

B's 1 day's work =  $\frac{1}{12}$ .

$\therefore$  A's 1 day's work =  $\frac{1}{6}$  ; (2 times of B's work)

(A + B)'s 1 day's work =  $\left(\frac{1}{6} + \frac{1}{12}\right) = \frac{3}{12} = \frac{1}{4}$ .

So, A and B together can finish the work in 4 days.



# TIME AND WORK



Twenty women can do a work in sixteen days. Sixteen men can complete the same work in fifteen days. What is the ratio between the capacity of a man and a woman?

- A. 3 : 4
- B. 4 : 3
- C. 5 : 3
- D. Data inadequate

**Answer:** Option B

**Explanation:**

(20 x 16) women can complete the work in 1 day.

$$\therefore 1 \text{ woman's 1 day's work} = \frac{1}{320}$$

(16 x 15) men can complete the work in 1 day.

$$\therefore 1 \text{ man's 1 day's work} = \frac{1}{240}$$

$$\text{So, required ratio} = \frac{1}{240} : \frac{1}{320}$$

$$= \frac{1}{3} : \frac{1}{4}$$

$$= 4 : 3 \text{ (cross multiplied)}$$



# TIME AND WORK

A can finish a work in 24 days, B in 9 days and C in 12 days. B and C start the work but are forced to leave after 3 days. The remaining work was done by A in:

- A. 5 days
- B. 6 days
- C. 10 days
- D.  $10\frac{1}{2}$  days

**Answer:** Option C

**Explanation:**

$$(B + C)\text{'s 1 day's work} = \left(\frac{1}{9} + \frac{1}{12}\right) = \frac{7}{36}$$

$$\text{Work done by B and C in 3 days} = \left(\frac{7}{36} \times 3\right) = \frac{7}{12}$$

$$\text{Remaining work} = \left(1 - \frac{7}{12}\right) = \frac{5}{12}$$

Now,  $\frac{1}{24}$  work is done by A in 1 day.

$$\text{So, } \frac{5}{12} \text{ work is done by A in } \left(24 \times \frac{5}{12}\right) = 10 \text{ days.}$$



# THANK YOU