## TIME, WORK AND WAGES

### I.GENERAL RULES FOR TIME AND WORK

1. If a man completes a piece of work in 'n' days, then his one day's work = $\frac{1}{n}$ th part of the work.

2. If a man completes $\frac{1}{n}$ th part of work in one day, his work is completed in n days.

3. If A is twice as good work man as B is, then AA will take one-half of the time taken by B to do the same job.
i.e. ratio of time done by A and B = 2 : 1
and ratio of time taken by A and B to complete the job = 1 : 2

4. If the number of persons engaged to do a certain job be increased in a certain ratio, the time required to do the same job will be decreased in the same ratio and vice versa
i.e. If the number of persons be changed in the ratio a : b then the time taken to finish the job will be changed in the ratio of b : a.

### II. GENERAL RULE FOR WORK AND WAGES

It must be remembered in mind, while dealing with the problem on wages that the money obtained is always divided in the ratio of the work done by each person.

### III. SHORT CUTS FOR WORK SOLVING THE PROBLEM

**Case I : If a man $M_1$ finishes a job in $D_1$ days and another man $M_2$ takes $D_2$ days to complete the same job, then time taken by them, if they work together is given by**

Time taken by ($M_1$ + $M_2$) working together = $\frac{D_1 D_2}{D_1 + D_2}$

**Q. Nithin can do a piece of work in 15 days and Amit can do the same work in 4 days. How long will they take to do the same work, if they work together?**

a) $3\frac{2}{9}\ days$ **b) $2\frac{2}{9}\ days$**

c) $3\frac{2}{6}$ d) $4\frac{2}{9}\ days$

**Case II. If two persons say $M_1$ and $M_2$ take n days, if they work together and $M_1$ alone takes $D_1$ days while doing the same work, then time taken $D_2$ by $M_2$ alone doing the same work is given by**

Time taken by $M_2$ (alone) $D_2 = \frac{D_1 n}{D_1 - n}$

**Q. Rohan takes 9 hours to polish the floor of a room. Rohan and mohit together take 4 hours in polishing the same floor. How long will mohit take to polish the floor, if he works alone.**

a) $3\frac{1}{5}\ hrs$ b) $4\frac{1}{5} hrs$

**c) $7\frac{1}{5}\ hrs$** d) 6 hrs



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**Case III.** If $M_1$, $M_2$ and $M_3$ can complete a work in $D_1$, $D_2$ and $D_3$ days respectively, then time taken by them, if they work together is given by

Time taken by $(M_1 + M_2 + M_3) = \frac{D_1D_2D_3}{D_1D_2+D_2D_3+D_3D_1}$

**Q. X, Y and Z can do certain job in 8, 10 and 8 days respectively. How long would they take to complete same job, if they all work together?**

**a) $2\frac{6}{7}$ days** b) $4\frac{6}{7}$ days
c) $6\frac{6}{7}$ days d) $8\frac{6}{7}$ days

**Case IV.** If $M_1$ and $M_2$ working together completes a job in D days. If $M_1$ takes x days more than D while doing the same job alone and $M_2$ takes y days than D in completing the same job alone, then

$$D^2 = xy$$

**Q. X and Y together can do a certain job in 10 days, while X alone can do the same job in 15 days. In how many days Y will complete the same job.**

a) 40 days
b) 36 days
**c) 30 days**
d) 45 days

**Case V.** If a man complete x/y part of the work in $D_1$ days then time taken by him to complete the remaining part of the work is given by

Let time taken to complete the remaining part be $D_2$ days

$$D_2 = \frac{D_1}{\frac{x}{y}} \times \left(1 - \frac{x}{y}\right)$$

**Q. If a man do 1/3 of the work in 5 days. Find the time taken by A to complete the whole work?**

a) 12 days
b) 13 days
c) 14 days
**d) 15 days**

**Case VI.** If 'm' men can do 1/n of a piece of work in $D_1$ days, then the number of men 'p' required to do the whole work in $D_2$ days is given by

$$P = \frac{nmD_1}{D_2}$$

**Q. If 15 men can do ¼ of a piece of work in 13 hours, then find the number of persons required to do the whole work in 20 hours.**

a) 38 men
**b) 39 men**
c) 30 men
d) 38 men



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**Case VII. If $M_1$ can do a piece of work in $D_1$ days and was paid Rs. X and $M_2$ can do a piece of work in $D_2$ days and was paid Rs. Y, then**

$M_1$'s wages : $M_2$'s wages = $M_1$'s 1 day's work : $M_2$'s 1 day's work

**Q. X alone could do the job in 3 weeks and Y alone in 4 weeks. If both of them finished the job working together, in what ratio should money be divided?**

a) 4 : 8 b) 4 : 9

c) 5 : 3 **d) 4 : 3**

**SOME IMPORTANT POINTS**

1. In the problem based on time, work and wages, it is always assumed that a person works at uniform rate, unless and until specified in the problem.
2. Time and work are always in direct proportion.
3. Men and work are always in direct proportion.
4. Men and time are always inversely proportional i.e. more number of men take lesser time to complete the job comparatively.
5. Ratio between the wages is equally divided between the work done in a day by men.
6. Wages are distributed inverse proportion to the time taken by the individual.

**Basic Level**

1) If 15 toys cost Rs 234 what do 35 toys cost?
   a) 546
   b) 466
   c) 544
   d) 745

2) If 36 men can do a piece of work in 25 hours, in how many hours will 15 men do it?
   a) 70 hours
   b) 50 hour
   c) 30 hours
   d) 60 hours

3) If the wages of 6 men for 15 days Rs. 2100. Then find the wages of 9 men for 12 days.
   a) 2390
   b) 2520
   c) 2334
   d) 2890


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4) 15 persons complete a job in 7 days. Then how many days will 10 persons take to complete the same job?
a) 10.8 days
b) 14 days
c) 12 days
d) 10.5 days

5) 26 men can complete a piece of work in 17 days. How many more men can it hired to complete the work in 13 days?
a) 34 men
b) 35 men
c) 24 men
d) 37 men

6) 16 men can complete a piece of work in 24 days. How many days can 12 men complete the same piece of work?
a) 34 days
b) 32 days
c) 36 days
d) 37 days

7) If 20 men can build a wall 56 m long in 6 days. What length if similar wall can be built by 35 men in 3 days.
a) 49 m
b) 46 m
c) 44 m
d) 48 m

8) The price of 6 toys is Rs. 264.37. what will be the approximate price of 5 toys?
a) 230
b) 220
c) 234
d) 221

9) The price of 357 mangoes is Rs. 1517.25. what will be the approximate price of 9 dozen of such mangoes?
a) 442
b) 452
c) 432
d) 446

10) If a quarter kg of potatoes price will 60 paise, how many paise will 200gm cost?
a) 48 paise
b) 45 paise
c) 43 paise
d) 41 paise

11) If 11.25 m of uniform iron rod weight 42.75 kg. what will be the weight of 6 m of 50 m iron rod?
a) 22
b) 22.8
c) 12.8
d) 24.8


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12) A canteen required 651 bananas for a week. Totally how many bananas will be required for the month of April, May and June 2009?
a) 8734
b) 8463
c) 8778
d) 8335

13) On a scale of map 0.6cm represents 6.6km. if the distance between the point on the map 80.5cm. the actual distance between this point is?
a) 885.5 km
b) 876.5 km
c) 386.9 km
d) 568.6 km

14) A canteen required 21 dozen bananas for a week. How many dozen bananas will it require for 54 days?
a) 167
b) 189
c) 186
d) 162

15) A canteen requires 28 dozen of bananas for a week. How many dozen of bananas will it require for 47 days?
a) 198
b) 188
c) 178
d) 167

## Moderate Level

16) A takes 5 days to complete a job and B takes 10 days to complete the same job. How much time they will complete together?
a) 3.33 b) 4.56
c) 2.64 d) 3. 67

17) A is twice as efficient as of B and B can complete a job in 30days before A. in how many days they can complete work together?
a) 10 days b) 20 days
c) 30 days d) 25 days

18) A and B together can complete a piece of work in 4 days. If A alone can complete the same work in 12 days. How many days can B alone complete the same work?
a) 7 days b) 4 days
c) 6 days d) 9 days


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19) A can do a piece of work in 7 days of 9 hours and B can do it in 6 days of 7 hours. How long will they take to do working together $8\frac{2}{5}$ hours in a day?

a) 6 days b) 4 days
c) 3 days d) 7 days

20) A is twice as good a workman as B and together they finish a piece of work in 18 days. In how many days will A alone to finish the work?

a) 18 days b) 34 days
c) 27 days d) 45 days

21) A can do a certain job in 12 days. B is 60% more efficient than A. how many days is B alone to do same job?

a) 7.5 days b) 3.6 days
c) 2.5 days d) 4.7 days

22) Worker A takes 8 hours, worker B takes 10 hours. How long should it takes to both A and B working together but independently to do the same job?

a) 5.55 b) 4.44
c) 3.33 d) 6.66

23) 12 women alone can complete a piece of work in 5 days. Where 3 women and 9 children together complete the same work in 10 days. In how many days 36 children complete the work?

a) 46 b) 40
c) 48 d) 43

24) A and B together can complete a piece of work in 4 days. If A alone can complete the same work in 12 days. How many days can B alone complete the same work?

a) 7 b) 6
c) 3 d) 10

25) A can do a piece of work in 7 days of 9 hours and B can do it in 6 days of 7 hours. How long will they take to do working together?

a) 24 b) 21
c) 25.2 d) 20

26) 150 men work for 45 days. after 10 days 25 men left the work. So how many days for remaining work.

a) 44 days b) 56 days
c) 34 days d) 42 days


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27) A can do work in 2 days. B can do work in 3 days. C can do work in 6 days. Then how many days for work together?

a) 1 day b) 4 days
c) 3 days d) 5 days

28) X, Y and Z can do certain job in 8, 10 and 8 days respectively. How long would they take to complete same job, if they all work together?

a) $5\frac{3}{6}$ days b) $4\frac{5}{6}$ days
c) $2\frac{6}{7}$ days d) $6\frac{4}{7}$ days

29) 10 men can produce 30 products in 8 days. Then 12 men can produce 40 products in how many days?

a) 8.8 days b) 3.6 days
c) 4.6 days d) 7 days

30) 30 men in 12 days they did 6km road. 45 men in 30 days how many km road will do it?

a) 22.6 days b) 23.5 days
c) 22.5 days d) 24. 6 days

31) 20 men can do 60 products in 4 days. 90 products can do it 5 days of how many men?

a) 25 b) 34
c) 44 d) 24

32) 20 men can work 5 hrs / day they produce 60 products in 4 days. How many men can produce 90 product Working 6 hrs / day finish in 5 days?

a) 30 men b) 20 men
c) 25 men d) 35 men

33) 10 men working in 5 hrs / day they produce 900 products in 15 days. Then 15 men working in 4 hrs / day in 30 days. How many products can produce?

a) 2456 b) 2434
c) 2160 d) 2189

34) X and Y together can do a certain job in 10 days. while X done can do the same job in 15 days. In how many days Y will complete the work?

a) 30 days b) 35 days
c) 37 days d)37 days

35) If A can do $\frac{1}{3}$ of the work in 5 days. find the time taken by A to complete the work?

a) 17 days b) 15 days
c) 21 days d) 14 days



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