WORK AND WAGES

Work:-Activity involving mental or physical effort done in order to achieve a result.

Wage:- A payment usually of money for labour or services usually according to contract and on hourly, daily or piecework basis.

1. If 20 persons can do a piece of work in 7 days then calculate the number of persons required to complete the work in 28 days.

Sol. Since work is constant, therefore

$M_1 \times D_1 = M_2 \times D_2$ = work done.

$20 \times 7 = M_2 \times 28$

$M_2 = 5$

2. If 25 men can do a piece of work in 36 days working 10 hours a day, then how many men are required to complete the work working 6 hours a day in 20 days?

Sol. $M_1 \times D_1 \times H_1 = M_2 \times D_2 \times H_2$

$25 \times 36 \times 10 = M_2 \times 20 \times 6$

$M_2 = 75$ persons

3. If 24 men can do a piece of work in 40 days working 12 hours a day, then how many men are required to complete the double work working 6 hours a day in 20 days?

Sol. $\frac{M_1 \times D_1 \times H_1}{W_1} = \frac{M_2 \times D_2 \times H_2}{W_2}$

$\frac{24' \; 40' \; 12}{1} = \frac{M_2 \times 20 \times 6}{2}$

$M_2 = 192$

4. A contractor employed 30 men to complete the project in 100 days. But later on he realised that after 25 days only 20% of work had been completed.

(a) How may extra days, than the scheduled time are required?

(b) To complete the work on the scheduled time how many men he has to increase?

(c) If the amount of work is also increased by 20% of the actual work then how many extra days are required (in comparison with scheduled time) but the number of men remained constant?

(d) How many men should be increased so that the work will be completed in 25 days less than the scheduled time?

Sol. (a) 20% work complete in = 25 days

100% work complete in

$\frac{25}{20} \times 100 = 125$ days

Extra days = 125–100 = 25 days

(b) Let x number of men are more required

$\therefore M_1 \times D_1 = M_2 \times D_2$

$30 \times 100 = (x + 30) \times 75$

$120 = 3x + 90$

$3x = 30$

$x = 10$ days

(c) $20\% = \frac{1}{5}$

Original work = 5

New work = 6

$\frac{M_1 \times D_1}{W_1} = \frac{M_2 \times D_2}{W_2}$

$\frac{30' \; 125}{5} = \frac{30 \times D_2}{6}$

$D_2 = 150$ days

Extra days= 150–100 = 50 days

(d) Original time = 100 days

New time = 100–25 = 75 days

$M_1 \times D_1 = M_2 \times D_2$

$30 \times 125 = M_2 \times 75$

$M_2 = 50$ men.

Extra men = 50–30 = 20 men

5. 4 men and 6 women can complete a work in 8 days while 3 men and 7 women can complete it in 10 days. In how many days will 10 women complete it?

Sol. 4 men + 6 women = 8 days.

3 men + 7 women = 10 days

$\therefore$ 32 men + 48 women = 1 day .....(i)

30 men + 70 women = 1 day .....(ii)

compare equation (i) and (ii)

32 men + 48 women = 30 men + 70 women

2 men = 22 women

1 men = 11 women

4 men = 44 women

$B_1 \times D_1 = B_2 \times D_2$

$(4 \text{ m} + 6 \text{ w}) \times 8 = 10\text{w} \times D_2$

$(44 \text{ w} + 6 \text{ w}) \times 8 = 10\text{w} \times D_2$

8

ays

complete a piece
days and 10 days
They contracted
to complete the work for Rs. 30,000. The share of A in the contracted money is ?

Sol. A → 15 — 2
B → 10 — 3
30(T.W)

A's 1 day work = 2 units
B's 1 day work = 3 units
(A+B)'s 1 day work = (2+3)
=5 units
Time taken by (A+B) to complete the whole work

$= \frac{30}{5} = 6$ day

Note:- Wage is distributed in the ratio of efficiency if the work is done for same time.
A's efficiency = 2
B's efficiency = 3
5 units = ` 30,000
2 units (A's share)

$= \frac{30,000}{5} \times 2 =$ ` 12000

7. A builder decided to build a farmhouse in 60 days. He employed 150 men in the beginning and 130 more after 45 days and completed the construction in stipulated time. If he had not employed the additional men, how many days behind schedule would it have been finished?
(a) 10 days (b) 23 days
(c) 13 days (d) 15 days

Sol. (c) Let the number of days = x
According to question
150 × x = 150 × 45 + (150+ 130) × 15
150x = 6750 + 280 × 15

$x = \frac{10950}{150} = 73$ days

Extra days = 73 – 60 = 13 days

8. There is a sufficient food for 150 men for 15 days. After 10 days, 75 men leave the place. For how many days will the rest of the food last for the rest of the men?
(a) 10 days (b) 8 days
(c) 5 days (d) 15 days

Sol. (a) Let the number of days food for the rest men = x days

A.T.Q 150 × 5 = 75 × x
x = 10 days

9. Wages for 45 women amount to Rs.15525 in 48 days. How many men must work 16 days to receive Rs.5750, the daily wages of a man being double than that of a woman?
(a) 25 men (b) 24 men
(c) 18 men (d) 10 men

Sol. (a) wage of 1 woman in 1 day

$= \frac{15525}{48 \times 45} =$ Rs. $\frac{115}{16}$

wage of x men in 1 day

$=$ Rs. $\frac{5750}{16} =$ Rs. $\frac{2875}{8}$

A.T.Q. $\frac{2875}{8 \times x} = \frac{115}{16} \times 2$

$x = \frac{2875 \times 16}{115 \times 8 \times 2}$

x = 25 men

10. 60 men could complete a work in 250 days. They worked together for 200 days After that the work had to be stopped for 10 days due to bad weather. How many more men should be engaged to complete the work in time?
(a) 10 (b) 15
(c) 18 (d) 20

Sol. (b) Work done by 60 men in 200 days $= \frac{200}{250} = \frac{4}{5}$

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

60 × 50 = 40 × x

$x = \frac{50 \times 60}{40} = 75$

Extra more = 75 – 60 = 15

11. If 6 persons working 8 hours a day earn ` 8400 per week, then 9 persons working 6 hours a day will earn per week?
(a) ` 8400 (b) ` 16800
(c) ` 9450 (d) ` 16200

Sol. (c) $\frac{6_{\text{persons}} \times 8_{\text{hr}}}{8400} = \frac{9_{\text{Persons}} \times 6_{\text{hr}}}{\text{Amount}}$

Amount earned by 9 persons = ` 9450

12. A contractor undertook to complete a project in 90 days and employed 60 men on it. After 60 days, he found that $\frac{3}{4}$ of the work has already been completed. How many men can he discharge so that the project may be completed exactly on time?
(a) 40 (b) 20
(c) 30 (d) 15

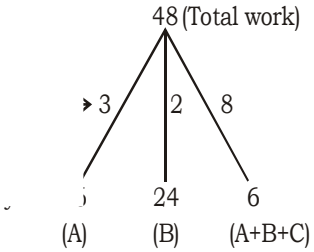
Sol. (b) Let 'n' number of men can be discharged.
According to the question

$\frac{60_{\text{men}} \times 60_{\text{days}}}{\frac{3}{4}\text{work}}$

$= \frac{(60-n)_{\text{men}} \times 30_{\text{days}}}{\frac{1}{4}\text{work}}$

n = 20
therefore, number of men discharged = 20

13. A can do a piece of work in 16 days and B in 24 days. They take the help of C and they all together finish the work in 6 days. If the total remuneration for the work is ` 400. The amount (in rupees) each will recieve, in proportion, to do the work is
(a) A : 150, B : 100, C : 150
(b) A : 100, B : 150, C : 150
(c) A : 150, B : 150, C : 100
(d) A : 100, B : 150, C = 100



C's efficiency = 8 – 3 – 2 = 3 units

A	:	B	:	C	:	Total
3	:	2	:	3	:	8
↓×50		↓×50		↓×50		↓×50
` 150		` 100		` **150**		` 400

14. If 10 men or 20 boys can make 260 mats in 20 days, then how many mats will be made by 8 men and 4 boys in 20 days?
(a) 260 (b) 240
(c) 280 (d) 520

Sol. (a) We know,

$$\frac{m_1 \times t_1 \times d_1}{w_1} = \frac{m_2 \times t_2 \times d_2}{w_2}$$

According to the question,

$$\frac{10M \times 20days}{260Mats} = \frac{20B \times 20days}{260Mats}$$

10M = 20B

1M = 2B

$$\frac{M}{B} = \frac{2}{1}$$

1M work = 2 units/day

1B work = 1 unit/day

Mats made by (8M + 4B) in 20 days

$$\frac{10M \times 20days}{260\,Mats} = \frac{(8M+4B) \times 20days}{x\,mats}$$

$$\frac{10 \times 2 \times 20days}{260m}$$

$$= \frac{20 \times 20days}{xm}$$

after solving,

x = 260 mats

15. A 10 hectare field is reaped by 2 men, 3 women and 4 children together in 10 days. If working capabilities of a man, a woman and a child are in the ratio 5 : 4 : 2, then a 16 hectare field will be reaped by 6 men, 4 women and 7 children in
(a) 5 days (b) 6 days
(c) 7 days (d) 8 days

Sol. (d) According to the question, efficiency of a man, a women and a child are 5 : 4 : 2 units days

One day work of 2 men

= 2 × 5 = 10 units

One day work of 3 women

= 3 × 4 = 12 units

One day work of 4 children

= 4 × 2 = 8 units

Applying formula,

let time taken be 'D' days

$$\frac{(10+12+8) \times 10_{days}}{10_{hectare}}$$

$$= \frac{[(6_{men} \times 5)+(4_{women} \times 4)+(7_{children} \times 2)] \times D}{16_{hectare}}$$

$$\frac{(30) \times 10}{10} = \frac{[60] \times D}{16}$$

D = 8 days

16. A road of 5 km length will be constructed in 100 days. So 280 workers were employed. But after 80 days it was found that only $3\frac{1}{2}$ km road was completed. Now how many more people were need to finish the work in the specified time?
(a) 480 (b) 80
(c) 200 (d) 100

Sol. (c) Let 'n' more number of men are required to complete the job in 20 days.

$$\frac{80_{days} \times 280_{worker}}{3.5km}$$

$$= \frac{(280+n)_{worker} \times 20_{days}}{1.5km}$$

After solving :

480 = 280 + n

n = 200

17. A contractor was engaged to construct a road in 16 days. After working for 12 days with 20 labours it was found that only $\frac{5}{8}$th of the road had been constructed. To complete the work in stipulated time the number of extra labours required are.
(a) 16 (b) 12
(c) 10 (d) 18

Sol. (a) From $\frac{m_1 \times d_1 \times t_1}{w_1} = \frac{m_2 \times d_2 \times t_2}{w_2}$

Let number of extra workers be x

$$\therefore \frac{20 \times 12}{5/8} = \frac{(20+x) \times 4}{3/8}$$

$$\therefore 4 \times 12 = \frac{(20+x) \times 4}{3}$$

$$\therefore 36$$

= 20 + x

$$\therefore x = 16$$

Therefore, Number of extra workers = 16

EXERCISE

1. If 2 men or 3 women or 4 boys can do a piece of work in 52 days, then the same piece of work will be done by 1 man, 1 woman and 1 boy in :
   (a) 48 days
   (b) 36 days
   (c) 45 days
   (d) None of these
2. 2 men or 5 women or 7 boys can finish a work in 469 days, then the number of days taken by 7 men, 5 women and 2 boys to finish the work in :
   (a) 134 (b) 106
   (c) 100 (d) 98
3. 6 children and 2 men complete a certain piece of work in 6 days. Each child takes twice the time taken by a man to finish the work. In how many days will 5 men finish the same work?
   (a) 6 (b) 8
   (c) 9 (d) 15
4. 450 man-days of work can be completed by certain number of men in some days. If the number of people (men) are increased by 27 , then the number of days required to complete the same work is decreased by 15. The number of days required to complete the three times work (than the previous/actual work) by 27 men?
   (a) 50 days (b) 60 days
   (c) 54 days (d) 45 days
5. 33 men can do a job in 30 days. If 44 men started the job together and after every day of the work, one person leaves. What is the minimum number of days required to complete the whole work?
   (a) 21 (b) 42
   (c) 45 (d) 44
6. 7 Indian and 4 Chinese finished a job in 5 days. 7 Japanese and 3 Chinese finish the same job in 7 days. Given that the efficiency of each person of a particular nationality is same but different from others. One Indian, one Chinese and one Japanese will complete the work in :
   (a) $18\frac{3}{13}$ days (b) $20\frac{5}{12}$ days
   (c) $21\frac{6}{14}$ days (d) $20\frac{7}{12}$ days
7. 4 men and 2 boys can finish a piece of work in 5 days, 3 women and 4 boys can finish the same work in 5 days. Also 2 men and 3 women can finish the same work in 5 days. In how many days 1 man, 1 woman and one boy can finish the work, at their double efficiency ?
   (a) $4\frac{8}{13}$ (b) $4\frac{7}{13}$
   (c) $3\frac{7}{13}$ (d) 5

Direction:- At Rakesh Yadav Publication every book goes through 3 phases (or stages) typing, composing and binding. There are 16 typists, 10 composer and 15 binders. A typist can type 8 books in each hour, a composer can compose 12 books in each hour and a binder can bind 12 books in each hour. All of the people at Rakesh Yadav Publication works for 10 hours a day and each person is trained to do only the job of 1 category.

8. How many books can be prepared in one day?
   (a) 1500 (b) 1200
   (c) 1440 (d) 1380

Direction:- 8 men and 5 women working 6 hours a day can complete a work in 4 days. Also 4 men and 5 women working for 8 hours a day can complete the same job in 5 days. Similarly 5 boys working 8 hours a day can complete the same job in 30 days.

9. If 4 men, 3 women and 4 boys worked together everyday for 5 hours, then in how many days they have completed the work?
   (a) 3 (b) 4
   (c) 8 (d) 6
10. Three men and 5 women together can finish a job in 3 days. Working on the same job 3 women take 5 days more than the time required by 2 men. What is the ratio of efficiency of a man to a woman?
    (a) 2 : 1 (b) 3 : 2
    (c) 5 : 2 (d) 4 : 1
11. The ratio of the work of a man, a woman and a boy is 4 : 3 : 2 and in a factory 16 men, 18 women and 24 boys do the work and they earn 13944 Rs. in a week. Then find the annual earning of 36 men, 24 women and 20 boys, if a year contains 365 days?
    (a) 1121280 Rs.
    (b) 1121240 Rs.
    (c) 1122280 Rs.
    (d) None of these
12. 3 men, 8 women and 18 boys can do a work in 1 day, $\frac{3}{4}$ days and $\frac{1}{2}$ day respectively. If 3 women and 3 boys are hired for 1 day work then find out how many men are hired for how many days to complete the remaining work?
    (a) 1 Man for $\frac{1}{2}$ day
    (b) 1 Man for 2 days
    (c) 2 Men for 1 day
    (d) None of these
13. 8 men and 12 boys can do a work in 12 days, while 16 men in 8 hours do the same work as 12 boys do in 24 hours. Then find in how many days will 40 men and 45 boys do thrice the work?
    (a) 8 days (b) 6 days

(d) None of these

employs 200 men

of total work in

e to rain the work

will stop for 20 days, and $\frac{2}{5}$th work also destroyed. After rain only 150 men came on the work. In how many days the work will complete?

(a) 38 days

(b) 8 days

(c) 28 days

(d) None of these

15. There is an arrangement of food for 1600 soldiers for 80 days and each soldier take 900 gm food. After 30 days 400 soldiers left the camp. Now each soldier take 1000 gm food everyday. The remaining arrangement last for how many days?

(a) 60 days

(b) 50 days

(c) 40 days

(d) None of these

16. There is an arrangement of food for certain number of soldiers for certain number of days. After 20 days, $\frac{1}{4}$th soldiers left the camp. Now the remaining arrangement will last long for same number of days that are in starting find the number of certain days?

(a) 70 days (b) 140 days

(c) 35 days (d) 80 days

17. 20 men can do a piece of work in 18 days. They worked together for 3 days, then 5 men joined them. In how many more days is the work completed?

(a) 12 (b) 13

(c) 14 (d) 15

18. 10 men or 15 women or 20 boys complete a piece of work in 60 days by working 6 hours a day. Then find how many hours required in a day for 10 men, 15 women and 20 boys to finish the work in 15 days ?

(a) 8 hours

(b) 10 hours

(c) 16 hours

(d) None of Thes

19. 25 men can do a piece of work in 10 days while 20 children can do the same work in 50 days. If 5 men started the work after 10 days how many children must assist so that the remaining work is completed in 20 days?

(a) 60 (b) 40

(c) 25 (d) 20

20. The wages of 6 men, 8 women & 4 boys is 520 rupees. The wages of 5 men is equal to that of 8 women and the wages of 5 boys is equal to that of 4 women. Find the total wages of 7 men, 6 women and 10 boys.

(a) Rs 610 (b) Rs. 630

(c) Rs 665 (d) Rs. 700

21. 6 men and 5 children can earn Rs. 1400 in 5 days. 8 men and 7 children can earn Rs. 3040 in 8 days. How many days will it take to 4 men and 3 children to earn Rs. 720?

(a) 3 days (b) 2 days

(c) 4 days (d) None of these

22. 9 men and 20 women working $\frac{5}{4}$ hours a day can do $\frac{3}{4}$ of work in 9 days and the remaining part of the work is done by 7 men and 46 women, working $\frac{1}{4}$ hours a day, in 5 days. Find the number of the days for 13 men and 14 women to complete the same entire work by working $\frac{1}{2}$ hour a day.

(a) 10 days (b) 15 days

(c) 16 days (d) 21 days

23. 3 men and 5 women can built a wall of length 25 metre in 20 days. 2 men and 6 women built 40 metres wall of same type in 40 days. Find the ratio of work efficiencies of 1 men and 1 women.

(a) 2 : 3 (b) 4 : 1

(c) 5 : 1 (d) 1 : 5

24. 3 men or 4 women or 5 boys can earn Rs. 150 daily. Then, 7 men with 12 women and 3 boys will earn per day is :

(a) Rs. 880 (b) Rs. 950

(c) Rs. 900 (d) Rs. 910

25. 3 men and 4 boys can earn Rs.756 in 7 days. 11 men and 13 boys can earn Rs.3008 in 8 days. In what time will 7 men with 9 boys earn Rs.2480?

(a) 12 days (b) 15 days

(c) 10 days (d) 18 days

26. 20 men can cut 30 trees in 4 hours. If 4 men leave the job, how many trees will be cut in 6 hours?

(a) 30 trees (b) 36 trees

(c) 40 trees (d) None of these

27. 5 men can prepare 10 toys in 6 days working 6 hours a day. Then in how many days can 12 men prepare 16 toys working 8 hrs a day?

(a) 3 days (b) 4 days

(c) 6 days (d) 5 days

28. 10 men can prepare 20 toys in 3 days working 12 hours a day. Then in how many days can 24 men prepare 32 toys working 4 hrs a day?

(a) 2 days (b) 3 days

(c) 4 days (d) 6 days

29. 20 men can prepare 40 toys in 24 days working 18 hours a day. Then in how many days can 36 men prepare 48 toys working 16 hrs a day?

(a) 16 days (b) 12 days

(c) 21 days (d) 18 days

30. 10 men can complete a piece of work in 15 days and 15 women can complete the same work in 12 days. If all the 10 men and 15 women work together, in how many days will work get completed?

(b) $7\frac{2}{3}$

(d) $6\frac{1}{3}$

do a piece of work in 2 hours, which 7 women could do in 3 hours, or 9 children in 4 hours. How long would 1 man, 1 woman and 1 child together take to do the work?

(a) $\frac{1260}{221}$ (b) $\frac{1270}{231}$

(c) $\frac{1221}{260}$ (d) None of these

32. If 12 men and 16 boys can do a piece of work in 5 days and 13 men and 24 boys can do it in 4 days, how long will 7 men and 10 boys take to do it?

(a) $8\frac{1}{3}$ days (b) $12\frac{1}{8}$

(c) $12\frac{1}{3}$ (d) None of these

33. If 12 men and 16 boys can do a piece of work in 5 days and 13 men and 24 boys can do it in 4 days, compare the daily work done by a man with that of a boy:

(a) 1 : 2 (b) 2 : 1

(c) 1 : 3 (d) 3 : 1

34. If 30 men and 14 boys can reap a field in 21 days, in how many days will 20 men and 4 boys reap it, supposing 3 men can do as much work as 5 boys?

(a) 36 days (b) 30 days

(c) 42 days (d) 45 days

35. If 5 men and 2 boys working together can do 4 times as much work per hour as a man and a boy together, compare the work of a man with that of a boy :

(a) 2 : 1

(b) 3 : 1

(c) 4 : 1

(d) Data indadequate

36. If Sandeep hires 2 men and 3 boys for 6 days to do the same piece of work as 11 men and 5 boys could do in $1\frac{1}{2}$ days compare the work of a boy with that of a man :

(a) 7 : 3 (b) 3 : 7

(c) 2 : 5 (d) 5 : 2

37. 8 children and 12 men complete a certain piece of work in 9 days. Each child takes twice the time by a man to finish the work. In how many days will 12 men finish the same work?

(a) 8 days (b) 9 days

(c) 12 days (d) 15 days

38. A certain number of men can do a work in 45 days. If there were 4 men less it could be finished in 15 days more. How many men are there?

(a) 28 men (b) 16 men

(c) 24 men (d) 20 men

39. A certain number of men can do a work in 30 days. If there were 6 men less it could be finished in 20 days more. How many men are there?

(a) 15 men (b) 12 men

(c) 18 men (d) 20 men

40. 6 men and 3 boys working together can do 2 times as much work per hour done by 2 men and 2 boys together. Compare the work of a man with that of a boy :

(a) 2 : 1 (b) 3 : 1

(c) 3 : 2 (d) 4 : 1

41. 1 man or 2 women or 3 boys can do a work in 44 days. Then in how many days will 1 man, 1 woman and 1 boy do the work?

(a) 24 days (b) 12 days

(c) 8 days (d) 16 days

42. 3 men or 4 women or 5 boys can do a work in 47 days. Then in how many days will 1 man, 1 woman and 1 boy do the work?

(a) 40 days (b) 50 days

(c) 60 days (d) 45 days

43. 1 man or 3 women or 4 boys can do a work in 38 days. Then in how many days will 1 man, 1 woman and 1 boy do the work?

(a) 24 days (b) 12 days

(c) 18 days (d) 36 days

44. 1 man or 2 women or 4 boys can do a work in 56 days. Then in how many days will 1 man, 1 woman and 1 boy do the work?

(a) 24 days (b) 28 days

(c) 20 days (d) 32 days

45. A group of men decided to do a work in 12 days, but 8 of them became absent. If the rest of the group did the work in 20 days, find the original number of men:

(a) 18 men (b) 20 men

(c) 22 men (d) 24 men

46. A group of men decided to do a work in 15 days, but 2 of them became absent. If the rest of the group did the work in 25 days, find the original number of men:

(a) 5 men (b) 4 men

(c) 7 men (d) 6 men

47. A certain number of men can do a work in 60 days. If there were 8 men more it could be finished in 10 days less. How many men are there?

(a) 40 men (b) 20 men

(c) 35 men (d) 25 men

48. A certain number of men can do a work in 50 days. If there were 3 men more it could be finished in 5 days less. How many men are there?

(a) 36 men (b) 18 men

(c) 27 men (d) 30 men

49. A builder decided to build a farm house in 40 days. He employed 100 men in the beginning and 100 more after 35 days and completed the construction in stipulated time. If he had not employed the additional men, how many days behind schedule would it have been finished?

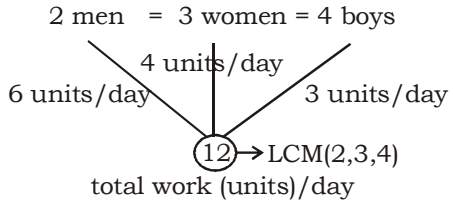
(a) 5 days (b) 8 days

(c) 10 days (d) 9 days

50. There is enough food stored for 200 men for 36 days. After 33 days, 140 men leave the place. For how many days will the

SOLUTION

1. (a)



Now we calculate the total work as follows :

total work = 12 × 52 units

Required time for (1 men + 1 woman + 1 boy)

$$= \frac{\text{Total work}}{\text{total efficiency}}$$

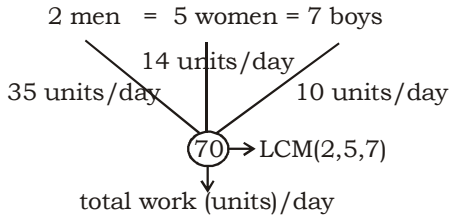
$$= \frac{12\times52}{13} = 48 \text{ days}$$

Note :-

(1) In such type of questions first calculate the efficiency of a man, a woman and a boy individually.

(2) Then calculate the total work and apply the further procedure as above.

2. (d)



Now total work = 70× 469 units

Required time for (7 men + 5 women + 2 boys)

$$= \frac{\text{Total work}}{\text{total effciency}}$$

$$= \frac{70\times469}{(35\times7+5\times14+10\times2)}$$

$$= \frac{70\times469}{335} = 98 \text{ days}$$

3. (a) (6 children + 2 men) → 6 days

according to the question,

	Child:	Man
Time →	2 :	1
Efficiency →	1 :	2

$$\left[\therefore T \propto \frac{1}{E}\right]$$

now we calculate total work units as follows:

Total work units

= (6 + 2 × 2) × 6 = 60 units

Time taken by 5 men to finish the work = $\frac{60}{(5\times2)}$ = 6 days

4. (a) Actual work = 450 man-days [given]

new work = 450 × 3 man-days

men = 27

we know : $M_1D_1 = M_2D_2$

$450 \times 3 = 27 \times D_2$

$D_2 = 50$ days

5. (d) 33 men do the work = 30 days

total work = 33 × 30 = 990 units

according to the question,

44 + 43 + 42 + ... = 990

It is a series of Arithmetic progression.

we know, **sum** = $\frac{\mathbf{n}}{\mathbf{2}}$ **[2a+ (n–1)d]**

a = 44, d = 43 – 44 = –1

$$990 = \frac{n}{2}[2 \times 44 + (n-1)-1]$$

after solving n = 44

6. (b) (7 Indian + 4 Chinese)×5

= (7 Japanese + 3 Chinese) × 7

Abbreviations:-

Indian → I, Chinese → C, Japanese → J]

(7 I + 4C) × 5 = (7J + 3C) × 7

35 I + 20C = 49J + 21C

35 I = 49J + C

Note:- now assume the efficiency of all but it should be satisfy the above equation and also according to the question condition,

Let I = 2, J = 1, C = 21

total work = (7 × 2 + 4 × 21)×5

= 98 × 5 units

Required time for (1I + 1C + 1J)

$$= \frac{98\times5}{24} = \frac{245}{12} = 20\frac{5}{12} \text{ days}$$

Alternatively:-

One day's work of (7I + 4C) = 1/5

One day's work of (7J + 3C) = 1/7

Therefore, one day's work of (7 Indian + 7 chinese + 7 Japanese) = $\frac{1}{5}+\frac{1}{7}=\frac{12}{35}$

Therefore, one days work of (1 Indian + 1 Chinese + 1 Japanese) = $\frac{12}{35}\times\frac{1}{7}$

∴ Number of days required for (1I + 1C + 1J)

$$= \frac{35\times7}{12} = \frac{245}{12} = 20\frac{5}{12} \text{ days}$$

7. (d) One day's work of

(4m + 2b) = $\frac{1}{5}$

one day's work of (3w + 4b) = $\frac{1}{5}$

one day's work of (2m + 3w) = $\frac{1}{5}$

Therefore, one day's work of (6m + 6w + 6b)

$$= \frac{1}{5}+\frac{1}{5}+\frac{1}{5}=\frac{3}{5}$$

one day's work of

(1m + 1w + 1b) = $\frac{3}{5\times6} = \frac{1}{10}$

Required time for

(1m + 1w + 1b) = 10 days

But according to question,

Note:- The efficiency is double then the time would be half.

Required time = $\frac{1}{2}[10]$ = 5 days.

8. (b)

	Typist	:	Composer	:	Binder
	16	:	10	:	15
	8	:	12	:	12
In 1 hr.	128		1200		180
In 10hrs.	1280		1200		1800

Since, restriction is imposed by composers be since only 1200 books can be composed in 10 hours so not more than 1200 books can be finally prepared.

9. (c) $(8m + 5w) \times 6 \times 4$

$= (4m + 5w) \times 8 \times 5$

$24m + 15w = 20m + 25w$

$4m = 10w$

$2m = 5w \Rightarrow \frac{m}{w} = \frac{5}{2}$

[where $m \rightarrow$ man, $w \rightarrow$ woman]

Total work $= (40 + 10) \times 24$

$= 1200$ units

According to the question,

$5b \times 8 \times 30 = 1200$

$\Rightarrow b = 1$ [$\therefore b \rightarrow$ Boy]

Time taken by $(4m + 3w + 4b)$ to complete the work when they worked 5 hours everyday

$= \frac{1200}{(20+6+4)\times 5} = \frac{1200}{150} = 8$ days

10. (c) Let the 2 men would do the work in x days then time taken by 3 women = $(x + 5)$ days.

2 men $\rightarrow x$ days

3 men $\rightarrow \frac{2x}{3}$ days

Similarly:-

3 women $\rightarrow (x+5)$ 1 women $\rightarrow 3(x+5)$

5 women $\rightarrow \frac{3}{5}(x+5)$ days

According to the question:

$\frac{3}{2x} + \frac{5}{3(x+5)} = \frac{1}{3}$

$\Rightarrow \frac{9x+45+10x}{6x(x+5)} = \frac{1}{3}$

$\Rightarrow \frac{19x+45}{6x^2+30x} = \frac{1}{3}$

$57x + 135 = 6x^2 + 30x$

$6x^2 - 27x - 135 = 0$

$6x^2 - 45x + 18x - 135 = 0$

$3x(2x - 15) + 9(2x - 15) = 0$

$x = \frac{15}{2}, x = -3$

Time taken by man

$= \frac{15}{2} \times 2 = 15$

Time taken by woman

$= 3\left(\frac{15}{2} + 5\right) = \frac{25}{2} \times 3 = \frac{75}{2}$

	Man	:	Woman
Time $\rightarrow$	15	:	$\frac{75}{2}$
E $\rightarrow$	$\frac{75}{2}$	:	15

Ratio of efficiency of man : woman = 5 : 2

Note:- In such type of questions take help from options to save your valuable time for further details check earlier examples.

11. (a) Ratio of work of 1 man, 1 woman and 1 boy = 4 : 3 : 2

$\therefore$ Ratio of work of 16 men, 18 women, and 24 boys

$= 16\times4 : 3\times18 : 24\times2$

$32 : 27 : 24$

$\therefore$ Weekly wages of 16 men

$= \frac{13944}{(32+27+24)} \times 32 = \text{Rs. } 5376$

Weekly wages of 18 women

$= \frac{13944}{83} \times 27 = \text{Rs. } 4536$

Weekly wages of 24 boys

$= \frac{13944}{83} \times 24 = \text{Rs. } 4032$

Per day wages of a man

$= \frac{5376}{16\times7} = \text{Rs.}48$

Per day wages of a woman

$= \frac{4536}{18\times7} = \text{Rs. } 36$

Per day wages of a boy

$= \frac{4032}{24\times7} = \text{Rs. } 24$

$\therefore$ Annual wages of 36 men, 24 women and 20 boys

$= (48\times36 + 36\times24 + 24\times20)\times365$

$= (1728 + 864 + 480)\times365$

$= 3072 \times 365 = \text{Rs. } 1121280$

Alternatively:-

Try to think like that in this question we are asking about annual wages. It means finding per day wages we multiply the answer by 365 for finding annual wages. So we can say answer will be the multiple of 365 and all its factors. So pick options and check divisibility.

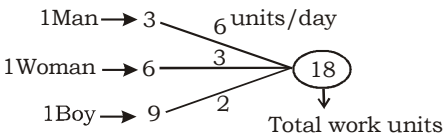
12. (a) 1 Man can do the work $= 1 \times 3 = 3$ days

1 Woman can do the work

$= \frac{3}{4} \times 8 = 6$ days

1 Boy can do the work

$= \frac{1}{2} \times 18 = 9$ days



According to the question :-

(3 women + 3 boys) one day work $= 3(3 + 2) = 15$ units

Remaining work $= (18 - 15) = 3$ units

Required time for 1 man

$= \frac{3}{6} = \frac{1}{2}$ day

So 1 man can do the remaining work in $\frac{1}{2}$ day.

13. (a) According to the question:- [$m \rightarrow$ man, $b \rightarrow$ boy,

w → woman]

16m × 8 = 12 b × 24

m : b

9 : 4

Now total work

= (8 × 9 + 12 × 4) × 12

= (72 + 48) × 12

= 120 × 12 = 1440 units

Required time for completing thrice the work for 40 men and 45 boys

$$= \frac{1440 \times 3}{(40 \times 9 + 45 \times 4)}$$

$$= \frac{1440 \times 3}{540} = 8 \text{ days}$$

14. (a) According to the question :-

$$\text{Total work} = \frac{200 \times 10 \times 6}{5}$$

= 2400 units

$$10 \text{ days work} = 2400 \times \frac{5}{6}$$

= 2000 units

Due to rain, destroyed work

$$= 2000 \times \frac{2}{5} = 800 \text{ units}$$

Total work to be done = (2400 – 2000) + 800 = 1200 units

Required time for 150 men

$$= \frac{1200}{150} = 8 \text{ days}$$

Total time taken in completion of work

=10 + 20 + 8 = 38 days

15. (a) We know :-

$$\boxed{\frac{M_1 D_1}{W_1} = \frac{M_2 D_2}{W_2}}$$

Now according to the question.

1600 × 50 × 900

= 1200 × 1000 × D

$$D = \frac{1600 \times 50 \times 900}{1200 \times 1000} = 60 \text{ days}$$

16. (d) Let the number of soldiers =M

Let the number of days = D

according to the question,

$$M \times (D - 20) = \frac{3}{4} M \times D$$

4 MD – 80 M = 3 MD

D = 80 days

17. (a) According to the question:-

Total work=20 × 18 =360 units

Work done by 20 men in 3 days = 3 × 20 = 60 units

after joining of 5 men then total men = 25

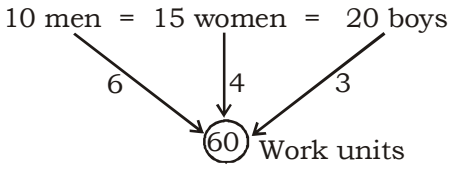
Remaining work = 360 – 60

= 300 units

$$\text{Now Required time} = \frac{300}{25}$$

= **12 days**

18. (a) According to the question :



Now we find total work as :-

Total work = 60 × 6 × 60

= 21600 units

Required time for (10 men + 15 women + 20 boys)

$$\Rightarrow \frac{21600}{(10 \times 6 + 4 \times 15 + 3 \times 20) \times 15}$$

$$\Rightarrow \frac{21600}{(60 + 60 + 60) \times 15}$$

$$\Rightarrow \frac{21600}{180 \times 15}$$

⇒ **8 hours**

19. (d) [M = Man, C = Children]

25 M × 10 = 20 C × 50

1 M = 4 C

The work done by 1 man

= 25 × 10 = 250 days

Work done by 5 men in 10 days = 50 units

Work left to be done in 20 days = 200 units

It required 10 men per day to work but we have only 5 men and Require 5 men more.

Hence 5 men = 20 Children.

20. (b) We know:-

[Wages ∝ Work efficiency]

Now, 5 Men = 8 Women = 10 Boys

	Men	Women	Boys
Ratio of efficiency →	$8x$	$5x$	$4x$

So, $6 \times 8x + 8 \times 5x + 4 \times 4x = 520$

$x = 5$

Wages of a man = 8 × 5 = 40 Rs.

Wages of a woman =5×5=25 Rs.

Wages of a boy =4 × 5= 20 Rs.

Hence, Total wages=7×40+6 × 25 + 10 × 20

= **630 Rs.**

21. (c) $\frac{5}{1400} \times (6m + 5c)$

$$= \frac{8}{3040} \times (8m + 7c)$$

2m = 3 c

Now let it takes D days to earn Rs. 720 for 4 men and children.

$$\frac{5}{1400} \times (6m + 5c)$$

$$= \frac{D}{720} \times (4m + 3c)$$

$$= \frac{5}{1400} \times (9c + 5c)$$

$$= \frac{D}{720} \times (6c + 3c)$$

D = **4 days**

22. (b) $$\frac{(9m + 20w) \times \frac{5}{4} \times 9}{\frac{3}{4}}$$

$$= \frac{(7m + 46w) \times \frac{1}{4} \times 5}{\frac{1}{4}}$$

1 m = 2 w

Now, $\frac{(7m + 46w)\times\frac{1}{4}\times5}{\frac{1}{4}}$

$= \frac{(13m + 14w)\times\frac{1}{2}\times D}{1}$

$\therefore \frac{(14w + 46w)\times\frac{1}{4}\times5}{\frac{1}{4}}$

$= \frac{(26w + 14w)\times\frac{1}{2}\times D}{1}$

D = 15 days

23. (c) $(3m + 5w)\times\frac{20}{25}$

$= (2m + 6w)\times\frac{40}{40}$

1m = 5w

$\frac{m}{w} = \frac{5}{1}$

Ratio of efficiency man : woman = **5 : 1**

24. (b) Earning of 1 man per day

$= \frac{150}{3}$ = Rs.50

Earning of 1 woman per day

$= \frac{150}{4}$ = Rs. $\frac{75}{2}$

Earning of 1 boy per day

$= \frac{150}{5}$ = Rs. 30

Earnings of (7men + 12 women + 3 boys)

$= 7 \times 50 + 12 \times \frac{75}{2} + 3 \times 50$

= 350 + 450 + 150 = Rs. 950

25. (c) Let the number of required days = D

$\frac{(3m + 4b)\times7}{756}$

$= \frac{(11m + 13b)\times8}{3008}$

282m + 376b = 297m + 351b

15m = 25b $\boxed{\frac{m}{b} = \frac{5}{3}}$

According to the question,

$\frac{(3\times5 + 4\times3)\times7}{756}$

$= \frac{(7\times5 + 9\times3)}{2480}\times D$

D = 10 days

26. (b) Let the number of Days = D_2

$\frac{M_1 D_1}{W_1} = \frac{M_2 D_2}{W_2}$

$\frac{20' 4}{30} = \frac{(20-4)' 6}{x}$

$\frac{80}{30} = \frac{16' 6}{x}$

x = 36 trees

27. (a) Let the number of Days = D_2

$\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$

$\frac{5' 6' 6}{10} = \frac{12' D_2' 8}{16}$

$D_2 = \frac{5' 6' 6' 16}{10' 12' 8}$

D_2 = 3 days

28. (d) Let the number of Days = D_2

According to question

$\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$

$\frac{10' 3' 12}{20} = \frac{24' 4' D_2}{32}$

= 18 = $3D_2$ = 6 days

29. (d) Let the number of Days = D_2

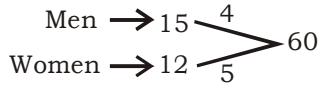
$\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$

$\frac{20\times24\times18}{40} = \frac{36\times D_2\times16}{48}$

$D_2 = \frac{20' 24' 18' 48}{40' 36' 16}$

D_2 = 18 days

30. (c)



Total Time required by (10 men + 15 women) to complete the whole work

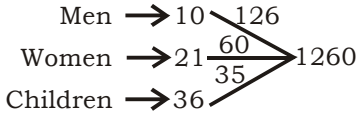
$= \frac{60}{4+5} = \frac{60}{9} = 6\frac{2}{3}$ days

31. (a) 1 men complete the work = 2 × 5 = 10 hours

1 women complete the work

= 7 × 3 = 21 hours

1 chidren complete the work = 9 × 4 = 36 hours



1 men, , woman and 1 child together complete the work

$= \frac{\text{Total work}}{\text{Total Efficiency}}$

$= \frac{1260}{126+60+35} = \frac{1260}{221}$ hours

32. (a) (12m + 16B) × 5 = (13m + 24B) × 4

60m + 80B = 52m + 96B

8M = 16B

$\frac{M}{B} = \frac{2}{1}$

Total unit = (12M + 16B) × 5

= (12 × 2 + 16 × 1) × 5

= (24 + 16) × 5 = 200 units

7Men and 10 Boys

$= \frac{200}{7' 2+10' 1}$

$= \frac{200}{14+10} = \frac{200}{24} = \frac{25}{3}$

$= 8\frac{1}{3}$ days

33. (a) (16M + 12B) × 5 = (24M + 13B) × 4

80M + 60B = 96M + 52B

8B = 16M

$\frac{M}{B} = \frac{1}{2}$

34. (a) 3Men = 5 boys

$\frac{Men}{Boy} = \frac{5}{3}$

Total work = (30M + 14B) × 21

= (30 × 5 + 14 × 3) × 21

= (150 + 42) × 21

= 192 × 21 = 4032 units

20 men and 4 boys

$= \frac{4032}{20' 5 + 4' 3}$

$= \frac{4032}{112}$ = 36 days

35. (a) (5M + 2B) = 4 (1M + B)

5M + 2B = 4M + 4B

1M = 2B

$\frac{M}{B} = \frac{2}{1}$

36. (b) $(2M + 3B)\,6 = (11M + 5B) \times \frac{3}{2}$

$12M + 18B = \frac{33}{2}M + \frac{15}{2}B$

$\frac{33}{2}M - 12M = 18B - \frac{15}{2}B$

$\frac{9}{2}M = \frac{21}{2}B$

$\frac{M}{B} = \frac{21}{9} = \frac{7}{3} = \frac{B}{M} = \frac{3}{7}$

37. (c) [C – Children, M – Men]

1M = 2 × C

$\frac{M}{C} = \frac{2}{1}$

Total work = (8C + 12M) × 9

= (8 × 1 + 12 × 2) × 9

= (8 + 24) × 9 = 288 units

12 Men finished the work

$= \frac{288}{12' 2} = \frac{288}{24}$ = 12 days

38. (b) Let the number of men = x

1 Men complete the work = 45 × x days

A.T.Q

45x = (x – 4) × (45 + 15)

45x = (x – 4) × 60

3x = (x – 4) × 4

3x = 4x – 16

x = 16 men

39. (a) Let the number of men = x

1 men complete a work = 30x days

A.T.Q

30 × x = (x – 6) (30 + 20)

30x = 50x – 300

20x = 300

x = 15 men

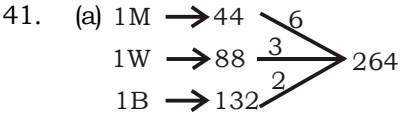
40. (a) (6M + 3B) = 2 (2M + 2B)

6M + 3B = 4M + 4B

2M = 1B

$\frac{M}{B} = \frac{1}{2}$

41. (a)

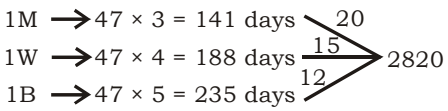


1M + 1W + 1B

$= \frac{\text{Total work}}{\text{Total Efficiency}} = \frac{264}{11}$

= 24 days

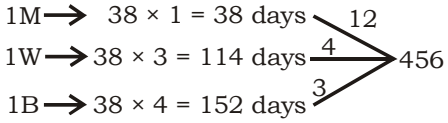
42. (c)



1M + 1W + 1B complete the work = $\frac{2820}{20 + 15 + 12} = \frac{2820}{47}$

= 60 days

43. (a)

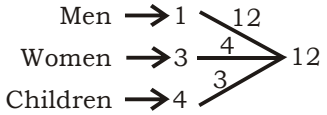


1M + 1W + 1B = $\frac{456}{12 + 4 + 3}$

$= \frac{456}{19}$ = 24 days

Alternate:–

This type of question we assume Total person in work is number of Days.



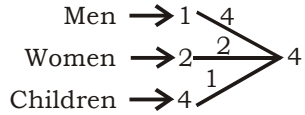
1M + 1W + 1B = (12 + 4 + 3) units

$= \frac{12}{12 + 4 + 3} = \frac{12}{19}$

then, we multiply by 38

$= \frac{12}{19} \times 38$ = 24 days

44. (d)



$1M + 1W + 1B = \frac{4}{4 + 2 + 1} = \frac{4}{7}$

then, we multiply by 56

$= \frac{4}{7} \times 56$ = 32 days

45. (b) Let the original number of men = x

A.T.Q

x × 12 = (x – 8) 20

3x = 5x – 40

2x = 40

x = 20 men

46. (a) Let the original number of men = x

A.T.Q

x × 15 = (x – 2) × 25

3x = 5x – 10

2x = 10

x = 5 men

47. (a) Let the number of men = x

A.T.Q

x × 60 = (x + 8) × 50

6x = 5x + 40

x = 40 men

48. (c) Let the number of men = x

A.T.Q

$x \times 50 = (x + 3) \times 45$

$10x = 9x + 27$

$x = 27$ men

49. (a) Let the number of original days = x

A.T.Q

$100 \times x$

$= 100 \times 35 + (100 + 100) \times 5$

$100x = 3500 + 1000$

$x = \frac{4500}{100} = 45$ days

Extra days = 45 – 40 = 5 days

50. (b) Let the number of days food for the rest men = x days

A.T.Q

$200 \times 3 = 60 \times x$

x = 10 days