12 TIME AND WORK

Importance : In all level competitive examinations questions on Time and Work have been asked. Due to limited number of types you can ensure your marks with minimum efforts.

Scope of questions : In these questions, time taken by one/two persons or groups in doing certain works. required number of persons for any work are commonly asked. Comparision of male, female, children works, time taken after distribution/change and questions based on efficiency (per cent of ratio) are also asked.

Way to success : Note that 'time and work' and 'number of labour and work', have direct ratio while 'time and number of labour' have inverse ratio to solve these questions use ratio method to be it is noted that practice will ensure your accuracy and fast speed.

RULE 1 : If M_1 men can finish W_1 work in D_1 days and M_2 men can finish W_2 work in D_2 days then, Relation is

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

If M_1 men finish W_1 work in D_1 days, working T_1 time each day and M_2 men finish W_2 work in D_2 days, working T_2 time each day, then

$$\frac{M_1 D_1 T_1}{W_1} = \frac{M_2 D_2 T_2}{W_2}$$

RULE 2 : If A completes a piece of work in 'x' days, and B completes the same work in 'y' days, then,

Work done by A in 1 day = $\frac{1}{x}$, Work done by B in 1 day = $\frac{1}{y}$

$\therefore$ Work done by A and B in 1 day = $\frac{1}{x} + \frac{1}{y} = \frac{x+y}{xy}$

$\therefore$ Total time taken to complete the work by A and B both = $\left(\frac{xy}{x+y}\right)$

RULE 3 : If A can do a work in 'x' days, B can do the same work in 'y' days, C can do the same work in 'z' days then, total time taken by A, B and C to complete the work

together = $\dfrac{1}{\frac{1}{x} + \frac{1}{y} + \frac{1}{z}} = \dfrac{xyz}{xy + yz + zx}$ and

If workers are more than 3 then total time taken by A, B, C ...... so on to complete the work together =

$$\dfrac{1}{\frac{1}{x} + \frac{1}{y} + \frac{1}{z} + ...}$$

RULE 4 : If A alone can do a certain work in 'x' days and A and B together can do the same work in 'y' days, then B alone can do the same work in

$$\left(\frac{xy}{x-y}\right) \text{ days}$$

RULE 5 : If A and B can do a work in 'x' days, B and C can do the same work in 'y' days, C and A can do the same work in 'z' days. Then total time taken, when A, B and C

work together = $\dfrac{2}{\left(\frac{1}{x} + \frac{1}{y} + \frac{1}{z}\right)}$ OR $\dfrac{2xyz}{xy + yz + zx}$ days

RULE 6 : Work of one day = $\dfrac{\text{Total work}}{\text{Total no. of working days}}$

Total work = (work of one day) × (total no. of working days)
Remaining work = 1 – (work done)
Work done by A = (Work done in 1 day by A) × (total no. of days worked by A,

B and C and so on) = $\dfrac{\frac{1}{x}}{\left(\frac{1}{x} + \frac{1}{y} + \frac{1}{z} + ...\right)}$

where A can complete work in x days, B in y days, C in z days and so on....

RULE 7 : If A can finish $\frac{m}{n}$ part of the work in D days. Then,

Total time taken to finish the work by

$$A = \dfrac{D}{\left(\frac{m}{n}\right)} = \frac{n}{m} \times D \text{ days}$$

RULE 8 : (i) If A can do a work in 'x' days and B can do the same work in 'y' days and when they started working together, B left the work 'm' days before completion then

total time taken to complete work is $\dfrac{(y+m)x}{x+y}$

(ii) A leaves the work 'm' days before its completion then total time taken to complete work is $= \dfrac{(x+m)y}{x+y}$

RULE 9 : If A and B together can finish a certain work in 'a' days. They worked together for 'b' days and then 'B' (or A) left the work. A (or B) finished the rest work in 'd' days, then

Total time taken by A (or B) alone to complete the work

$= \dfrac{ad}{a-b}$ or $\dfrac{bd}{a-b}$ days

RULE 10 : If food is available for 'a' days for 'A' men at a certain place and after 'b' days. 'B' men join, then the remaining food will serve total men for

Required time = $\dfrac{A(a-b)}{(A+B)}$ days

If food is available for 'a' days for 'A' men at a certain place, and after 'b' days 'B' men leave then the remaining food will serve remaining men for

$\therefore$ Required time = $\dfrac{A(a-b)}{(A-B)}$ days

RULE 11 : If A_1 men and B_1 boys can do a certain work in D_1 days, Again, A_2 men and B_2 boys can do the same work in D_2 days, then, A_3 men and B_3 boys can do the same work in

Required time

$$= \frac{D_1 D_2 [A_1 B_2 - A_2 B_1]}{D_1 [A_1 B_3 - A_3 B_1] - D_2 [A_2 B_3 - A_3 B_2]} \text{ days}$$

RULE 12 : If A men or B boys can do a certain work in 'a' days, then A_1 men and B_1 boys can do the same work in

Time taken $= \dfrac{a}{\dfrac{A_1}{A} + \dfrac{B_1}{B}} = \dfrac{a(A.B)}{A_1 B + B_1 A}$ days

RULE 13 : If A men or B boys or C women can do a certain work in 'a' days, then A_1 men, B_1 boys and C_1 women can do the same work in

Time taken $= \dfrac{a}{\dfrac{A_1}{A} + \dfrac{B_1}{B} + \dfrac{C_1}{C}}$

RULE 14 : If 'A' men can do a certain work in 'a' days and 'B' women can do the same work in 'b' days, then the total time taken when A_1 men and B_1 women work together is

Time taken $= \dfrac{1}{\left(\dfrac{A_1}{A.a} + \dfrac{B_1}{B.b} \right)}$

If A men do a certain work in 'a' days, B women do the same work in 'b' days and C boys do the same work in 'c' days then the total time taken when A_1 men, B_1 women and C_1 boys can work together is

Total time taken $= \dfrac{1}{\left(\dfrac{A_1}{A.a} + \dfrac{B_1}{B.b} + \dfrac{C_1}{C.c} \right)}$

RULE 15 : The comparison of rate of work done is called efficiency of doing work. Efficiency (E) $\propto \dfrac{1}{\text{No. of days}}$,

$E_1 : E_2 : E_3 = \dfrac{1}{D_1} : \dfrac{1}{D_2} : \dfrac{1}{D_3}$, $E = \dfrac{k}{D}$ or, ED = k or, $E_1 D_1 = E_2 D_2$

RULE 16 : If the efficiency to work of A is twice the efficiency to work of B, then, A:B (efficiency) = 2x:x and A:B (time) = t:2t

RULE 17 : If A can do a work in 'x' days and B is R% more efficient than A, then 'B' alone will do the same work

in x $\dfrac{100}{(100 + R)}$ days

RULE 18 : A, B and C can do a certain work together within 'x' days. While, any two of them can do the same work separately in 'y' and 'z' days, then in how many days can 3rd do the same work?

Required time $= \dfrac{xyz}{yz - x(y + z)}$ days

RULE 19 : A and B can do a work in 'x' days, B and C can do the same work in 'y' days. C and A can do the same work in 'z' days. Then, all can do alone the work as following:

A alone can do in $= \dfrac{2xyz}{xy + yz - zx}$ days

B alone can do in $= \dfrac{2xyz}{-xy + yz + zx}$ days

C alone can do in $= \dfrac{2xyz}{-yz + xy + zx}$ days

RULE 20 : A can do a certain work in 'm' days and B can do the same work in 'n' days. They worked together for 'P' days and after this A left the work, then in how many days did B alone do the rest of work ?

Required time $= \dfrac{mn - P(m + n)}{m}$ days

when after 'P' days B left the work, then in how many days did A alone do the rest of work?

Required time $= \dfrac{mn - P(m + n)}{n}$ days

RULE 21 : If a man can do a certain work in 'd_1' days working 'h_1' hours in a days, while another man can do the same work in 'd_2' days working 'h_2' hours in a day. When they work together everyday 'h' hours, then in how many days work will complete?

Required time $= \left[\dfrac{(h_1 d_1) \times (h_2 d_2)}{(h_1 d_1 + h_2 d_2)} \right] \dfrac{1}{h}$

RULE 22 : The efficiency of A to work is 'n' times more than that of B, Both start to work together and finish it in 'D' days. Then, A and B will separately complete, the work

in $\left(\dfrac{n+1}{n} \right)$ D and (n + 1) D days respectively.

RULE 23 : Some people finish a certain work in 'D' days. If there were 'a' less people, then the work would be completed in 'd' days more, what was the number of people initially?

$\therefore$ Required number $= \dfrac{a(D - d)}{d}$ people

RULE 24 : A can do a work in 'm' days and B can do the same work in 'n' days. If they work together and total wages is R, then.

Part of A $= \dfrac{n}{(m + n)} \times R$

Part of B $= \dfrac{m}{(m + n)} \times R$

RULE 25 : If A, B and C finish the work in m, n and p days respectively and they receive the total wages R, then

the ratio of their wages is $\dfrac{1}{m} : \dfrac{1}{n} : \dfrac{1}{p}$

RULE 26 : A and B can do a piece of work in x and y days, respectively. Both begin together but after some days. A leaves the job and B completed the remaining work in a days. After how many days did A leave?

Required time, t $= \dfrac{(y - a)}{x + y} \times x$

RULE 27 : If A men and B boys can complete a work in x days, while A_1 men and B_1 boys will complete the same work in y days, then

$\dfrac{\text{One day work of 1 man}}{\text{One day work of 1 boy}} = \dfrac{(yB_1 - xB)}{(xA - yA_1)}$

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QUESTIONS ASKED IN PREVIOUS SSC EXAMS

TYPE-I

1. A and B can do a work in 12 days, B and C in 15 days and C and A in 20 days. If A, B and C work together, they will complete the work in :

   (1) 5 days   (2) $7\dfrac{5}{6}$ days

   (3) 10 days   (4) $15\dfrac{2}{3}$ days

   (SSC CGL Prelim Exam. 04.07.1999 (Ist Sitting) & (SSC CPO S.I. Exam. 07.09.2003 & 03.09.2006) & (SSC CGL Prelim Exam. 19.06.2011) (Ist Sitting) & (SSC GL Tier-I Exam. 19.05.2013) (Ist Sitting)

2. A and B can do a piece of work in 72 days. B and C can do it in 120 days, A and C can do it in 90 days. In how many days all the three together can do the work ?
   (1) 80 days   (2) 100 days
   (3) 60 days   (4) 150 days
   (SSC CGL Prelim Exam. 04.07.1999 (IInd Sitting) & (SSC MTS (Non-Technical) Exam. 27.02.2011)

3. A particular job can be completed by a team of 10 men in 12 days. The same job can be completed by a team of 10 women in 6 days. How many days are needed to complete the job if the two teams work together?
   (1) 4 days   (2) 6 days
   (3) 9 days   (4) 18 days
   (SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

4. A can do a work in 6 days and B in 9 days. How many days will both take together to complete the work?
   (1) 7.5 days   (2) 5.4 days
   (3) 3.6 days   (4) 3 days
   (SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

5. A and B can do a piece of work in 10 days, B and C in 15 days and C and A in 20 days. C alone can do the work in :
   (1) 60 days   (2) 120 days
   (3) 80 days   (4) 30 days
   (SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

6. A can do a piece of work in 4 hours; B and C can do it in 3 hours. A and C can do it in 2 hours. How long will B alone take to do it ?
   (1) 10 hours   (2) 12 hours
   (3) 8 hours   (4) 24 hours
   (SSC CGL Prelim Exam. 24.02.2002 (IInd Sitting) & (SSC CGL Prelim Exam. 13.11.2005 (IInd Sitting)

7. 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

   (1) $\dfrac{1}{4}$ day   (2) $\dfrac{7}{24}$ day

   (3) $3\dfrac{3}{7}$ days   (4) 4 days

   (SSC CPO S.I. Exam. 12.01.2003)

8. A and B together can do a piece of work in 10 days. A alone can do it in 30 days. The time in which B alone can do it is
   (1) 10 days   (2) 12 days
   (3) 15 days   (4) 20 days
   (SSC CPO S.I. Exam. 05.09.2004)

9. A and B together can complete a piece of work in 72 days, B and C together can complete it in 120 days, and A and C together in 90 days. In what time can A alone complete the work ?
   (1) 80 days   (2) 100 days
   (3) 120 days   (4) 150 days
   (SSC CPO S.I. Exam. 26.05.2005)

10. A and B together can do a work in 8 days, B and C together in 6 days while C and A together in 10 days, if they all work together, the work will be completed in :

    (1) $3\dfrac{3}{4}$ days   (2) $3\dfrac{3}{7}$ days

    (3) $5\dfrac{5}{47}$ days   (4) $4\dfrac{4}{9}$ days

    (SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

11. A and B can do a piece of work in 12 days, B and C in 8 days and C and A in 6 days. How long would B take to do the same work alone ?
    (1) 24 days   (2) 32 days
    (3) 40 days   (4) 48 days
    (SSC CGL Prelim Exam. 24.02.2002 (Middle Zone) & (SSC CGL Prelim Exam. 13.11.2005 (Ist Sitting)

12. A and B can complete a piece of work in 30 days, B and C in 20 days, while C and A in 15 days. If all of them work together, the time taken in completing the work will be
    (1) 10 days   (2) 12 days

    (3) $12\dfrac{2}{3}$ days   (4) $13\dfrac{1}{3}$ days

    (SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

13. A and B together can complete a work in 8 days and B and C together in 12 days. All of the three together can complete the work in 6 days. In how much time will A and C together complete the work ?
    (1) 8 days   (2) 10 days
    (3) 12 days   (4) 20 days
    (SSC Section Officer (Commercial Audit) Exam. 26.11.2006 (IInd Sitting) & (SSC CHSL DEO & LDC Exam. 11.12.2011) (Delhi)

14. A alone can complete a work in 12 days. A and B together can complete it in 8 days. How long will B alone take to complete the work ?
    (1) 24 days   (2) 18 days
    (3) 16 days   (4) 20 days
    (SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

15. If A and B together can complete a work in 18 days, A and C together in 12 days and B and C together in 9 days, then B alone can do the work in
    (1) 18 days   (2) 24 days
    (3) 30 days   (4) 40 days
    (SSC Section Officer (Commercial Audit) Exam. 30.09.2007 (IInd Sitting)

16. While working 7 hours a day, A alone can complete a piece of work in 6 days and B alone in 8 days. In what time would they complete it together, working 8 hours a day ?
    (1) 3 days   (2) 4 days
    (3) 2.5 days   (4) 3.6 days
    (SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

17. A and B can do a piece of work in 10 days. B and C can do it in 12 days. C and A in 15 days. In how many days will C finish it alone ?
(1) 24 days (2) 30 days
(3) 40 days (4) 60 days
(SSC CPO S.I. Exam. 06.09.2009)

18. If A and B together can complete a piece of work in 15 days and B alone in 20 days, in how many days can A alone complete the work ?
(1) 60 days (2) 45 days
(3) 40 days (4) 30 days
(SSC CGL Tier-I Exam. 16.05.2010 (First Sitting)

19. If A and B together can complete a work in 12 days, B and C together in 15 days and C and A together in 20 days, then B alone can complete the work in
(1) 30 days (2) 25 days
(3) 24 days (4) 20 days
(SSC (South Zone) Investigator Exam 12.09.2010)

20. A work can be completed by P and Q in 12 days, Q and R in 15 days, R and P in 20 days. In how many days P alone can finish the work?
(1) 10 days (2) 20 days
(3) 30 days (4) 60 days
(SSC CGL Tier-1 Exam 19.06.2011 (Second Sitting) & (SSC GL Tier-I Exam. 19.05.2013**)**

21. A and B can complete a piece of work in 8 days, B and C can do it in 12 days, C and A can do it in 8 days. A, B and C together can complete it in
(1) 4 days (2) 5 days
(3) 6 days (4) 7 days
(SSC CGL Tier-1 Exam 26.06.2011 (First Sitting)

22. *A* and B together can do a work in 10 days. B and C together can do the same work in 6 days. A and C together can do the work in 12 days. Then A, B and C together can do the work in
(1) 28 days (2) 14 days
(3) $5\frac{5}{7}$ days (4) $8\frac{2}{7}$ days
(SSC CGL Tier-1 Exam 26.06.2011 (Second Sitting)

23. A and B working together; can do a piece of work in $4\frac{1}{2}$ hours.
B and C working together can do it in 3 hours. C and A working together can do it in $2\frac{1}{4}$ hours.
All of them begin the work at the same time. Find how much time they will take to finish the piece of work.
(1) 3 hours (2) 2 hours
(3) 2·5 hours (4) 3·25 hours
(SSC CPO (SI, ASI & Intelligence Officer) Exam 28.08.2011 (Paper-I)

24. A and B together can complete a piece of work in 18 days, B and C in 24 days and A and C in 36 days. In how many days, will all of them together complete the work ?
(1) 16 days (2) 15 days
(3) 12 days (4) 10 days
(SSC CISF ASI Exam 29.08.2010 (Paper-1)

25. A and B together can do a piece of work in 5 days and A alone can do it in 8 days. B alone can do the same piece of work in
(1) $11\frac{1}{3}$ days (2) $12\frac{3}{5}$ days
(3) $13\frac{1}{3}$ days (4) $16\frac{4}{5}$ days
(SSC Data Entry Operator Exam. 31.08.2008)

26. A, B and C together can complete a piece of work in 30 minutes. A and B together can complete the same work in 50 minutes. C alone can complete the work in
(1) 60 minutes (2) 75 minutes
(3) 80 minutes (4) 150 minutes
(SSC CHSL DEO & LDC Exam. 28.11.2010 (IInd Sitting)

27. A and B can do a piece of work in 8 days, B and C can do it in 24 days, while C and A can do it in $8\frac{4}{7}$ days. In how many days can C do it alone?
(1) 60 days (2) 40 days
(3) 30 days (4) 10 days
(SSC Multi-Tasking (Non-Technical) Staff Exam. 20.02.2011)

28. A and B can do a piece of work in 10 days. B and C can do it in 12 days. A and C can do it in 15 days. How long will A take to do it alone ?
(1) 24 days (2) 20 days
(3) 40 days (4) 30 days
(SSC CHSL DEO & LDC Exam. 04.12.2011(IInd Sitting (North Zone)

29. If A and B together can finish a piece of work in 20 days, B and C in 10 days and C and A in 12 days, then A, B, C jointly can finish the same work in
(1) $4\frac{2}{7}$ days (2) 30 days
(3) $8\frac{4}{7}$ days (4) $\frac{7}{60}$ days
(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (East Zone)

30. A, B and C individually can do a work in 10 days, 12 days and 15 days respectively. If they start working together, then the number of days required to finish the work is
(1) 16 days (2) 8 days
(3) 4 days (4) 2 days
(SSC Constable (GD) & Rifleman (GD) Exam. 22.04.2012 (IInd Sitting)

31. A and B together can do a piece of work in 12 days, while B alone can finish it in 30 days. A alone can finish the work in
(1) 20 days (2) 25 days
(3) 15 days (4) 18 days
(SSC CHSL DEO & LDC Exam. 21.10.2012 (Ist Sitting)

32. A, B and C can complete a piece of work in 12, 24 and 36 days respectively. In how many days will they together complete the same work ?
(1) $5\frac{6}{11}$ days (2) 4 days
(3) $6\frac{6}{11}$ days (4) 6 days
(SSC CHSL DEO & LDC Exam. 28.10.2012 (Ist Sitting)

33. A and B can separately do a piece of work in 6 days and 12 days respectively. How long will they together take to do the work ?
(1) 9 days (2) 18 days
(3) 6 days (4) 4 days
(SSC Graduate Level Tier-I Exam. 11.11.2012 (Ist Sitting)

34. A and B can do a piece of work in 36 days, B and C can do it in 60 days, A and C can do it in 45 days. C alone can do it in
(1) 90 days   (2) 180 days
(3) 120 days   (4) 150 days
(SSC CHSL DEO & LDC Exam. 04.11.2012, IInd Sitting)

35. Ronald and Elan are working on an Assignment. Ronald takes 6 hours to type 32 pages on a computer, while Elan 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 ?
(1) 7 hrs. 30 min.
(2) 8 hrs.
(3) 8 hrs. 15 min.
(4) 8 hrs. 25 min.
(SSC Graduate Level Tier-I Exam. 21.04.2013)

36. A can do a piece of work in 20 days and B can do the same piece of work in 30 days. Find in how many days both can do the work ?
(1) 16 days   (2) 14 days
(3) 10 days   (4) 12 days
(SSC Constable (GD) Exam. 12.05.2013) & (SSCCHSL DEO & LDC Exam. 20.10.2013)

37. A can do as much work as B and C together can do. A and B can together do a piece of work in 9 hours 36 minutes and C can do it in 48 hours. The time (in hours) that B needs to do the work alone, is :
(1) 18 hrs   (2) 24 hrs
(3) 30 hrs   (4) 12 hrs
(SSC CAPFs SI & CISF ASI Exam. 23.06.2013)

38. A can do a piece of work in 12 days and B in 15 days. They work together for 5 days and then B left. The days taken by A to finish the remaining work is
(1) 3   (2) 5
(3) 10   (4) 12l
(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

39. A and B together can dig a trench in 12 days, which A alone can dig in 28 days; B alone can dig it in
(1) 20 days   (2) 21 days
(3) 22 days   (4) 23 days
(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (Ist Sitting)

40. A can complete a work in 'm' days and B can complete it in 'n' days. How many days will it take to complete the work if both A and B work together ?
(1) $(m + n)$ days

(2) $\left(\dfrac{1}{m} \times \dfrac{1}{n} \right)$ days

(3) $\left(\dfrac{m + n}{mn} \right)$ days

(4) $\left(\dfrac{mn}{m + n} \right)$ days
(SSC CGL Tier-I Exam. 19.10.2014 (Ist Sitting)

41. Three men A. B and C working together can do a job in 6 hours less time than A alone, in 1 hour less time than B alone and in one half the time needed by C when working alone. Then A and B together can do the job in

(1) $\dfrac{2}{3}$ hour   (2) $\dfrac{3}{4}$ hour

(3) $\dfrac{3}{2}$ hour   (4) $\dfrac{4}{3}$ hour

(SSC CGL Tier-I Exam. 19.10.2014)

42. A takes three times as long as B and C together to do a job. B takes four times as long as A and C together to do the work. If all the three, working together can complete the job in 24 days, then the number of days, A alone will take to finish the job is
(1) 100   (2) 96
(3) 95   (4) 90
(SSC CGL Tier-I Exam. 19.10.2014)

43. A can do a piece of work in 4 days and B can do it in 12 days. In how many days will they finish the work, both working together ?
(1) 4 days   (2) 6 days
(3) 2 days   (4) 3 days
(SSC CGL Tier-I Exam. 26.10.2014)

44. A can do $\dfrac{1}{4}$ of a work in 10 days.

B can do $\dfrac{1}{3}$ of the work in 20 days. In how many days can both A and B together do the work ?
(1) 30 days   (2) 32 days
(3) 24 days   (4) 25 days
(SSC CGL Tier-I Exam. 26.10.2014)

45. 15 men take 20 days to complete a job working 8 hours a day. The number of hours a day should 20 men take to complete the job in 12 days
(1) 5 hours   (2) 10 hours
(3) 15 hours   (4) 18 hours
(SSC CGL Tier-II Exam. 21.09.2014)

46. Raj and Ram working together do a piece of work in 10 days. Raj alone can do it in 12 days. Ram alone will do the work in
(1) 20 days   (2) 40 days
(3) 50 days   (4) 60 days
(SSC CGL Tier-II Exam. 21.09.2014)

47. A and B working separately can do a piece of work in 9 and 15 days respectively. If they work for a day alternately, with A beginning, then the work will be completed in
(1) 10 days   (2) 11 days
(3) 9 days   (4) 12 days
(SSC CHSL DEO & LDC Exam. 9.11.2014)

48. How many men need to be employed to complete a job in 5 days, if 15 men can complete $\dfrac{1}{3}$ of the job in 7 days ?
(1) 20   (2) 21
(3) 45   (4) 63
(SSC CHSL DEO Exam. 02.11.2014 (Ist Sitting)

49. If x can finish a job in 4 hours and y can finish the same job in 8 hours independently, then they together will finish the job in
(1) 140 minutes
(2) 160 minutes
(3) 120 minutes
(4) 150 minutes
(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

50. x can copy 80 pages in 20 hours, x and y together can copy 135 pages in 27 hours. Then y can copy 20 pages in
(1) 20 hours   (2) 3 hours
(3) 24 hours   (4) 12 hours
(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

51. A and B can do a piece of work in 15 days. B and C can do a similar work in 12 days and C and A in 10 days. How many days will A take to do the work by himself ?

(1) 13   (2) 24

(3) 40   (4) 8

(SSC CGL Tier-II Exam,
2014 12.04.2015 (Kolkata Region)
TF No. 789 TH 7)

52. A can do a piece of work in 25 days and B can do the same work in 30 days. They work together for 5 days, how much of work is left ?

(1) $\dfrac{11}{30}$ (2) $\dfrac{15}{30}$

(3) $\dfrac{19}{30}$ (4) $\dfrac{12}{30}$

(SSC CAPFs SI, CISF ASI & Delhi
Police SI Exam, 21.06.2015
IInd Sitting)

53. A and B together can do a piece of work in 6 days. If A can alone do the work in 18 days, then the number of days required for B to finish the work is

(1) 10   (2) 12

(3) 9   (4) 15

(SSC CGL Tier-I Exam, 09.08.2015
(Ist Sitting) TF No. 1443088)

54. A's 2 days' work is equal to B's 3 days' work. If A can complete the work in 8 days then to complete the work B will take

(1) 14 days   (2) 12 days

(3) 15 days   (4) 16 days

(SSC CGL Tier-I Exam, 16.08.2015
(Ist Sitting) TF No. 3196279)

55. 16 men are able to complete a piece of work in 12 days working 14 hours a day. How long will 28 men, working 12 hours a day, take to complete the work ?

(1) 10 days   (2) 7 days

(3) 8 days   (4) 6 days

(SSC Constable (GD)
Exam, 04.10.2015, Ist Sitting)

56. A and B can do a given piece of work in 8 days, B and C can do the same work in 12 days and A, B, C complete it in 6 days. Number of days required to finish the work by A and C is

(1) 16   (2) 8

(3) 12   (4) 24

(SSC CGL Tier-II Exam,
25.10.2015, TF No. 1099685)

57. If 90 men can do a certain job in 16 days, working 12 hours per day, then the part of that work which can be completed by 70 men in 24 days, working 8 hours per day is

(1) $\dfrac{1}{3}$ (2) $\dfrac{2}{3}$

(3) $\dfrac{7}{9}$ (4) $\dfrac{5}{8}$

(SSC CGL Tier-II Exam,
25.10.2015, TF No. 1099685)

58. A, B and C can do a work separately in 16, 32 and 48 days respectively. They started the work together but B left off 8 days and C six days before the completion of the work. In what time is the work finished?

(1) 10 days   (2) 9 days

(3) 12 days   (4) 14 days

(SSC CGL Tier-II Exam,
25.10.2015, TF No. 1099685)

59. A and B can do a piece of work in 15 days. B and C can do the same work in 10 days and A and C can do the same in 12 days. Time taken by A, B and C together to do the job is

(1) 4 days   (2) 9 days

(3) 8 days   (4) 5 days

(SSC CHSL (10+2) LDC, DEO & PA/SA
Exam, 01.11.2015, IInd Sitting)

60. A, B and C can complete a work in 10, 12 and 15 days respectively. A left the work 5 days before the work was completed and B left 2 days after A had left. Number of days required to complete the whole work is :

(1) $8\dfrac{2}{3}$ (2) $6\dfrac{2}{3}$

(3) 7   (4) 6

(SSC CHSL (10+2) LDC, DEO
& PA/SA Exam, 15.11.2015
(Ist Sitting) TF No. 6636838)

61. A, B and C can complete a piece of work in 24, 5 an 12 days respectively. Working together, they will complete the same work in :

(1) $\dfrac{7}{24}$ days   (2) $3\dfrac{1}{13}$ days

(3) 4 days   (4) $\dfrac{1}{24}$ days

(SSC CHSL (10+2) LDC, DEO
& PA/SA Exam, 15.11.2015
(IInd Sitting) TF No. 7203752)

62. If 20 women can lay a road of length 100m in 10 days. Then 10 women can lay the same road of length 50m in

(1) 20 days   (2) 15 days

(3) 5 days   (4) 10 days

(SSC CHSL (10+2) LDC, DEO
& PA/SA Exam, 06.12.2015
(IInd Sitting) TF No. 3441135)

63. A can do a piece of work in 9 days while B can do it in 12 days. A and B together can do the work in

(1) $5\dfrac{1}{7}$ days   (2) $5\dfrac{2}{7}$ days

(3) $6\dfrac{1}{7}$ days   (4) $6\dfrac{2}{7}$ days

(SSC CGL Tier-I (CBE)
Exam.11.09.2016) (Ist Sitting)

64. A man can do a piece of work in 30 hours. If he works with his son then the same piece of work is finished in 20 hours. If the son works alone he can do the work in

(1) 60 hours   (2) 50 hours

(3) 25 hours   (4) 10 hours

(SSC CGL Tier-II Online
Exam.01.12.2016)

65. A can do a piece of work in 12 days and B in 20 days. If they together work on it for 5 days, and remaining work is completed by C in 3 days, then in how many days can C do the same work alone?

(1) 10 days   (2) 9 days

(3) 12 days   (4) 15 days

(SSC CPO SI, ASI Online
Exam.05.06.2016) (IInd Sitting)

66. A can finish a work in 7 days. B can finish the same work in 9 days. The number days required to finish the same work by both of them together is

(1) $1\dfrac{15}{16}$ (2) $2\dfrac{15}{16}$

(3) $3\dfrac{15}{16}$ (4) $4\dfrac{15}{16}$

(SSC CHSL (10+2) Tier-I (CBE)
Exam. 08.09.2016) (Ist Sitting)

67. A and B together can finish a job in 24 days, while A, B and C together can finish the same job in 8 days. C alone will finish the job in

(1) 12 days   (2) 14 days
(3) 16 days   (4) 24 days

(SSC CGL Tier-I (CBE)
Exam. 09.09.2016) (Ist Sitting)

68. A can do a piece of work in 12 days and B in 24 days. If they work together, in how many days will they finish the work?

(1) 12 days   (2) 20 days
(3) 15 days   (4) 8 days

(SSC CAPFs (CPO) SI & ASI,
Delhi Police Exam. 20.03.2016)
(IInd Sitting)

69. A, B and C working separately can do a piece of work in 11 days, 20 days and 55 days respectively. In how many days, the work will be completed if A is assisted by B and C on alternate days ?

(1) 2   (2) 6
(3) 4   (4) 8

(SSC CAPFs (CPO) SI & ASI,
Delhi Police Exam. 20.03.2016)
(IInd Sitting)

70. A and B together can do a piece of work in 6 days and A alone can do it in 9 days. The number of days B will take to do it alone is

(1) 18 days   (2) 24 days
(3) 9 days   (4) 12 days

(SSC CGL Tier-I (CBE)
Exam. 27.08.2016) (Ist Sitting)

71. A can do a piece of work in 18 days. He worked at it for 12 days and B finished the remaining work in 8 days. B alone can do the whole work in

(1) 16 days   (2) 24 days
(3) 28 days   (4) 29 days

(SSC CGL Tier-I (CBE)
Exam. 28.08.2016) (IInd Sitting)

72. A and B can do a work in 8 days, B and C can do the same work in 12 days. A, B and C together can finish it in 6 days. A and C together will do it in :

(1) 4 days   (2) 6 days
(3) 8 days   (4) 12 days

(SSC CGL Tier-I (CBE)
Exam. 30.08.2016) (Ist Sitting)

73. A and B together can do a piece of work in 9 days. If A does thrice the work of B in a given time, the time A alone will take to finish the work is

(1) 4 days   (2) 6 days
(3) 8 days   (4) 12 days

(SSC CGL Tier-I (CBE)
Exam. 31.08.2016) (Ist Sitting)

74. If 100 cats kill 100 mice in 100 days, then 4 cats would kill 4 mice in how many days?

(1) 4 days   (2) 3 days
(3) 40 days   (4) 100 days

(SSC CGL Tier-I (CBE)
Exam. 03.09.2016) (IInd Sitting)

75. X can do a piece of work in 'p' days and Y can do the same work in 'q' days. Then the number of days in which X and Y can together do that work is

(1) $\dfrac{p+q}{2}$ (2) $\dfrac{1}{p}+\dfrac{1}{q}$

(3) $\dfrac{pq}{p+q}$ (4) pq

(SSC CGL Tier-I (CBE)
Exam. 04.09.2016) (Ist Sitting)

76. A can do a piece of work in 8 days and B can do it in 10 days separately. How many days would it take for both A and B to finish the same work together ?

(1) $\dfrac{33}{8}$ (2) $\dfrac{40}{9}$

(3) $\dfrac{41}{10}$ (4) $\dfrac{42}{11}$

(SSC CGL Tier-I (CBE)
Exam. 06.09.2016) (Ist Sitting)

77. A and B together can do a piece of work in 36 days, B and C together can do it in 24 days. A and C together can do it in 18 days. The three working together can finish the work in

(1) 8 days   (2) 16 days
(3) 30 days   (4) 32 days

(SSC CGL Tier-I (CBE)
Exam. 07.09.2016) (Ist Sitting)

78. Koushik can do a piece of work in x days and Krishnu can do the same work in y days. If they work together, then they can do the work in

(1) $(x + y)$ days

(2) $\dfrac{1}{(x+y)}$ days

(3) $\dfrac{xy}{(x+y)}$ days

(4) $\dfrac{(x+y)}{xy}$ days

(SSC CGL Tier-I (CBE)
Exam. 02.09.2016) (IInd Sitting)

79. A canal of a village can be cleaned by 24 villagers in 12 days. The number of days in which 36 villagers can clean the canal is

(1) 18   (2) 8
(3) 72   (4) 16

(SSC CGL Tier-II (CBE)
Exam. 30.11.2016)

80. A and B can do a piece of work in 18 days, B and C in 24 days, A and C in 36 days. Working together they can do the work in

(1) 12 days   (2) 13 days
(3) 16 days   (4) 26 days

(SSC CGL Tier-II (CBE)
Exam. 30.11.2016)

81. A can do as much work in 4 days as B can do in 5 days, and B can do as much work in 6 days as C in 7 days. In what time will C do a piece of work which A can do in a week ?

(1) $10\dfrac{5}{24}$ days   (2) $4\dfrac{4}{5}$ days

(3) $6\dfrac{8}{15}$ days   (4) $12\dfrac{6}{19}$ days

(SSC CGL Tier-II (CBE)
Exam. 30.11.2016)

82. If 42 persons consume 144 kg of wheat in 15 days, then in how many days will 30 persons consume 45 kg of wheat ?

(1) 8 days   (2) 7 days

(3) 12 days   (4) 6 days

(SSC CPO SI & ASI, Online
Exam. 06.06.2016) (IInd Sitting)

83. A father can do a job as fast as his two sons working together. If one son does the job in 3 hours and the other in 6 hours, the number of hours taken by the father, to do the job alone is

(1) 1   (2) 2
(3) 3   (4) 4

(SSC CGL Tier-I (CBE)
Exam. 28.08.2016 (Ist Sitting)

84. A can do a piece of work in 10 days, B can do it in 12 days and C can do it in 15 days. In how many days will A, B and C finish it, working all together?

(1) 6 days   (2) $5\dfrac{1}{4}$ days

(3) $4\dfrac{4}{11}$ days   (4) 4 days

(SSC CGL Tier-I (CBE)
Exam. 30.08.2016 (IIIrd Sitting)

85. If 5 persons together can make 5 mats in 5 hours, then 10 persons in 10 hours will make
(1) 20 mats   (2) 10 mats
(3) 15 mats   (4) 5 mats

(SSC CGL Tier-I (CBE)
Exam. 31.08.2016 (IIIrd Sitting)

86. A and B together can do a piece of work in 12 days while A alone can do the same work in 30 days. B alone can do it in
(1) 18 days   (2) 20 days
(3) 15 days   (4) 22 days

(SSC CGL Tier-I (CBE)
Exam. 02.09.2016 (IInd Sitting)

87. Ganesh, Ram and Sohan together can complete a work in 16 days. If Ganesh and Ram together can complete the same work in 24 days, the number of days Sohan alone takes, to finish the work is
(1) 40   (2) 48
(3) 32   (4) 30

(SSC CGL Tier-I (CBE)
Exam. 03.09.2016 (IIIrd Sitting)

88. A and B can do a piece of work in 72 days. B and C can do it in 120 days and A and C can do it in 90 days. A alone can do it in :
(1) 120 days   (2) 130 days
(3) 150 days   (4) 100 days

(SSC CGL Tier-I (CBE)
Exam. 09.09.2016 (IIIrd Sitting)

89. If 35 men can finish a piece of work in 8 days, then the number of men who can do the same work in 10 days is :
(1) 38   (2) 28
(3) 19   (4) 17

(SSC CGL Tier-I (CBE)
Exam. 27.10.2016 (Ist Sitting)

90. A can do a piece of work in 30 days while B can do it in 40 days. In how many days can A and B working together do it ?

(1) $42\dfrac{3}{4}$ days   (2) $27\dfrac{1}{7}$ days

(3) $17\dfrac{1}{7}$ days   (4) 70 days

(SSC Multi-Tasking Staff
Exam. 30.04.2017)

TYPE-II

1. A and B can do a work in 18 and 24 days respectively. They worked together for 8 days and then A left. The remaining work was finished by B in :

(1) 5 days   (2) $5\dfrac{1}{3}$ days

(3) 8 days   (4) 10 days

(SSC CGL Prelim Exam. 04.07.1999
(First Sitting)

2. A can do a piece of work in 12 days and B can do it in 18 days. They work together for 2 days and then A leaves. How long will B take to finish the remaining work ?
(1) 6 days   (2) 8 days
(3) 10 days   (4) 13 days

(SSC CGL Prelim Exam. 04.07.1999
(Second Sitting)

3. A and B can do a job in 6 and 12 days respectively. They began the work together but A leaves after 3 days. Then the total number of days needed for the completion of the work is :
(1) 4 days   (2) 5 days
(3) 6 days   (4) 9 days

(SSC CGL Prelim Exam. 27.02.2000
(Second Sitting)

4. A and B can do a piece of work in 30 days while B and C can do the same work in 24 days and C and A in 20 days. They all work together for 10 days when B and C leave. How many days more will A take to finish the work ?
(1) 18 days   (2) 24 days
(3) 30 days   (4) 36 days

(SSC CPO S.I. Exam. 12.01.2003)

5. A and B can together finish a work in 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 job ?
(1) 50 days   (2) 60 days
(3) 48 days   (4) 54 days

(SSC CGL Prelim Exam. 11.05.2003
(First Sitting) & (SSC DEO & LDC
Exam. 10.11.2013)

6. 8 men can do a work in 12 days. After 6 days of work, 4 more men were engaged to finish the work. In how many days would the remaining work be completed?

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(1) 2   (2) 3
(3) 4   (4) 5

(SSC CGL Prelim Exam. 11.05.2003
(First Sitting)

7. 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 :
(1) 5 days   (2) 6 days

(3) 10 days   (4) $10\dfrac{1}{2}$ days

(SSC CGL Prelim Exam. 11.05.2003
(First Sitting)

8. A certain number of persons can complete a piece of work in 55 days. If there were 6 persons more, the work could be finished in 11 days less. How many persons were originally there ?
(1) 17   (2) 24
(3) 30   (4) 22

(SSC CGL Prelim Exam. 11.05.2003
(Second Sitting)

9. A and B working separately can do a piece of work in 10 days and 15 days respectively. If they work on alternate days beginning with A, in how many days will the work be completed ?
(1) 18 days   (2) 13 days
(3) 12 days   (4) 6 days

(SSC CPO S.I. Exam. 07.09.2003)

10. A and B can do a piece of work in 28 and 35 days respectively. They began to work together but A leaves after sometime and B completed remaining work in 17 days. After how many days did A leave ?

(1) $14\dfrac{2}{5}$ days (2) 9 days

(3) 8 days   (4) $7\dfrac{5}{9}$ days

(SSC CPO S.I. Exam. 07.09.2003)

11. 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 :
(1) 10 days   (2) 8 days
(3) 12 days   (4) 15 days

(SSC CGL Prelim Exam. 08.02.2004
(First Sitting)

12. A and B can do a piece of work in 20 days and 12 days respectively. A started the work alone and then after 4 days B joined him till the completion of the work. How long did the work last ?

(1) 10 days (2) 20 days

(3) 15 days (4) 6 days

(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

13. A and B can do a work in 45 days and 40 days respectively. They began the work together but A left after some time and B completed the remaining work in 23 days. After how many days of the start of the work did A leave ?

(1) 10 days (2) 9 days

(3) 8 days (4) 5 days

(SSC CPO S.I. Exam. 05.09.2004)

14. A man and a boy can complete a work together in 24 days. If for the last six days man alone does the work then it is completed in 26 days. How long the boy will take to complete the work alone ?

(1) 72 days (2) 20 days

(3) 24 days (4) 36 days

(SSC Section Officer (Commercial Audit) Exam. 25.09.2005)

15. A and B together can complete a work in 8 days. B alone can complete that work in 12 days. B alone worked for four days. After that how long will A alone take to complete the work ?

(1) 15 days (2) 18 days

(3) 16 days (4) 20 days

(SSC Section Officer (Commercial Audit) Exam. 25.09.2005)

16. A and B can complete a piece of work in 12 and 18 days respectively. A begins to do the work and they work alternatively one at a time for one day each. The whole work will be completed in

(1) $14\dfrac{1}{3}$ days (2) $15\dfrac{2}{3}$ days

(3) $16\dfrac{1}{3}$ days (4) $18\dfrac{2}{3}$ days

(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

17. A, B and C can complete a work in 10, 12 and 15 days respectively. They started the work together. But A left the work before 5 days of its completion. B also left the work 2 days after A left. In how many days was the work completed?

(1) 4 days (2) 5 days

(3) 7 days (4) 8 days

(SSC CGL Prelim Exam. 04.07.1999 (Ist Sitting) & (SSC MTS Exam. 17.03.2013 (IInd Sitting)

18. A can complete a piece of work in 10 days, B in 15 days and C in 20 days. A and C worked together for two days and then A was replaced by B. In how many days, altogether, was the work completed ?

(1) 12 days (2) 10 days

(3) 6 days (4) 8 days

(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

19. 40 men can complete a work in 40 days. They started the work together. But at the end of each 10th day, 5 men left the job. The work would have been completed in

(1) $56\dfrac{2}{3}$ days (2) $53\dfrac{1}{3}$ days

(3) 52 days (4) 50 days

(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

20. A can do a piece of work in 18 days and B in 12 days. They began the work together, but B left the work 3 days before its completion. In how many days, in all, was the work completed?

(1) 12 days (2) 10 days

(3) 9.6 days (4) 9 days

(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

21. A and B can separately complete a piece of work in 20 days and 30 days respectively. They worked together for some time, then B left the work. If A completed the rest of the work in 10 days, then B worked for

(1) 6 days (2) 8 days

(3) 12 days (4) 16 days

(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

22. A and B alone can complete work in 9 days and 18 days respectively. They worked together; however 3 days before the completion of the work A left. In how many days was the work completed ?

(1) 13 days (2) 8 days

(3) 6 days (4) 5 days

(SSC CPO S.I. Exam. 09.11.2008)

23. A can complete a piece of work in 18 days, B in 20 days and C in 30 days. B and C together start the work and are forced to leave after 2 days. The time taken by A alone to complete the remaining work is

(1) 10 days (2) 12 days

(3) 15 days (4) 16 days

(SSC CGL Tier-I Exam. 16.05.2010 (First Sitting)

24. A alone can complete a work in 18 days and B alone in 15 days. B alone worked at it for 10 days and then left the work. In how many more days, will A alone complete the remaining work ?

(1) 5 days (2) $5\dfrac{1}{2}$ days

(3) 6 days (4) 8 days

(SSC CPO S.I. Exam 12.12.2010 (Paper-I)

25. A and B working separately can do a piece of work in 9 and 12 days respectively. If they work for a day alternately with A beginning, the work would be completed in

(1) $10\dfrac{2}{3}$ days (2) $10\dfrac{1}{2}$ days

(3) $10\dfrac{1}{4}$ days (4) $10\dfrac{1}{3}$ days

(SSC SAS Exam. 26.06.2010) & SSC CGL Tier-1 Exam 26.06.2011 (Second Sitting)

26. A and B together can complete a work in 12 days. A alone can complete in 20 days. If B does the work only half a day daily, then in how many days A and B together will complete the work ?

(1) 10 days (2) 20 days

(3) 11 days (4) 15 days

FCI Assistant Grade-III Exam. 25.02.2012 (Paper-I) North Zone (Ist Sitting)

27. A and B can do a piece of work in 12 days and 15 days respectively. They began to work together but A left after 4 days. In how many more days would B alone complete the remaining work ?

(1) $\dfrac{20}{3}$ days   (2) $\dfrac{25}{3}$ days

(3) 6 days   (4) 5 days

(SSC Data Entry Operator
Exam. 02.08.2009)

28. X alone can complete a piece of work in 40 days. He worked for 8 days and left. Y alone completed the remaining work in 16 days. How long would X and Y together take to complete the work ?

(1) $13\dfrac{1}{3}$ days   (2) 14 days

(3) 15 days   (4) $16\dfrac{2}{3}$ days

(SSC CHSL DEO & LDC
Exam. 27.11.2010)

29. A, B and C can do a piece of work in 30, 20 and 10 days respectively. A is assisted by B on one day and by C on the next day, alternately. How long would the work take to finish ?

(1) $9\dfrac{3}{8}$ days   (2) $4\dfrac{8}{8}$ days

(3) $8\dfrac{4}{13}$ days   (4) $3\dfrac{9}{13}$ days

(SSC Graduate Level Tier-II
Exam.16.09.2012)

30. A can do a piece of work in 20 days which B can do in 12 days. B worked at it for 9 days. A can finish the remaining work in
(1) 5 days   (2) 7 days
(3) 11 days   (4) 3 days

(SSC CHSL DEO & LDC Exam.
04.11.2012 (Ist Sitting)

31. *A* can do a piece of work in 8 days which *B* can destroy in 3 days. A has worked for 6 days, during the last 2 of which *B* has been destroying; how many days must A now work alone to complete the work ?

(1) 7 days   (2) $7\dfrac{1}{3}$ days

(3) $7\dfrac{2}{3}$ days   (4) 8 days

(SSC Multi-Tasking Staff Exam.
10.03.2013, Ist Sitting : Patna)

32. A can finish a work in 18 days and B can do the same work in 5 days. B worked for 10 days and left the job. In how many days, A alone can finish the remaining work?

(1) 6 days   (2) $5\dfrac{1}{2}$ days

(3) 5 days   (4) 8 days

(SSC Graduate Level Tier-I
Exam. 21.04.2013, Ist Sitting)

33. A and B together can do a piece of work in 12 days which B and C together can do in 16 days. After A has been working at it for 5 days and B for 7 days, C finishes it in 13 days. In how many days B could finish the work ?
(1) 48 days   (2) 24 days
(3) 16 days   (4) 12 days

(SSC Graduate Level Tier-I
Exam. 21.04.2013 IInd Sitting)

34. 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 ?
(1) 10 days   (2) 12 days
(3) 15 days   (4) 20 days

(SSC CPO S.I. Exam. 09.11.2008) &
(SSC Graduate Level Tier-I
Exam.19.05.2013 (Ist Sitting)

35. A and B together can complete a work in 3 days. They start together. But, after 2 days, B left the work. If the work is completed after 2 more days, B alone could do the work in
(1) 10 days   (2) 4 days
(3) 6 days   (4) 8 days

(SSC CGL Prelim Exam. 04.02.2007
(Ist Sitting) & (SSC Graduate Level
Tier-I Exam.19.05.2013 (Ist Sitting)

36. A can do a piece of work in 20 days and B in 30 days. They work together for 7 days and then both leave the work. Then C alone finishes the remaining work in 10 days. In how many days will C finish the full work ?
(1) 25 days   (2) 30 days
(3) 24 days   (4) 20 days

(SSC Graduate Level Tier-II
Exam. 29.09.2013)

37. 45 men can complete a work in 16 days. Four days after they started working, 36 more men joined them. How many days will they now take to complete the remaining work ?

(1) 6 days   (2) 8 days

(3) $6\dfrac{2}{3}$ days   (4) $7\dfrac{3}{4}$ days

(SSC Constable (GD) & Rifleman
(GD) Exam. 22.04.2012 (Ist Sitting)

38. A and B together can complete a job in 8 days. Both B and C, working alone can finish the same job in 12 days. A and B commence work on the job, and work for 4 days, where upon A leaves. B continues for 2 more days, and then he leaves too. C now starts working, and finishes the job. How many days did C require ?
(1) 5   (2) 8
(3) 3   (4) 4

(SSC CGL Tier-I
Re-Exam. (2013) 27.04.2014)

39. A and B can together finish a work in 30 days. They worked at it for 20 days and then B left. The remaining work was done by A alone in 20 more days. A alone can finish the work in

(1) 60 days   (2) 54 days

(3) 48 days   (4) 50 days

(SSC CGL Tier-I Exam. 26.10.2014)

40. A, B and C can do a job in 6 days, 12 days and 15 days respectively. After $\dfrac{1}{8}$ of the work is completed, C leaves the job. Rest of the work is done by A and B together. Time taken to finish the work is

(1) $5\dfrac{5}{6}$ days (2) $5\dfrac{1}{4}$ days

(3) $3\dfrac{1}{2}$ days (4) $3\dfrac{3}{4}$ days

(SSC CGL Tier-II Exam. 21.09.2014)

41. 16 women take 12 days to complete a work which can be completed by 12 men in 8 days. 16 men started working and after 3 days 10 men left and 4 women joined them. How many days will it take them to complete the remaining work ?
(1) 4   (2) 6
(3) 8   (4) 10

(SSC CHSL GL DEO & LDC Exam.
02.11.2014 (IInd Sitting)

42. 40 men can complete a work in 18 days. Eight days after they started working together, 10 more men joined them. How many days will they now take to complete the remaining work ?
(1) 6   (2) 8
(3) 10   (4) 12
(SSC CHSL DEO & LDC Exam. 02.11.2014 (IInd Sitting)

43. If 12 men or 24 boys can do a work in 66 days, the number of days in which 15 men and 6 boys can do it is
(1) 44   (2) 33
(3) 55   (4) 66
(SSC CHSL DEO & LDC Exam. 16.11.2014)

44. A, B and C together can do a piece of work in 40 days. After working with B and C for 16 days, A leaves and then B and C complete the remaining work in 40 days more. A alone could do the work in
(1) 80 days   (2) 90 days
(3) 100 days   (4) 120 days
(SSC CGL Tier-I Exam. 19.10.2014 TF No. 022 MH 3)

45. A certain number of men complete a piece of work in 60 days. If there were 8 men more, the work could be finished in 10 days less. The number of men originally was
(1) 30   (2) 40
(3) 32   (4) 36
(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014 , Ist Sitting TF No. 333 LO 2)

46. Some staff promised to do a job in 18 days, but 6 of them went on leave. So the remaining men took 20 days to complete the job. How many men were there originally ?
(1) 55   (2) 62
(3) 56   (4) 60
(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014, IInd Sitting TF No. 545 QP 6)

47. A certain number of men can do a piece of work in 40 days. If there were 45 men more the work could have been finished in 25 days. Find the original number of men employed in the work.
(1) 70   (2) 85
(3) 65   (4) 75
(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014, IInd Sitting TF No. 545 QP 6)

48. A and B can do a piece of work in 45 and 40 days repectively. They began the work together but A left after some days and B finished the remaining work in 23 days. A left after
(1) 6 days   (2) 9 days
(3) 12 days   (4) 5 days
(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

49. 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 ?
(1) 15   (2) 12
(3) 14   (4) 13
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 (Ist Sitting) TF No. 8037731)

50. A, B and C can do a piece of work in 24, 30 and 40 days respectively. They began the work together but C left 4 days before completion of the work. In how many days was the work done ?
(1) 13   (2) 12
(3) 14   (4) 11
(SSC CGL Tier-I Exam, 09.08.2015 (IInd Sitting) TF No. 4239378)

51. Raja can do a piece of work in 20 days while Ramesh can finish it in 25 days. Ramesh started working and Raja joined him after 10 days. The whole work is completed in
(1) 18 days   (2) $16\dfrac{2}{3}$ days
(3) 20 days   (4) 15 days
(SSC Constable (GD) Exam, 04.10.2015, Ist Sitting)

52. A certain number of men can do a work in 40 days. If there were 8 men more, it could be finished in 10 days less. How many men were there initially?
(1) 20   (2) 24
(3) 30   (4) 16
(SSC Constable (GD) Exam, 04.10.2015, IInd Sitting)

53. X can do a piece of work in 24 days. When he had worked for 4 days, Y joined him. If complete work was finished in 16 days, Y can alone finish that work in:
(1) 18 days   (2) 27 days
(3) 36 days   (4) 42 days
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (Ist Sitting) TF No. 6636838)

54. 12 men can complete a work in 90 days. 30 days after they started work, 2 men left and 8 men joined. How many days will it take to complete the remaining work ?
(1) 90 days   (2) 60 days
(3) 40 days   (4) 50 days
(SSC CPO Exam. 06.06.2016) (Ist Sitting)

55. A can do a job in 10 days and B can do the same job in 15 days. They start working together, but B leaves after 5 days. How many more days A want to finish the work ?
(1) 2 days   (2) $1\dfrac{2}{3}$ days
(3) 3 days   (4) $2\dfrac{2}{3}$ days
(SSC CPO Exam. 06.06.2016) (Ist Sitting)

56. A and B together can finish a work in 30 days. They worked on it for 20 days and then B left the work. The remaining work was done by A alone in 20 days more. In how many days can A alone finish the work?
(1) 48 days   (2) 50 days
(3) 54 days   (4) 60 days
(SSC CGL Tier-I (CBE) Exam. 01.09.2016) (Ist Sitting)

57. Ram and Hari can cut 12 kgs nuts in 2 days. After 5 days, Hari left the work. Ram took 8 more days to cut the rest of the nuts. If total of 58 kgs of nuts were cut, the time taken by Hari to cut 10 kgs of nuts is
(1) 1 days   (2) 2 days
(3) 3 days   (4) 4 days
(SSC CGL Tier-I (CBE) Exam. 01.09.2016) (IInd Sitting)

58. Ramesh and Rahman can do a work in 20 and 25 days respectively. After doing collectively for 10 days at the work, they leave the work due to illness and Suresh completes rest of the work in 3 days. How many days Suresh alone can take to complete the whole work ?
(1) 32 days   (2) 28 days
(3) 29 days   (4) 30 days
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

59. A can do a piece of work in 10 days and B can do it in 12 days. They work together for 3 days. Then B leaves and A alone continues. 2 days after that C joins and the work is completed in 2 days more. In how many days can C do it, if he works alone ?
(1) 30 days   (2) 50 days
(3) 40 days   (4) 60 days
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

60. A certain number of men can do a piece of work in 60 days. If there were 6 men more, the work can be finished 20 days earlier. The number of men working is :
(1) 6   (2) 12
(3) 18   (4) 24
(SSC CGL Tier-I (CBE)
Exam. 06.09.2016 (IIIrd Sitting)

61. A can do a piece of work in 20 days and B in 15 days. With the help of C, they finish the work in 5 days. C can alone do the work in
(1) 5 days   (2) 6 days
(3) 10 days   (4) 12 days
(SSC CGL Tier-I (CBE)
Exam. 07.09.2016 (IInd Sitting)

62. 15 men can finish a piece of work in 40 days. The number of days after which 5 men should leave the work so that the work is finished in 45 days altogether is :
(1) 10   (2) 20
(3) 30   (4) 35
(SSC CGL Tier-I (CBE)
Exam. 27.10.2016 (Ist Sitting)

63. A and B together can complete a piece of work in 12 days. They worked together for 5 days and then A alone finished the rest of the work in 14 days. A alone can complete the work in
(1) 24 days   (2) 22 days
(3) 20 days   (4) 18 days
(SSC CGL Tier-II (CBE)
Exam. 12.01.2017)

TYPE-III

1. If 6 men and 8 boys can do a piece of work in 10 days and 26 men and 48 boys can do the same in 2 days, then the time taken by 15 men and 20 boys to do the same type of work will be :
(1) 5 days   (2) 4 days
(3) 6 days   (4) 7 days
(SSC CGL Prelim Exam. 04.07.1999
(First Sitting)

2. 5 men can do a piece of work in 6 days while 10 women can do it in 5 days. In how many days can 5 women and 3 men do it ?
(1) 4 days   (2) 5 days
(3) 6 days   (4) 8 days
(SSC CGL Prelim Exam. 04.07.1999
(Second Sitting)

3. If 3 men or 6 women can do a piece of work in 16 days, in how many days can 12 men and 8 women do the same piece of work?
(1) 4 days   (2) 5 days
(3) 3 days   (4) 2 days
(SSC CGL Prelim Exam. 27.02.2000
(First Sitting)

4. A man, a woman and a boy can complete a job in 3, 4 and 12 days respectively. How many boys must assist 1 man and 1 woman to complete the job in $\frac{1}{4}$ of a day?
(1) 1   (2) 4
(3) 19   (4) 41
(SSC CGL Prelim Exam. 27.02.2000
(First Sitting)

5. If 16 men or 20 women can do a piece of work in 25 days. In what time will 28 men and 15 women do it?
(1) $14\frac{2}{7}$ days   (2) $33\frac{1}{3}$ days
(3) $18\frac{3}{4}$ days   (4) 10 days
(SSC CGL Prelim Exam. 27.02.2000
(Second Sitting)

6. If 5 men or 8 women can do a piece of work in 12 days, how many days will be taken by 2 men and 4 women to do the same work?
(1) 15 days   (2) $13\frac{1}{2}$ days
(3) $13\frac{1}{3}$ days   (4) 10 days
(SSC CGL Prelim Exam. 24.02.2002
(First Sitting)

7. If 3 men or 4 women can plough a field in 43 days, how long will 7 men and 5 women take to plough it ?
(1) 10 days   (2) 11 days
(3) 9 days   (4) 12 days
(SSC CGL Prelim Exam. 11.05.2003
(First Sitting)

8. 6 men or 12 women can do a piece of work in 20 days. In how many days can 8 men and 16 women do twice as big as this work ?
(1) 2 days   (2) 5 days
(3) 15 days   (4) 10 days
(SSC CGL Prelim Exam. 08.02.2004
(Second Sitting)

9. A man, a woman and a boy can together complete a piece of work in 3 days. If a man alone can do it in 6 days and a boy alone in 18 days, how long will a woman alone take to complete the work?
(1) 9 days   (2) 21 days
(3) 24 days   (4) 27 days
(SSC CGL Prelim Exam. 13.11.2005
(Second Sitting)

10. 3 men or 5 women can do a work in 12 days. How long will 6 men and 5 women take to finish the work?
(1) 20 days   (2) 10 days
(3) 4 days   (4) 15 days
(SSC CPO S.I. Exam. 03.09.2006) &
(SSC GL Tier-I Exam. 19.05.2013)

11. 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?
(1) 260   (2) 240
(3) 280   (4) 520
(SSC CGL Prelim Exam. 04.07.1999
(First Sitting)

12. Three men can complete a piece of work in 6 days. Two days after they started the work, 3 more men joined them. How many days will they take to complete the remaining work ?
(1) 1 days   (2) 2 days
(3) 3 days   (4) 4 days
(SSC CHSL DEO & LDC Exam.
10.11.2013, Ist Sitting)

13. One man and one woman together can complete a piece of work in 8 days. A man alone can complete the work in 10 days. In how many days can one woman alone complete the work ?
(1) $\frac{140}{9}$ days   (2) 30 days
(3) 40 days   (4) 42 days
(SSC CPO S.I. Exam 12.12.2010
(Paper-I)

14. 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 ?
(1) 50 days   (2) 45 days
(3) 40 days   (4) 35 days
(SSC CGL Prelim Exam. 08.02.2004
(First Sitting)

15. A man, a woman and a boy can complete a work in 20 days, 30 days and 60 days respectively. How many boys must assist 2 men and 8 women so as to complete the work in 2 days ?
(1) 8 　　　　 (2) 12
(3) 4 　　　　 (4) 6
(SSC Data Entry Operator Exam. 02.08.2009)

16. If 1 man or 2 women or 3 boys can complete a piece of work in 88 days, then 1 man, 1 woman and 1 boy together will complete it in
(1) 36 days 　　 (2) 42 days
(3) 48 days 　　 (4) 54 days
(SSC CHSL DEO & LDC Exam. 28.11.2010 (Ist Sitting)

17. 6 men and 8 women can do a work in 10 days, Then 3 men and 4 women can do the same work in
(1) 24 days 　　 (2) 20 days
(3) 12 days 　　 (4) 18 days
(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (East Zone)

18. 3 men and 4 boys can complete a piece of work in 12 days. 4 men and 3 boys can do the same work in 10 days. Then 2 men and 3 boys can finish the work in

(1) $17\frac{1}{2}$ days 　 (2) $5\frac{5}{11}$ days

(3) 8 days 　　 (4) 22 days
(SSC Graduate Level Tier-I Exam. 11.11.2012, Ist Sitting)

19. If 10 men or 20 women or 40 children can do a piece of work in 7 months, then 5 men, 5 women and 5 children together can do half of the work in :
(1) 6 months 　　 (2) 4 months
(3) 5 months 　　 (4) 8 months
(SSC Graduate Level Tier-I Exam. 21.04.2013, Ist Sitting)

20. If 8 men or 12 boys can do a piece of work in 16　days, the number of days required to complete the work by 20 men and 6 boys is

(1) $5\frac{1}{3}$ days 　 (2) $6\frac{1}{3}$ days

(3) $8\frac{1}{3}$ days 　 (4) $7\frac{1}{3}$ days

(SSC Graduate Level Tier-I Exam. 21.04.2013 IInd Sitting)

21. 2 men and 3 boys can do a piece of work in 10 days while 3 men and 2 boys can do the same work in 8 days. In how many days can 2 men and 1 boy do the work ?
(1) 8 days 　　 (2) 7 days

(3) $12\frac{1}{2}$ days 　 (4) 2 days

(SSC Graduate Level Tier-I Exam. 19.05.2013 Ist Sitting)

22. 2 men and 3 women can do a piece of work in 10 days while 3 men and 2 women can do the same work in 8 days. Then, 2 men and 1 woman can do the same work in

(1) 12 days 　　 (2) $12\frac{1}{2}$ days.

(3) 13 days 　　 (4) $13\frac{1}{2}$ days

(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (North Zone))

23. 3 men and 4 boys can complete a piece of work in 12 days. 4 men and 3 boys can do the same work in 10 days. Then 2 men and 3 boys can finish the work in number of days is

(1) $17\frac{1}{2}$ days (2) $5\frac{5}{11}$ days

(3) 8 days 　　 (4) 22 days
(SSC Graduate Level Tier-I Exam. 11.11.2012 (Ist Sitting)

24. If 4 men or 6 women can do a piece of work in 12 days working 7 hours a day; how many days will it take to complete a work twice as large with 10 men and 3 women working together 8 hours a day?
(1) 6 days 　　 (2) 7 days
(3) 8 days 　　 (4) 10 days
(SSC CHSL DEO & LDC Exam. 27.10.2013 IInd Sitting)

25. A man, a woman and a boy together finish a piece of work in 6 days. If a man and a woman can do the work in 10 and 24 days respectively. The days taken by a boy to finish the work is
(1) 30 　　　 (2) 35
(3) 40 　　　 (4) 45
(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

26. If 40 men or 60 women or 80 children can do a piece of work in 6 months, then 10 men, 10 women and 10 children together do half of the work in

(1) $5\frac{6}{13}$ months

(2) 6 months

(3) $5\frac{7}{13}$ months

(4) $11\frac{1}{13}$ months

(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (IInd Sitting)

27. A man is twice as fast as a woman and a woman is twice as fast as a boy in doing a work. If all of them, a man, a woman and a boy can finish the work in 7 days, in how many days a boy will do it alone ?
(1) 49 　　　 (2) 7
(3) 6 　　　 (4) 42
(SSC CGL Tier-II Exam. 21.09.2014)

28. One man or two women or three boys can do a piece of work in 88 days. One man, one woman and one boy will do it in
(1) 44 days 　　 (2) 24 days
(3) 48 days 　　 (4) 20 days
(SSC CHSL DEO Exam. 16.11.2014 (Ist Sitting)

29. 3 men or 7 women can do a piece of work in 32 days. The number of days required by 7 men and 5 women to do a piece of work twice as large is
(1) 19 　　　 (2) 21
(3) 27 　　　 (4) 36
(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014 , Ist Sitting TF No. 333 LO 2)

30. If 1 man or 2 women or 3 boys can do a piece of work in 44 days, then the same piece of work will be done by 1 man, 1 woman and 1 boy in
(1) 21 days 　　 (2) 24 days
(3) 26 days 　　 (4) 33 days
(SSC CGL Tier-I Re-Exam, 30.08.2015)

31. 8 children and 12 men complete a certain piece of work in 9 days. Each child takes twice the time taken by a man to finish the work. In how many days will 12 men finish the same work ?
(1) 9 days 　　 (2) 13 days
(3) 12 days 　　 (4) 15 days
(SSC Constable (GD) Exam, 04.10.2015, IInd Sitting)

32. 12 men and 16 boys can do a piece of work in 5 days; 13 men and 24 boys can do it in 4 days, then the ratio of the daily work done by a man to that of a boy is
(1) 2 : 1 　　　 (2) 3 : 1
(3) 1 : 3 　　　 (4) 5 : 4
(SSC CGL Tier-I (CBE) Exam. 27.08.2016) (IInd Sitting)

33. Twenty women can do a work in sixteen days. Sixteen men can complete the same work in fifteen days. The ratio between the capacity of a man and a woman is
(1) 3 : 4   (2) 4 : 3
(3) 5 : 3   (4) 5 : 7
(SSC CGL Tier-I (CBE)
Exam. 29.08.2016 (Ist Sitting)

34. 18 men or 36 boys working 6 hours a day can plough a field in 24 days. In how many days will 24 men and 24 boys working 9 hours a day plough the same field ?
(1) 9   (2) 10
(3) 6   (4) 8
(SSC CGL Tier-I (CBE)
Exam. 08.09.2016 (IIIrd Sitting)

35. 3 men and 5 women can do a work in 14 days while 5 men can do it in 14 days. 5 men and 5 women can complete the work in
(1) 13 days   (2) 11 days
(3) 10 days   (4) 12 days
(SSC Multi-Tasking Staff
Exam. 30.04.2017)

TYPE-IV

1. A can do a work in 15 days and B in 20 days.If they together work on it for 4 days, then the fraction of the work that is left is:
(1) $\dfrac{8}{15}$ (2) $\dfrac{7}{15}$
(3) $\dfrac{1}{4}$ (4) $\dfrac{1}{10}$
(SSC CGL Prelim Exam. 27.02.2000
(First Sitting)

2. A can cultivate $\dfrac{2}{5}$ th of a land in 6 days and B can cultivate $\dfrac{1}{3}$ rd of the same land in 10 days. Working together A and B can cultivate $\dfrac{4}{5}$ th of the land in:
(1) 4 days   (2) 5 days
(3) 8 days   (4) 10 days
(SSC CGL Prelim Exam. 24.02.2002
(First Sitting)

3. A does $\dfrac{4}{5}$ of a piece of work in 20 days; He then calls in B and they finish the remaining work in 3 days. How long B alone will take to do whole work ?
(1) $37\dfrac{1}{2}$ days (2) 37 days
(3) 40 days   (4) 23 days
(SSC CGL Prelim Exam. 24.02.2002
(Second Sitting)

4. A can finish a work in 18 days and B can do the same work in half the time taken by A. Then working together what part of the same work they can finish in a day ?
(1) $\dfrac{1}{6}$ (2) $\dfrac{2}{5}$
(3) $\dfrac{1}{9}$ (4) $\dfrac{2}{7}$
(SSC CGL Prelim Exam. 24.02.2002
(Second Sitting)

5. A does $\dfrac{7}{10}$ part of work in 15 days. After that he completes the remaining work in 4 days with the help of B. In how many days will A and B together do the same work ?
(1) $10\dfrac{1}{3}$ days (2) $12\dfrac{2}{3}$ days
(3) $13\dfrac{1}{3}$ days (4) $8\dfrac{1}{4}$ days
(SSC CGL Prelim Exam. 24.02.2002
(Middle Zone) & (SSC CGL Prelim
Exam. 13.11.2005 (Ist Sitting)

6. A can complete a work in 6 days while B can complete the same work in 12 days. If they work together and complete it, the portion of the work done by A is
(1) $\dfrac{1}{3}$ (2) $\dfrac{2}{3}$
(3) $\dfrac{1}{4}$ (4) $\dfrac{1}{2}$
(SSC CPO S.I. Exam. 07.09.2003)

7. A can do $\dfrac{1}{2}$ of a piece of work in 5 days, B can do $\dfrac{3}{5}$ of the same work in 9 days and C can do $\dfrac{2}{3}$ of that work in 8 days. In how many days can three of them together do the work ?
(1) 3 days   (2) 5 days
(3) $4\dfrac{1}{2}$ days   (4) 4 days
(SSC CPO S.I. Exam. 26.05.2005)

8. If 28 men complete $\dfrac{7}{8}$ of a piece of work in a week, then the number of men, who must be engaged to get the remaining work completed in another week, is
(1) 5   (2) 6
(3) 4   (4) 3
(SSC CGL Prelim Exam. 27.07.2008
(Second Sitting)

9. A can complete $\dfrac{1}{3}$ of a work in 5 days and B, $\dfrac{2}{5}$ of the work in 10 days. In how many days both A and B together can complete the work ?
(1) 10 days   (2) $9\dfrac{3}{8}$ days
(3) $8\dfrac{4}{5}$ days   (4) $7\dfrac{1}{2}$ days
(SSC CGL Tier-I Exam. 16.05.2010
(Second Sitting)

10. A can complete $\dfrac{2}{3}$ of a work in 4 days and B can complete $\dfrac{3}{5}$ of the work in 6 days. In how many days can both A and B together complete the work ?
(1) 3   (2) 2
(3) $3\dfrac{3}{4}$ (4) $2\dfrac{7}{8}$
(SSC CISF ASI Exam 29.08.2010
(Paper-1)

11. 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 ?

(1) 40 (2) 20
(3) 30 (4) 15

(SSC CGL Prelim Exam. 04.02.2007
(Second Sitting)

12. P can complete $\frac{1}{4}$ of a work in 10 days, Q can complete 40% of the same work in 15 days, R, completes $\frac{1}{3}$ of the work in 13 days and S, $\frac{1}{6}$ of the work in 7 days. Who will be able to complete the work first ?

(1) P (2) Q
(3) R (4) S

(SSC CHSL DEO & LDC
Exam. 28.11.2010 (IInd Sitting)

13. A and B can do a piece of work in 72 days, B and C can do it in 120 days, and A and C can do it in 90 days. When A, B and C work together, how much work is finished by them in 3 days.

(1) $\frac{1}{40}$ (2) $\frac{1}{30}$

(3) $\frac{1}{20}$ (4) $\frac{1}{10}$

(SSC Multi-Tasking (Non-Technical)
Staff Exam. 27.02.2011)

14. A can do $\frac{1}{6}$ of a work in 5 days and B can do $\frac{2}{5}$ of the work in 8 days. In how many days, can both A and B together do the work?

(1) 12 days (2) 13 days
(3) 15 days (4) 20 days

(SSC Constable (GD) & Rifleman
(GD) Exam. 22.04.2012 (IInd Sitting)

15. A can do a work in 20 days and B in 40 days. If they work on it together for 5 days, then the fraction of the work that is left is :

(1) $\frac{5}{8}$ (2) $\frac{8}{15}$

(3) $\frac{7}{15}$ (4) $\frac{1}{10}$

(SSC CHSL DEO & LDC Exam.
21.10.2012 (IInd Sitting)

16. A alone can do a piece of work in 20 days and B alone in 30 days. They begin to work together. They will finish half of the work in :

(1) 8 days (2) 9 days
(3) 12 days (4) 6 days

(SSC CHSL DEO & LDC Exam.
21.10.2012 (IInd Sitting)

17. A does half as much work as B in three- fourth of the time. If together they take 18 days to complete a work, how much time shall B take to do it alone?

(1) 30 days (2) 35 days
(3) 40 days (4) 45 days

(SSC CGL Tier-1 Exam 26.06.2011
(Second Sitting)

18. A does half as much work as B in one-third of the time taken by B. If together they take 10 days to complete a work, then the time taken by B alone to do it would have been

(1) 30 days (2) 25 days
(3) 6 days (4) 12 days

(SSC CHSL DEO & LDC
Exam. 04.12.2011 (IInd Sitting
(North Zone)

19. A can do one and a half as much of a work which B can do in one day. B alone can do a piece of work in 18 days. They together can finish that work in

(1) $10\frac{1}{5}$ days (2) $11\frac{1}{5}$ days

(3) $5\frac{1}{5}$ days (4) $7\frac{1}{5}$ days

(SSC Multi-Tasking Staff
Exam. 17.03.2013, Ist Sitting)

20. A can do $\frac{7}{8}$ of work in 28 days, B can do $\frac{5}{6}$ of the same work in 20 days. The number of days they will take to complete if they do it together is

(1) $15\frac{3}{7}$ days (2) $17\frac{3}{5}$ days

(3) $14\frac{5}{7}$ days (4) $13\frac{5}{7}$ days

(SSC CAPFs SI, CISF ASI & Delhi
Police SI Exam. 22.06.2014
TF No. 999 KP0)

21. Two workers A and B are engaged to do a piece of work. A working alone would take 8 hours more to complete the work than when work together. If B worked alone, would take $4\frac{1}{2}$ hours more than when work together. The time required to finish the work together is

(1) 5 hours (2) 4 hours
(3) 8 hours (4) 6 hours

(SSC CGL Tier-II Exam. 12.04.2015
TF No. 567 TL 9)

22. A company employed 200 workers to complete a certain work in 150 days. If only one-fourth of the work has been done in 50 days, then in order to complete the whole work in time, the number of additional workers to be employed was

(1) 100 (2) 300
(3) 600 (4) 200

(SSC CGL Tier-II Exam. 12.04.2015
TF No. 567 TL 9)

23. x does $\frac{1}{4}$ of a job in 6 days. y completes rest of the job in 12 days. Then x and y could complete the job together in

(1) 9 days (2) $9\frac{3}{5}$ days

(3) $8\frac{1}{8}$ days (4) $7\frac{1}{3}$ days

(SSC CGL Tier-II Exam. 12.04.2015
TF No. 567 TL 9)

24. A does half as much work as B in three fourth of the time. If together they take 18 days to complete the work, how much time will B alone take to do it ?

(1) 40 days (2) 45 days

(3) 50 days (4) 30 days

(SSC CGL Tier-II Exam,
2014 12.04.2015 (Kolkata Region)
TF No. 789 TH 7)

25. A, B and C are employed to do a piece of work for Rs. 5,290. A and B together are supposed to do $\frac{19}{23}$ of the work and B and C together $\frac{8}{23}$ of the work. Then A should be paid

(1) Rs. 4,250   (2) Rs. 3,450

(3) Rs. 1,950   (4) Rs. 2,290

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

26. A can do a work in 10 days and B in 20 days. If they together work on it for 5 days, then the fraction of the work that is left is

(1) $\frac{3}{4}$ (2) $\frac{4}{3}$

(3) $\frac{3}{20}$ (4) $\frac{1}{4}$

(SSC CGL Tier-I Exam, 09.08.2015 (IInd Sitting) TF No. 4239378)

27. 4 men and 6 women complete a work in 8 days. 2 men and 9 women also complete in 8 days in which. The number of days in which 18 women complete the work is :

(1) $4\frac{1}{3}$ days   (2) $5\frac{1}{3}$ days

(3) $4\frac{2}{3}$ days   (4) $5\frac{2}{3}$ days

(SSC CGL Tier-I Exam, 16.08.2015 (Ist Sitting) TF No. 3196279)

28. A can do in one day three times the work done by B in one day. They together finish $\frac{2}{5}$ of the work in 9 days. The number of days by which B can do the work alone is :

(1) 90 days   (2) 120 days

(3) 100 days   (4) 30 days

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (IInd Sitting) TF No. 7203752)

29. If 12 men working 8 hours a day complete the work in 10 days, how long would 16 men working $7\frac{1}{2}$ hours a day take to complete the same work?

(1) 7   (2) 6

(3) 10   (4) 8

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (Ist Sitting) TF No. 1375232)

30. 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 is :

(1) 18   (2) 10

(3) 12   (4) 16

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (IInd Sitting) TF No. 3441135)

31. Janardan completes $\frac{2}{3}$ of his work in 10 days. Time he will take to complete $\frac{3}{5}$ of the same work, is

(1) 8 days   (2) 6 days

(3) 9 days   (4) 4 days

(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 20.12.2015 (Ist Sitting) TF No. 9692918)

32. John does $\frac{1}{2}$ piece of work in 3 hours, Joe does $\frac{1}{4}$ of the remaining work in 1 hour and George finishes remaining work in 5 hours. How long would it have taken the three working together to do the work ?

(1) $2\frac{1}{7}$ hours   (2) $3\frac{1}{7}$ hours

(3) $3\frac{8}{11}$ hours   (4) $2\frac{8}{11}$ hours

(SSC CGL Tier-II Online Exam.01.12.2016)

33. A does $\frac{2}{5}$ of a work in 9 days. Then B joined him and they together completed the remaining work in 6 days. B alone can finish the whole work in

(1) $6\frac{12}{13}$ days   (2) $8\frac{2}{11}$ days

(3) 10 days   (4) 18 days

(SSC CGL Tier-II Online Exam.01.12.2016)

34. A and B work together to complete the rest of a job in 7 days. However, $\frac{37}{100}$ of the job was already done. Also, the work done

by A in 5 days is equal to the work done by B in 4 days. How many days would be required by the fastest worker to complete the entire work?

(1) 20   (2) 25

(3) 30   (4) 10

(SSC CPO SI, ASI Online Exam.05.06.2016) (IInd Sitting)

35. Dhiru can dig $\frac{1}{a}$ of a field in 20 hours. What fraction of the same field can Kaku dig in 20 hours if the two of them can dig the field in 60 hours, working together at their respective rates ?

(1) $\frac{(a-3)}{a}$ (2) $\frac{1}{3a}$

(3) $\frac{3a}{(a-3)}$ (4) $\frac{(a-3)}{3a}$

(SSC CPO SI & ASI, Online Exam. 06.06.2016) (IInd Sitting)

36. A can do a certain job in 12 days. B is 60% more efficient than A. Then B can do the same piece of work in

(1) 8 days   (2) $7\frac{1}{2}$ days

(3) $6\frac{1}{4}$ days   (4) 6 days

(SSC CGL Tier-I (CBE) Exam. 31.08.2016) (IInd Sitting)

37. A and B together can complete a work in 24 days. B alone does $\frac{1}{3}$ rd part of this work in 12 days. How many days will A alone take to complete the remaining work?

(1) 24 days   (2) 36 days

(3) 48 days   (4) 72 days

(SSC CGL Tier-I (CBE) Exam. 07.09.2016 (IIIrd Sitting)

38. A can do $\frac{1}{3}$ rd of a work in 5 days and B can do $\frac{2}{5}$ th of this work in 10 days. Both A and B, together can do the work in

(1) $7\frac{3}{8}$ days   (2) $8\frac{4}{5}$ days

(3) $9\frac{3}{8}$ days   (4) 10 days

(SSC CGL Tier-I (CBE) Exam. 09.09.2016 (IInd Sitting)

39. A, B and C contract a work for Rs. 440. A and B together are to do $\dfrac{9}{11}$ of the work. The share of C should be :
(1) Rs. 75   (2) Rs. 90
(3) Rs. 100   (4) Rs. 80
(SSC CGL Tier-I (CBE) Exam. 11.09.2016 (IIIrd Sitting)

40. P can do $\left(\dfrac{1}{4}\right)$th of work in 10 days, Q can do 40% of work in 40 days and R can do $\left(\dfrac{1}{3}\right)$rd of work in 13 days. Who will complete the work first?
(1) P   (2) Q
(3) R   (4) Both P and R
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

TYPE-V

1. A does half as much work as B in one sixth of the time. If together they take 10 days to complete a work, how much time shall B take to do it alone?
(1) 70 days   (2) 30 days
(3) 40 days   (4) 50 days
(SSC CGL Prelim Exam. 24.02.2002 (Ist Sitting) & (SSC CGL Prelim Exam. 13.11.2005 (IInd Sitting)

2. Babu and Asha can do a job together in 7 days. Asha is $1\dfrac{3}{4}$ times as efficient as Babu. The same job can be done by Asha alone in
(1) $\dfrac{49}{4}$ days   (2) $\dfrac{49}{3}$ days
(3) 11 days   (4) $\dfrac{28}{3}$ days
(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

3. Jyothi can do $\dfrac{3}{4}$ of a job in 12 days. Mala is twice as efficient as Jyothi. In how many days will Mala finish the job ?
(1) 6 days   (2) 8 days
(3) 12 days   (4) 16 days
(SSC CPO S.I. Exam. 06.09.2009)

4. A can do a piece of work in 70 days and B is 40% more efficient than A. The number of days taken by B to do the same work is
(1) 40 days   (2) 60 days
(3) 50 days   (4) 45 days
FCI Assistant Grade-III Exam. 25.02.2012 (Paper-I) North Zone (Ist Sitting)

5. 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
(1) 5 days   (2) 6 days
(3) 7 days   (4) 8 days
(SSC CPO S.I. Exam. 09.11.2008)

6. To complete a work, A takes 50% more time than B. If together they take 18 days to complete the work, how much time shall B take to do it ?
(1) 30 days   (2) 35 days
(3) 40 days   (4) 45 days
(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

7. A is twice as good a workman as B and B is twice as good a workman as C. If A and B can together finish a piece of work in 4 days, then C can do it by himself in
(1) 6 days   (2) 8 days
(3) 24 days   (4) 12 days
(SSC CPO S.I. Exam. 06.09.2009)

8. A and B together can complete a work in 15 days. A is 50% more efficient worker than B. How long will A take to complete the work alone ?
(1) 20 days   (2) 21 days
(3) 21.4 days   (4) 22.5 days
(SSC SAS Exam 26.06.2010 (Paper-1)

9. Tapas works twice as fast as Mihir. If both of them together complete a work in 12 days, Tapas alone can complete it in
(1) 15 days   (2) 18 days
(3) 20 days   (4) 24 days
(SSC CPO S.I. Exam. 12.12.2010 (Paper-I)

10. A and B together can do a work in 12 days. B and C together do it in 15 days. If A's efficiency is twice that of C, then the days required for B alone to finish the work is
(1) 60 days   (2) 30 days
(3) 20 days   (4) 15 days
(SSC CGL Tier-1 Exam 19.06.2011 (First Sitting)

11. A is 50% as efficient as B. C does half of the work done by A and B together. If C alone does the work in 20 days, then A, B and C together can do the work in
(1) $5\dfrac{2}{3}$ days   (2) $6\dfrac{2}{3}$ days
(3) 6 days   (4) 7 days
(SSC CGL Tier-1 Exam 19.06.2011 (First Sitting)

12. A is thrice as good a workman as B and is, therefore, able to finish a piece of work in 60 days less than B. The time (in days) in which they can do it working together is
(1) 22 days   (2) $22\dfrac{1}{2}$ days
(3) 23 days   (4) $23\dfrac{1}{4}$ days
(SSC CGL Prelim Exam. 04.07.1999 (Ist Sitting) & (SSC CPO S.I. Exam. 26.05.2005) & (SSC CGL Tier-1 Exam. 19.06.2011 (IInd Sitting) & (SSC CHSL DEO & LDC Exam. 04.11.2012)

13. A does 20% less work than B. If A can complete a piece of work in $7\dfrac{1}{2}$ hours, then B can do it in
(1) $6\dfrac{1}{2}$ hours   (2) 6 hours
(3) $5\dfrac{1}{2}$ hours   (4) 5 hours
(SSC CPO S.I. Exam. 03.09.2006) & (SSC GL Tier-I Exam. 19.05.2013 (Ist Sitting)

14. Kamal can do a work in 15 days. Bimal is 50 per cent more efficient than Kamal in doing the work. In how many days will Bimal do that work?
(1) 14 days   (2) 12 days
(3) 10 days   (4) $10\dfrac{1}{2}$ days
(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone) & (SSC CPO S.I. Exam.03.09.2006)

15. A takes twice as much time as B and thrice as much as C to complete a piece of work. They together complete the work in 1 day. In what time, will A alone complete the work.
(1) 9 days   (2) 5 days
(3) 6 days   (4) 4 days
(SSC Data Entry Operator Exam. 31.08.2008)

16. A is thrice as good a workman as B and therefore is able to finish a job in 40 days less than B. Working together, they can do it in
(1) 14 days   (2) 13 days
(3) 20 days   (4) 15 days
(SSC Multi-Tasking (Non-Technical) Staff Exam. 20.02.2011) & (SSC CGL Tier-I Exam. 26.06.2011 (Ist Sitting)

17. A is twice as good a workman as B and together they finish a piece of work in 14 days. The number of days taken by A alone to finish the work is
(1) 11 days   (2) 21 days
(3) 28 days   (4) 42 days
(SSC Multi-Tasking (Non-Technical) Staff Exam. 27.02.2011)

18. A can do a work in 21 days. B is 40% more efficient than A. The number of days required for B to finish the same work alone is
(1) 10 days   (2) 12 days
(3) 15 days   (4) 18 days
(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (North Zone))

19. A can do a work in 5 days less than the time taken by B to do it. If both of them together take $11\dfrac{1}{9}$ days, then the time taken by 'B' alone to do the same work (in days) is
(1) 15   (2) 20
(3) 25   (4) 30
(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (East Zone))

20. A takes 10 days less than the time taken by B to finish a piece of work. If both A and B can do it in 12 days, then the time taken by B alone to finish the work is
(1) 30 days   (2) 27 days
(3) 20 days   (4) 25 days
(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (East Zone))

21. A can do a work in 9 days, if B is 50% more efficient than A, then in how many days can B do the same work?
(1) 13.5 days   (2) 4.5 days
(3) 6 days   (4) 3 days
(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (Delhi Zone))

22. A is 30% more efficient than B, and can alone do a work in 23 days. The number of days, in which A and B, working together can finish the job is
(1) 11 days   (2) 13 days
(3) 20 days   (4) 21 days
(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (East Zone))

23. 5 men and 2 women working together can do four times as much work per hour as a man and a woman together. The work done by a man and a woman should be in the ratio :
(1) 1 : 2   (2) 2 : 1
(3) 1 : 3   (4) 4 : 1
(SSC CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting (East Zone))

24. A can do a certain job in 12 days. B is 60% more efficient than A. To do the same job B alone would take :
(1) $7\dfrac{1}{2}$ days   (2) 8 days
(3) 10 days   (4) 7 days
(SSC CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting (Delhi Zone))

25. A can do a certain work in 12 days. B is 60% more efficient than A. How many days will B and A together take to do the same job?
(1) $\dfrac{80}{13}$ days   (2) $\dfrac{70}{13}$ days
(3) $\dfrac{75}{13}$ days   (4) $\dfrac{60}{13}$ days
(SSC Graduate Level Tier-II Exam.16.09.2012)

26. A and B can do a job together in 12 days. A is 2 times as efficient as B. In how many days can B alone complete the work ?
(1) 18 days   (2) 9 days
(3) 36 days   (4) 12 days
(SSC CHSL DEO & LDC Exam. 21.10.2012 (Ist Sitting) & (SSC CGL Prelim Exam. 27.02.2000 (IInd Sitting)

27. P is thrice as good a workman as Q and therefore able to finish a job in 48 days less than Q. Working together, they can do it in :
(1) 18 days   (2) 24 days
(3) 30 days   (4) 12 days
(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

28. To do a certain work, B would take time thrice as long as A and C together and C twice as long as A and B together. The three men together complete the work in 10 days. The time taken by A to complete the work separately is
(1) 22 days   (2) 24 days
(3) 30 days   (4) 20 days
(SSC Delhi Police S.I. (SI) Exam. 19.08.2012)

29. A can do a piece of work in 6 days. B is 25% more efficient than A. How long would B alone take to finish this work?
(1) $4\dfrac{4}{5}$ days   (2) $3\dfrac{1}{3}$ days
(3) $5\dfrac{1}{4}$ days   (4) $2\dfrac{2}{3}$ days
(SSC Graduate Level Tier-I Exam. 19.05.2013 Ist Sitting)

30. Two workers A and B working together completed a job in 5 days. If A worked twice as efficiently as he actually did and B worked $\dfrac{1}{3}$ as efficiently as he actually did, the work would have been completed in 3 days. To complete the job alone, A would require
(1) $5\dfrac{1}{5}$ days   (2) $6\dfrac{1}{4}$ days
(3) $7\dfrac{1}{2}$ days   (4) $8\dfrac{3}{4}$ days
(SSC Graduate Level Tier-II Exam. 29.09.2013

31. Sunil completes a work in 4 days, whereas Dinesh completes the work in 6 days. Ramesh works $1\dfrac{1}{2}$ times as fast as Sunil. The three together can complete the work in
(1) $1\dfrac{5}{12}$ days   (2) $1\dfrac{5}{7}$ days
(3) $1\dfrac{3}{8}$ days   (4) $1\dfrac{5}{19}$ days
(SSC Graduate Level Tier-II Exam. 29.09.2013

32. Pratibha is thrices as efficient as Sonia and is therefore able to finish a piece of work in 60 days less than Sonia. Pratibha and Sonia can individually complete the work respectively in

(1) 30 days, 60 days

(2) 60 days, 90 days

(3) 30 days, 90 days

(4) 40 days, 120 days

(SSC CGL Tier-I Exam. 19.10.2014 TF No. 022 MH 3)

33. If A, B and C can complete a work in 6 days. If A can work twice faster than B and thrice faster than C, then the number of days C alone can complete the work is :

(1) 33 days   (2) 44 days

(3) 22 days   (4) 11 days

(SSC CGL Tier-I Exam, 16.08.2015 (IInd Sitting) TF No. 2176783)

34. A is twice as good as B and together they finish a piece of work in 16 days. The number of days taken by A alone to finish the work is

(1) 20 days   (2) 21 days

(3) 22 days   (4) 24 days

(SSC CGL Tier-I (CBE) Exam.10.09.2016)

35. A man does double the work done by a boy in the same time. The number of days that 3 men and 4 boys will take to finish a work which can be done by 10 men in 8 days is

(1) 4   (2) 16

(3) $7\dfrac{3}{11}$ (4) $8\dfrac{4}{5}$

(SSC CGL Tier-II Online Exam. 01.12.2016)

36. A works twice as fast as B. If B can complete a piece of work independently in 12 days, then what will be the number of days taken by A and B together to finish the work?

(1) 4   (2) 6

(3) 8   (4) 18

(SSC CGL Tier-I (CBE) Exam. 02.09.2016) (IInd Sitting)

37. If 10 people can do a job in 20 days, then 20 people with twice the efficiency can do the same job in

(1) 5 days   (2) 10 days

(3) 20 days   (4) 40 days

(SSC CGL Tier-I (CBE) Exam. 03.09.2016 (IInd Sitting)

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

(1) 15   (2) 16

(3) 18   (4) 25

(SSC CGL Tier-I (CBE) Exam. 08.09.2016 (IInd Sitting)

TYPE-VI

1. 39 persons can repair a road in 12 days working 5 hours a day. In how many days will 30 persons working 6 hours a day complete the work ?

(1) 10 days   (2) 13 days

(3) 14 days   (4) 15 days

(SSC CPO S.I. Exam. 12.01.2003)

2. If 72 men can build a wall of 280 m length in 21 days, how many men could take 18 days to build a similar type of wall of length 100 m?

(1) 30   (2) 10

(3) 18   (4) 28

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

3. A wall of 100 metres can be built by 7 men or 10 women in 10 days. How many days will 14 men and 20 women take to build a wall of 600 metres ?

(1) 15   (2) 20

(3) 25   (4) 30

(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

4. 5 persons can prepare an admission list in 8 days working 7 hours a day. If 2 persons join them so as to complete the work in 4 days, they need to work per day for :

(1) 10 hours   (2) 9 hours

(3) 12 hours   (4) 8 hours

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

5. 4 mat-weavers can weave 4 mats in 4 days. At the same rate how many mats would be woven by 8 mat-weavers in 8 days ?

(1) 4   (2) 8

(3) 12   (4) 16

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

6. 10 men working 6 hours a day can complete a work in 18 days. How many hours a day must 15 men work to complete the same work in 12 days ?

(1) 6 days   (2) 10 days

(3) 12 days   (4) 15 days

(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

7. Two persons can complete a piece of work in 9 days. How many more persons are needed to complete double the work in 12 days?

(1) 3   (2) 2

(3) 4   (4) 1

(SSC CPO S.I. Exam. 03.09.2006)

8. If p men working p hours per day for p days produce p units of work, then the units of work produced by n men working n hours a day for n days is

(1) $\dfrac{p^2}{n^2}$ (2) $\dfrac{p^3}{n^2}$

(3) $\dfrac{n^2}{p^2}$ (4) $\dfrac{n^3}{p^2}$

(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

9. If 10 men can do a piece of work in 12 days, the time taken by 12 men to do the same piece of work will be

(1) 12 days   (2) 10 days

(3) 9 days   (4) 8 days

(SSC CPO S.I. Exam. 09.11.2008)

10. 7 men can complete a piece of work in 12 days. How many additional men will be required to complete double the work in 8 days ?

(1) 28   (2) 21

(3) 14   (4) 7

(SSC CGL Tier-I Exam. 16.05.2010 (Second Sitting)

11. 'x' number of men can finish a piece of work in 30 days. If there were 6 men more, the work could be finished in 10 days less. The original number of men is

(1) 6   (2) 10

(3) 12   (4) 15

(SSC CGL Tier-1 Exam 19.06.2011 (Second Sitting)

12. Some carpenters promised to do a job in 9 days but 5 of them were absent and remaining men did the job in 12 days. The original number of carpenters was

(1) 24   (2) 20

(3) 16   (4) 18

FCI Assistant Grade-III Exam. 25.02.2012 (Paper-I) North Zone (Ist Sitting)

13. 2 men and 3 women together or 4 men together can complete a piece of work in 20 days. 3 men and 3 women will complete the same work in :
(1) 12 days   (2) 16 days
(3) 18 days   (4) 19 days
(SSC CHSL DEO & LDC Exam. 28.11.2010 (Ist Sitting)

14. Working 8 hours a day, Anu can copy a book in 18 days. How many hours a day should she work so as to finish the work in 12 days ?
(1) 12 hours   (2) 10 hours
(3) 11 hours   (4) 13 hours
(SSC CISF Constable (GD) Exam. 05.06.2011)

15. Some persons can do a piece of work in 12 days. Two times the number of such persons will do half of the work in
(1) 9 days   (2) 6 days
(3) 5 days   (4) 3 days
(SSC Constable (GD) & Rifleman (GD) Exam. 22.04.2012 (Ist Sitting)

16. If the work done by $(x-1)$ men in $(x+1)$ days is to the work done by $(x+2)$ men in $(x-1)$ days are in the ratio 9 : 10, then the value of x is equal to :
(1) 5   (2) 6
(3) 7   (4) 8
(SSC CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting (East Zone)

17. If 80 persons can finish a work within 16 days by working 6 hours a day, the number of hours a day, should 64 persons work to finish that very job within 15 days is :
(1) 5 hrs.   (2) 7 hrs.
(3) 8 hrs.   (4) 6 hrs.
(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

18. 18 boys can do a piece of work in 24 days. In how many days can 27 boys do the same work ?
(1) 16 days   (2) 32 days
(3) 23 days   (4) 48 days
(SSC CHSL DEO & LDC Exam. 28.10.2012 (Ist Sitting)

19. One man, 3 women and 4 boys can do a piece of work in 96 hours, 2 men and 8 boys can do it in 80 hours, 2 men and 3 women can do it in 120 hours. 5 men and 12 boys can do it in
(1) $39\dfrac{1}{11}$ hours

(2) $42\dfrac{7}{11}$ hours

(3) $43\dfrac{7}{11}$ hours

(4) 44 hours
(SSC Graduate Level Tier-I Exam. 21.04.2013)

20. If x men can do a piece of work in x days, then the number of days in which y men can do the same work is
(1) xy days   (2) $\dfrac{y^2}{x}$ days

(3) $\dfrac{x^2}{y}$ days   (4) x^2y days
(SSC Graduate Level Tier-II Exam. 29.09.2013)

21. 30 men can repair a road in 18 days. They are joined by 6 more workers. Now the road can be repaired in
(1) 14 days   (2) 15 days
(3) 16 days   (4) 17 days
(SSC CHSL DEO & LDC Exam. 28.10.2012 (Ist Sitting)

22. 20 men or 24 women can complete a piece of work in 20 days. If 30 men and 12 women undertake to complete the work, the work will be completed in
(1) 10 days   (2) 12 days
(3) 15 days   (4) 16 days
(SSC (South Zone) Investigator Exam 12.09.2010)

23. Either 8 men or 17 women can paint a house in 33 days. The number of days required to paint three such houses by 12 men and 24 women working at the same rate is :
(1) 44 days   (2) 43 days
(3) 34 days   (4) 66 days
(SSC CHSL DEO & LDC Exam. 11.12.2011 (IInd Sitting (Delhi Zone)

24. 3 men and 7 women can do a job in 5 days, while 4 men and 6 women can do it in 4 days. The number of days required for a group of 10 women working together, at the same rate as before, to finish the same job is :
(1) 30 days   (2) 36 days
(3) 40 days   (4) 20 days
(SSC CAPFs SI & CISF ASI Exam. 23.06.2013)

25. A contractor undertook to finish a work in 92 days and employed 110 men. After 48 days, he found that he had already done $\dfrac{3}{5}$ part of the work, the number of men he can withdraw so that the work may still be finished in time is :
(1) 45   (2) 40
(3) 35   (4) 30
(SSC Multi-Tasking Staff Exam. 10.03.2013)

26. A man undertakes to do a certain work in 150 days. He employs 200 men. He finds that only a quarter of the work is done in 50 days. The number of additional men that should be appointed so that the whole work will be finished in time is :
(1) 75   (2) 100
(3) 125   (4) 50
(SSC Graduate Level Tier-I Exam. 21.04.2013, Ist Sitting)

27. A contractor undertook to finish a certain work in 124 days and employed 120 men. After 64 days, he found that he had already done $\dfrac{2}{3}$ of the work. How many men can be discharged now so that the work may finish in time ?
(1) 48   (2) 56
(3) 40   (4) 50
(SSC Graduate Level Tier-I Exam. 21.04.2013)

28. If 7 men working 7 hrs a day for each of 7 days produce 7 units of work, then the units of work produced by 5 men working 5 hrs a day for each of 5 days is
(1) $\dfrac{25}{343}$ (2) $\dfrac{125}{49}$

(3) $\dfrac{49}{125}$ (4) $\dfrac{343}{25}$
(SSC CHSL DEO Exam. 02.11.2014 (Ist Sitting)

29. Seventy-five men are employed to lay down a railway line in 3 months. Due to certain emergency conditions, the work was to be finished in 18 days. How many more men should be employed to complete the work in the desired time ?

(1) 300   (2) 325

(3) 350   (4) 375

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014 TF No. 999 KP0)

30. If 4 men or 8 women can do a piece of work in 15 days, in how many days can 6 men and 12 women do the same piece of work ?

(1) 20 days   (2) 45 days

(3) 15 days   (4) 30 days

(SSC CGL Tier-I Exam, 16.08.2015 (Ist Sitting) TF No. 3196279)

31. 24 men can do a piece of work in 17 days. How many men will be able to do it in 51 days ?

(1) 8   (2) 10

(3) 12   (4) 6

(SSC CGL Tier-I (CBE) Exam. 06.09.2016 (IInd Sitting)

TYPE : VII

1. Suman can do a work in 3 days. Sumati can do the same work in 2 days. Both of them finish the work together and get ₹ 150. What is the share of Suman ?

(1) ₹ 30   (2) ₹ 60

(3) ₹ 70   (4) ₹ 75

(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

2. The average wage of 500 workers was found to be ₹ 200. Later on, it was discovered that the wages of two workers were misread as 180 and 20 instead of 80 and 220. The correct average wage is :

(1) ₹ 200.10   (2) ₹ 200.20

(3) ₹ 200.50   (4) ₹ 201.00

(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

3. A and B undertook to do a piece of work for ₹ 4500. A alone could do it in 8 days and B alone in 12 days. With the assistance of C they finished the work in 4 days. Then C's share of the money is

(1) ₹ 2250   (2) ₹ 1500

(3) ₹ 750   (4) ₹ 375

(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

4. If 6 persons working 8 hours a day earn ₹ 8400 per week, then 9 persons working 6 hours a day will earn per week

(1) ₹ 8400   (2) ₹ 16800

(3) ₹ 9450   (4) ₹ 16200

(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

5. 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 ₹ 3200. With the help of C they completed the work in 3 days. How much is to be paid to C ?

(1) ₹ 375   (2) ₹ 400

(3) ₹ 600   (4) ₹ 800

(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

6. A and B can complete a piece of work in 15 days and 10 days respectively. They contracted to complete the work for ₹ 30,000. The share of A in the contracted money will be :

(1) ₹ 18,000   (2) ₹ 16,500

(3) ₹ 12,500   (4) ₹ 12,000

(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

7. A man and a boy received ₹ 800 as wages for 5 days for the work they did together. The man's efficiency in the work was three times that of the boy. What are the daily wages of the boy ?

(1) ₹ 76   (2) ₹ 56

(3) ₹ 44   (4) ₹ 40

(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

8. A daily-wage labourer was engaged for a certain number of days for ₹ 5,750; but being absent on some of those days he was paid only ₹ 5,000. What was his maximum possible daily wage?

(1) ₹ 125   (2) ₹ 250

(3) ₹ 375   (4) ₹ 500

(SSC CPO S.I. Exam. 03.09.2006)

9. A, B and C completed a work costing ₹ 1,800. A worked for 6 days, B for 4 days and C for 9 days. If their daily wages are in the ratio of 5 : 6 : 4, how much amount will be received by A?

(1) ₹ 800   (2) ₹ 600

(3) ₹ 900   (4) ₹750

(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

10. A labourer was appointed by a contractor on the condition that he would be paid ₹ 75 for each day of his work but would be fined at the rate of ₹ 15 per day for his absence, apart from losing his wages, After 20 days, the contractor paid the labourer ₹ 1140. The number of days the labourer abstained from work was

(1) 3   (2) 5

(3) 4   (4) 2

(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

11. Two men undertook to do a job for ₹ 1400. One of them can do it alone in 7 days, and the other in 8 days. With the assistance of a boy they together completed the work in 3 days. How much money will the boy get ?

(1) ₹ 300   (2) ₹ 325

(3) ₹ 275   (4) ₹ 250

(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

12. If 5 men or 7 women can earn ₹ 5,250 per day, how much would 7 men and 13 women earn per day ?

(1) ₹ 11,600   (2) ₹ 11,700

(3) ₹ 16,100   (4) ₹ 17,100

(SSC CGL Tier-I Exam. 16.05.2010 (First Sitting)

13. 2 men and 1 woman together can complete a piece of work in 14 days, while 4 women and 2 men together can do it in 8 days. If a man gets ₹ 600 per day, how much should a woman get per day?

(1) ₹ 400   (2) ₹ 450

(3) ₹ 480   (4) ₹ 360

(SSC Data Entry Operator Exam. 31.08.2008)

14. Two men undertake a job for ₹ 960. They can complete it in 16 days and 24 days respectively. They work along with a third man and take 8 days to complete it. Then the share of the third man should be

(1) ₹ 155   (2) ₹ 165

(3) ₹ 160   (4) ₹ 150

(SSC CHSL DEO & LDC Exam. 04.11.2012, IInd Sitting)

15. If there is a reduction in the number of workers in a factory in the ratio 15 : 11 and an increment in their wages in the ratio 22 : 25, then the ratio by which the total wages of the workers should be decreased is
(1) 6 : 5   (2) 5 : 6
(3) 3 : 7   (4) 3 : 5
(SSC CHSL DEO & LDC Exam. 04.11.2012, IInd Sitting)

16. Stanie and Paul take a piece of work for ₹ 28,800. One alone could do it in 36 days, the other in 48 days. With the assistance of an expert, they finish it in 12 days. How much remuneration the expert should get ?
(1) ₹ 10000   (2) ₹ 18000
(3) ₹ 16000   (4) ₹ 12000
(SSC Multi-Tasking Staff Exam. 17.03.2013, Kolkata Region)

17. A and B were assigned to do a job for an amount of ₹ 1,200. A alone can do it in 15 days, while B can do it in 12 days. With the help of C, they can finish in 5 days. The share of amount that C earns is
(1) ₹ 300   (2) ₹ 400
(3) ₹ 500   (4) ₹ 600
(SSC Multi-Tasking Staff Exam. 24.03.2013, Ist Sitting)

18. A sum of money is sufficient to pay A's wages for 21 days and B's wages for 28 days. The same money is sufficient to pay the wages of both for :
(1) $12\dfrac{1}{4}$ days   (2) 14 days
(3) $24\dfrac{1}{2}$ days   (4) 12 days
(SSC Graduate Level Tier-I Exam. 21.04.2013)

19. A can do a piece of work in 12 days while B alone can do it in 15 days. With the help of C they can finish it in 5 days. If they are paid ₹ 960 for the whole work how much money A gets ?
(1) ₹ 480   (2) ₹ 240
(3) ₹ 320   (4) ₹ 400
(SSC Graduate Level Tier-I Exam. 21.04.2013)

20. A, B and C together earn ₹ 150 per day while A and C together earn ₹ 94 and B and C together earn ₹ 76. The daily earning of 'C' is
(1) ₹ 56   (2) ₹ 20
(3) ₹ 34   (4) ₹ 75
(SSC Constable (GD) Exam. 12.05.2013)

21. Three persons undertake to complete a piece of work for ₹ 1,200. The first person can complete the work in 8 days, second person in 12 days and third person in 16 days. They complete the work with the help of a fourth person in 3 days. What does the fourth person get?
(1) ₹ 180   (2) ₹ 200
(3) ₹ 225   (4) ₹ 250
(SSC Graduate Level Tier-II Exam. 29.09.2013)

22. A can do a piece of work in 16 days and B in 24 days. They take the help of C and three together finish the work in 6 days. If the total remuneration for the work is ₹ 400. The amount (in rupees) each will receive, in proportion, to do the work is
(1) A : 150, B : 100, C : 150
(2) A : 100, B : 150, C : 150
(3) A : 150, B : 150, C : 100
(4) A : 100, B : 150, C : 100
(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

23. A skilled, a half skilled and an unskilled labourer work for 7, 8 and 10 days respectively and they together get ₹ 369 for their work. If the ratio of their each day's work is $\dfrac{1}{3} : \dfrac{1}{4} : \dfrac{1}{6}$, then how much does the trained labourer get (in rupees) ?
(1) 164   (2) 102.50
(3) 201.50   (4) 143.50
(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (Ist Sitting)

24. A, B and C are employed to do a piece of work for ₹ 575. A and C are supposed to finish $\dfrac{19}{23}$ of the work together. Amount shall be paid to B is
(1) ₹ 210   (2) ₹ 100
(3) ₹ 200   (4) ₹ 475
(SSC CGL Tier-II Exam. 21.09.2014)

25. If a man earns ₹ 2000 for his first 50 hours of work in a week and is then paid one and a half times his regular hourly rate for any additional hours, then the hours must he work to make ₹ 2300 in a week is
(1) 6 hours   (2) 4 hours
(3) 7 hours   (4) 5 hours
(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

26. 2 men and 1 woman can complete a piece of work in 14 days while 4 women and 2 men can do the same work in 8 days. If a man gets Rs. 180 per day, then a woman will get per day
(1) Rs. 150   (2) Rs. 140
(3) Rs. 120   (4) Rs. 160
(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

27. The daily wages of A and B respectively are Rs.3.50 and Rs. 2.50. When A finishes a certain work, he gets a total wage of Rs. 63. When B does the same work, he gets a total wage of Rs.75. If both of them do it together what is the cost of the work ?
(1) Rs. 67.50   (2) Rs. 27.50
(3) Rs. 60.50   (4) Rs. 70.50
(SSC CGL Tier-II Online Exam.01.12.2016)

28. A can do a work in 12 days while B can do it in 15 days. They undertake to complete it together for Rs. 450. what will be the share of A in this amount of money ?
(1) Rs. 200   (2) Rs. 240
(3) Rs. 250   (4) Rs. 300
(SSC CGL Tier-I (CBE) Exam. 29.08.2016 (IInd Sitting)

29. A, B and C can work together for Rs. 550. A and B together are to do $\dfrac{7}{11}$ of the work. The share of C should be
(1) Rs. 200   (2) Rs. 300
(3) Rs. 400   (4) Rs. 450
(SSC CGL Tier-I (CBE) Exam. 01.09.2016 (IIIrd Sitting)

30. A and B undertake a piece of work for Rs. 250. A alone can do that work in 5 days and B alone can do that work in 15 days. With the help of C, they finish the work in 3 days. If every one gets paid in proportion to work done by them, the amount C will get is :
(1) Rs. 50   (2) Rs. 100
(3) Rs. 150   (4) Rs. 200
(SSC CGL Tier-I (CBE) Exam. 10.09.2016 (IIIrd Sitting)

37. A certain factory employed 600 men and 400 women and the average wage was ₹ 2.55 per day. If a women got 50 paise less than a man, the daily wages of a man and a woman were
(1) Man ₹ 2.75, Woman ₹ 2.25
(2) Man ₹ 5.30, Woman ₹ 2.50
(3) Man ₹ 2.50, Woman ₹ 2.00
(4) Man ₹ 3.25, Woman ₹ 2.75
(SSC Multi-Tasking Staff Exam. 30.04.2017)

TYPE-VIII

1. A certain number of men can complete a job in 30 days. If there were 5 men more, it could be completed in 10 days less. How many men were in the beginning?
(1) 10   (2) 15
(3) 20   (4) 25
(SSC CGL Prelim Exam. 27.02.2000 (IInd Sitting)

2. If the expenditure of gas on burning 6 burners for 6 hours a day for 8 days is ₹ 450, then how many burners can be used for 10 days at 5 hours a day for ₹ 625 ?
(1) 12   (2) 16
(3) 4   (4) 8
(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

3. A can do a piece of work in 60 days. He works for 15 days and then B alone finishes the remaining work in 30 days. The two together can finish the work in
(1) 24 days   (2) 25 days
(3) 30 days   (4) 32 days
(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

4. 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 the work in
(1) 15 days   (2) 20 days
(3) 25 days   (4) 30 days
(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

5. A man can do a piece of work in 5 days, but with the help of his son, he can do it in 3 days. In what time can the son do it alone ?
(1) 7 days   (2) 8 days
(3) $7\frac{1}{2}$ days   (4) $6\frac{1}{2}$ days
(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

6. A certain number of men can do a work in 60 days. If there were eight more men, it could be completed in 10 days less. How many men were there in the beginning?
(1) 70   (2) 55
(3) 45   (4) 40
(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

7. 12 persons can do a piece of work in 4 days. How many persons are required to complete 8 times the work in half the time ?
(1) 192   (2) 190
(3) 180   (4) 144
(SSC CPO S.I. Exam. 05.09.2004)

8. A work could be completed in 100 days by some workers. However, due to the absence of 10 workers, it was completed in 110 days. The original number of workers was :
(1) 100   (2) 110
(3) 55   (4) 50
(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

9. A job can be completed by 12 men in 12 days. How many extra days will be needed to complete the job if 6 men leave after working for 6 days ?
(1) 3 days   (2) 6 days
(3) 12 days   (4) 24 days
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

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 ?
(1) 10   (2) 15
(3) 18   (4) 20
(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

11. Working 5 hours a day, A can complete a work in 8 days and working 6 hours a day, B can complete the same work in 10 days. Working 8 hours a day, they can jointly complete the work in
(1) 3 days   (2) 4 days
(3) 4.5 days   (4) 5.4 days
(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

12. If two persons, with equal abilities, can do two jobs in two days, then 100 persons with equal abilities can do 100 similar jobs in
(1) 100 days   (2) 10 days
(3) 5 days   (4) 2 days
(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

13. Ganga and Saraswati, working separately can mow a field in 8 and 12 hours respectively. If they work in stretches of one hour alternately, Ganga beginning at 9 a.m., when will the moving be completed ?
(1) 6 p.m.   (2) 6.30 p.m.
(3) 5 p.m.   (4) 5.30 p.m.
(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

14. 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 needed to finish the work in the specified time ?
(1) 480   (2) 80
(3) 200   (4) 100
(SSC CPO S.I. Exam. 06.09.2009)

15. A can do a work in 12 days. When he had worked for 3 days, B joined him. If they complete the work in 3 more days, in how many days can B alone finish the work?
(1) 6 days   (2) 12 days
(3) 4 days   (4) 8 days
(SSC CGL Tier-I Exam 26.06.2011 (First Sitting)

16. Working efficiencies of P and Q for completing a piece of work are in the ratio 3 : 4. The number of days to be taken by them to complete the work will be in the ratio
(1) 3 : 2   (2) 2 : 3
(3) 3 : 4   (4) 4 : 3
(SSC CISF ASI Exam 29.08.2010 (Paper-1)

17. A contractor undertakes to make a road in 40 days and employs 25 men. After 24 days, he finds that only one-third of the road is made. How many extra men should he employ so that he is able to complete the work 4 days earlier?
(1) 100 (2) 60
(3) 75 (4) None of these
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

18. Twenty women together can complete a work in 16 days. 16 men together can complete the same work in 15 days. The ratio of the working capacity of a man to that of a woman is :
(1) 3 : 4 (2) 4 : 3
(3) 5 : 3 (4) 4 : 5
(SSC CHSL DEO & LDC Exam. 27.11.2010)

19. A man and a woman working together can do a certain work in 18 days. Their skills in doing the work are in the ratio 3 : 2. How many days will the woman take to finish the work alone?
(1) 45 days (2) 36 days
(3) 27 days (4) 30 days
(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (East Zone))

20. Two men can do a piece of work in x days. But y women can do that in 3 days. Then the ratio of the work done by 1 man and 1 woman is
(1) 3y : 2x (2) 2x : 3y
(3) $x : y$ (4) 2y : 3x
(SSC FCI Assistant Grade-III Main Exam. 07.04.2013)

21. A farmer can plough a field working 6 hours per day in 18 days. The worker has to work how many hours per day to finish the same work in 12 days ?
(1) 7 hrs (2) 9 hrs
(3) 11 hrs (4) 13 hrs
(SSC Graduate Level Tier-II Exam. 29.09.2013

22. If 12 carpenters working 6 hours a day can make 460 chairs in 240 days, then the number of chairs made by 18 carpenters in 36 days each working 8 hours a day is
(1) 92 (2) 132
(3) 138 (4) 126
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 IInd Sitting)

23. 8 workers can build a wall 18 m long, 2 m broad and 12 m high in 10 days, working 9 hours a day. Find how many workers will be able to build a wall 32 m long, 3 m broad and 9 m high in 8 days working 6 hours a day ?
(1) 16 (2) 20
(3) 30 (4) 10
(SSC CGL Tier-I Re-Exam, 30.08.2015)

24. P and Q together can do a job in 6 days. Q and R can finish the same job in $\dfrac{60}{7}$ days. P started the work and worked for 3 days. Q and R continued for 6 days. Then the difference of days in which R and P can complete the job is
(1) 15 (2) 10
(3) 8 (4) 12
(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

25. 150 workers were engaged to finish a piece of work in a certain number of days. Four workers dropped on the second day, four more workers dropped on third day and so on. It takes 8 more days to finish the work now. Find the number of days in which the work was completed?
(1) 28 (2) 24
(3) 25 (4) 30
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (Ist Sitting) TF No. 1375232)

26. Work done by $(x + 4)$ men in $(x + 5)$ days is equal to the work done by $(x – 5)$ men in $(x + 20)$ days. Then the value of x is
(1) 20 (2) 25
(3) 30 (4) 15
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 20.12.2015 (Ist Sitting) TF No. 9692918)

27. A group of workers can complete a piece of work in 50 days, when they are working individually. On the first day one person works, on the second day another person joins him, on the third day one more person joins them and this process continues till the work is completed. How many approximate days are needed to complete the work?
(1) 8 days (2) 9 days
(3) 10 days (4) 11 days
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 05.06.2016) (Ist Sitting)

28. 20 men working 8 hours per day can complete a piece of work in 21 days. How many hours per day must 48 men work to complete the same job in 7 days?
(1) 12 (2) 20
(3) 10 (4) 15
(SSC CGL Tier-I (CBE) Exam. 02.09.2016) (Ist Sitting)

29. The four walls and ceiling of a room of length 25 m, breadth 12 m and height 10 m are to be painted. Painter A can paint 200 m² in 5 days, Painter B can paint 250 m² in 2 days. If A and B work together, they will finish the job in
(1) 6 days (2) $6\dfrac{10}{33}$ days
(3) $7\dfrac{10}{33}$ days (4) 8 days
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

30. 36 men together can build a wall 140 m long in 21 days. The number of men working at the same rate required to build the same wall in 14 days is
(1) 54 (2) 48
(3) 36 (4) 18
(SSC CGL Tier-I (CBE) Exam. 30.08.2016) (IInd Sitting)

31. A canteen requires 56 kgs of rice for seven days . The quantity of rice required for the months of April and May together is :
(1) 468 kg. (2) 488 kg.
(3) 498 kg. (4) 508 kg.
(SSC CGL Tier-I (CBE) Exam. 04.09.2016 (IIIrd Sitting)

32. A school has 8 periods of 45 minutes each, everyday. How long will each period be if the school has to have 9 periods everyday, assuming the working hours to be the same?
(1) 40 minutes (2) 35 minutes
(3) 30 minutes (4) 45 minutes
(SSC CGL Tier-I (CBE) Exam. 07.09.2016 (IIIrd Sitting)

33. If 7 spiders make 7 webs in 7 days, then 1 spider will make 1 web in how many days ?
(1) 1 (2) $\dfrac{7}{2}$
(3) 7 (4) 49
(SSC CGL Tier-I (CBE) Exam. 11.09.2016 (IInd Sitting)

34. Sister can bake 50 cakes in 25 hours, Sister and Mummy together can bake 75 cakes in 15 hours. How many cakes Mummy can bake in 15 hours ?
 (1) 25 (2) 45
 (3) 20 (4) 10
(SSC CHSL (10+2) Tier-I (CBE) Exam. 16.01.2017) (IInd Sitting)

■ SHORT ANSWERS ■

TYPE-I

1. (3)	**2.** (3)	**3.** (1)	**4.** (3)
5. (2)	**6.** (2)	**7.** (3)	**8.** (3)
9. (3)	**10.** (3)	**11.** (4)	**12.** (4)
13. (1)	**14.** (1)	**15.** (2)	**16.** (1)
17. (3)	**18.** (1)	**19.** (4)	**20.** (3)
21. (3)	**22.** (3)	**23.** (2)	**24.** (1)
25. (3)	**26.** (2)	**27.** (1)	**28.** (1)
29. (3)	**30.** (3)	**31.** (1)	**32.** (3)
33. (4)	**34.** (2)	**35.** (3)	**36.** (4)
37. (2)	**38.** (1)	**39.** (2)	**40.** (4)
41. (4)	**42.** (2)	**43.** (4)	**44.** (3)
45. (2)	**46.** (4)	**47.** (2)	**48.** (4)
49. (2)	**50.** (1)	**51.** (2)	**52.** (3)
53. (3)	**54.** (2)	**55.** (3)	**56.** (2)
57. (3)	**58.** (3)	**59.** (3)	**60.** (3)
61. (*)	**62.** (4)	**63.** (1)	**64.** (1)
65. (2)	**66.** (3)	**67.** (1)	**68.** (4)
69. (4)	**70.** (1)	**71.** (2)	**72.** (3)
73. (4)	**74.** (4)	**75.** (3)	**76.** (2)
77. (2)	**78.** (3)	**79.** (2)	**80.** (3)
81. (1)	**82.** (2)	**83.** (2)	**84.** (4)
85. (1)	**86.** (2)	**87.** (2)	**88.** (1)
89. (2)	**90.** (3)		

TYPE-II

1. (2)	**2.** (4)	**3.** (3)	**4.** (1)
5. (2)	**6.** (3)	**7.** (3)	**8.** (2)
9. (3)	**10.** (3)	**11.** (3)	**12.** (1)
13. (2)	**14.** (1)	**15.** (3)	**16.** (1)
17. (3)	**18.** (4)	**19.** (1)	**20.** (4)
21. (1)	**22.** (2)	**23.** (3)	**24.** (3)
25. (3)	**26.** (4)	**27.** (3)	**28.** (1)
29. (1)	**30.** (1)	**31.** (2)	**32.** (1)
33. (1)	**34.** (3)	**35.** (3)	**36.** (3)
37. (3)	**38.** (4)	**39.** (1)	**40.** (3)
41. (2)	**42.** (2)	**43.** (1)	**44.** (3)
45. (2)	**46.** (4)	**47.** (4)	**48.** (2)
49. (2)	**50.** (4)	**51.** (2)	**52.** (2)
53. (3)	**54.** (3)	**55.** (2)	**56.** (4)
57. (4)	**58.** (4)	**59.** (3)	**60.** (2)
61. (4)	**62.** (3)	**63.** (1)	

TYPE-III

1. (2)	**2.** (2)	**3.** (3)	**4.** (4)
5. (4)	**6.** (3)	**7.** (4)	**8.** (3)
9. (1)	**10.** (3)	**11.** (1)	**12.** (2)
13. (3)	**14.** (1)	**15.** (1)	**16.** (3)
17. (2)	**18.** (1)	**19.** (4)	**20.** (1)
21. (3)	**22.** (2)	**23.** (1)	**24.** (2)
25. (3)	**26.** (3)	**27.** (1)	**28.** (3)
29. (2)	**30.** (2)	**31.** (3)	**32.** (1)
33. (2)	**34.** (4)	**35.** (3)	

TYPE-IV

1. (1)	**2.** (3)	**3.** (1)	**4.** (1)
5. (3)	**6.** (2)	**7.** (4)	**8.** (3)
9. (2)	**10.** (3)	**11.** (2)	**12.** (2)
13. (3)	**14.** (1)	**15.** (1)	**16.** (4)
17. (1)	**18.** (2)	**19.** (4)	**20.** (4)
21. (4)	**22.** (1)	**23.** (2)	**24.** (4)
25. (2)	**26.** (4)	**27.** (2)	**28.** (1)
29. (4)	**30.** (4)	**31.** (3)	**32.** (4)
33. (4)	**34.** (1)	**35.** (4)	**36.** (2)
37. (3)	**38.** (3)	**39.** (4)	**40.** (3)

TYPE-V

1. (3)	**2.** (3)	**3.** (2)	**4.** (3)
5. (4)	**6.** (1)	**7.** (3)	**8.** (*)
9. (2)	**10.** (3)	**11.** (2)	**12.** (2)
13. (2)	**14.** (3)	**15.** (3)	**16.** (4)
17. (2)	**18.** (3)	**19.** (3)	**20.** (1)

21. (3)	**22.** (2)	**23.** (2)	**24.** (1)
25. (4)	**26.** (3)	**27.** (1)	**28.** (2)
29. (1)	**30.** (2)	**31.** (4)	**32.** (3)
33. (1)	**34.** (4)	**35.** (2)	**36.** (1)
37. (1)	**38.** (2)		

TYPE-VI

1. (2)	**2.** (1)	**3.** (1)	**4.** (1)
5. (4)	**6.** (1)	**7.** (1)	**8.** (4)
9. (2)	**10.** (3)	**11.** (3)	**12.** (2)
13. (2)	**14.** (1)	**15.** (4)	**16.** (4)
17. (3)	**18.** (1)	**19.** (3)	**20.** (3)
21. (2)	**22.** (1)	**23.** (3)	**24.** (4)
25. (4)	**26.** (2)	**27.** (2)	**28.** (2)
29. (1)	**30.** (*)	**31.** (1)	

TYPE-VII

1. (2)	**2.** (2)	**3.** (3)	**4.** (3)
5. (2)	**6.** (4)	**7.** (4)	**8.** (2)
9. (2)	**10.** (3)	**11.** (3)	**12.** (4)
13. (1)	**14.** (3)	**15.** (1)	**16.** (4)
17. (1)	**18.** (4)	**19.** (4)	**20.** (2)
21. (3)	**22.** (1)	**23.** (4)	**24.** (2)
25. (4)	**26.** (3)	**27.** (1)	**28.** (3)
29. (1)	**30.** (1)	**31.** (1)	

TYPE-VIII

1. (1)	**2.** (4)	**3.** (1)	**4.** (3)
5. (3)	**6.** (4)	**7.** (1)	**8.** (2)
9. (3)	**10.** (2)	**11.** (1)	**12.** (4)
13. (2)	**14.** (3)	**15.** (1)	**16.** (4)
17. (3)	**18.** (2)	**19.** (1)	**20.** (1)
21. (2)	**22.** (3)	**23.** (3)	**24.** (2)
25. (3)	**26.** (1)	**27.** (3)	**28.** (3)
29. (2)	**30.** (1)	**31.** (2)	**32.** (1)
33. (3)	**34.** (2)		

EXPLANATIONS

TYPE-I

1. (3) According to question,
A and B can do a work in 12 days

∴ (A + B)'s one day's work $= \dfrac{1}{12}$

Similarly,

(B + C)'s one day's work $= \dfrac{1}{15}$

and (C + A)'s one day's work $= \dfrac{1}{20}$

On adding all three,
∴ 2 (A + B + C)'s one days's work

$= \dfrac{1}{12} + \dfrac{1}{15} + \dfrac{1}{20} = \dfrac{10+8+6}{120} = \dfrac{1}{5}$

$\Rightarrow$ (A + B + C)'s one days's work

$= \dfrac{1}{10}$

∴ A, B and C together can finish the whole work in 10 days.

Aliter : Using Rule 5,
Time taken

$= \dfrac{2 \times 12 \times 15 \times 20}{12 \times 15 + 15 \times 20 + 20 \times 12}$

$= \dfrac{24 \times 300}{180 + 300 + 240}$

$= \dfrac{7200}{720}$ = 10 days.

2. (3) (A+B)'s 1 day's work

$= \dfrac{1}{72}$,

(B+C)'s 1 day's work $= \dfrac{1}{120}$,

(C+A)'s 1 day's work $= \dfrac{1}{90}$

On adding all three
2 (A + B + C)'s 1 days work =

$= \dfrac{1}{72} + \dfrac{1}{120} + \dfrac{1}{90}$

$= \dfrac{5 + 3 + 4}{360} = \dfrac{1}{30}$

∴ (A+B+C)'s 1 day's work $= \dfrac{1}{60}$

∴ (A+B+C) will do the work in 60 days.

Aliter : Using Rule 5,
Time taken

$= \dfrac{2 \times 72 \times 120 \times 90}{72 \times 120 + 120 \times 90 + 72 \times 90}$

$= \dfrac{1555200}{8640 + 10800 + 6480}$

$= \dfrac{1555200}{25920}$ = 60 days

3. (1) According to question,

10 men's one day's work $= \dfrac{1}{12}$

∴ 1 man one day's work

$= \dfrac{1}{12 \times 10} = \dfrac{1}{120}$

Similarly,
1 woman one day's work

$= \dfrac{1}{6 \times 10} = \dfrac{1}{60}$

∴ (1 man + 1 woman)'s one day's

work $= \dfrac{1}{120} + \dfrac{1}{60}$

$= \dfrac{1+2}{120} = \dfrac{3}{120} = \dfrac{1}{40}$

∴ (10 men + 10 women)'s one

day's work $= \dfrac{10}{40} = \dfrac{1}{4}$

Therefore, both the teams can finish the whole work in 4 days.

4. (3) According to question,
A can finish the whole work in 6 days.

∴ A's one day's work $= \dfrac{1}{6}$

Similarly,

B's one day's work $= \dfrac{1}{9}$

(A + B)'s one day's work

$= \left(\dfrac{1}{6} + \dfrac{1}{9} \right) = \left(\dfrac{3+2}{18} \right) = \dfrac{5}{18}$

Therefore, (A + B)'s can finish the

whole work in $\dfrac{18}{5}$ days i.e., 3.6

days.

Aliter : Using Rule 2,

Time taken $= \dfrac{6 \times 9}{9 + 6} = \dfrac{54}{15}$

= 3.6 days

5. (2) According to the question
Work done by A and B together

in one day $= \dfrac{1}{10}$ part

Work done by B and C together

in one day $= \dfrac{1}{15}$ part

Work done by C and A together

in one day $= \dfrac{1}{20}$ part

So,

A + B $= \dfrac{1}{10}$ ....(I)

B + C $= \dfrac{1}{15}$ ...(II)

C + A $= \dfrac{1}{20}$ ....(III)

Adding I, II, III, we get

2 (A + B + C) $= \dfrac{1}{10} + \dfrac{1}{15} + \dfrac{1}{20}$

2 (A + B + C) $= \dfrac{6+4+3}{60} = \dfrac{13}{60}$

A + B + C $= \dfrac{13}{120}$ ....(IV)

Putting the value of eqn. (I) in eqn. (IV)

$\dfrac{1}{10} + C = \dfrac{13}{120}$

$C = \dfrac{13}{120} - \dfrac{1}{10} = \dfrac{13-12}{120} = \dfrac{1}{120}$

∴ Work done in 1 day by C is

$\dfrac{1}{120}$ part

Hence, C will finish the whole work in 120 days

Aliter : Using Rule 19,

Time Taken by C$= \dfrac{2xyz}{xy - yz + zx}$

$= \dfrac{2 \times 10 \times 15 \times 20}{10 \times 15 - 15 \times 20 + 20 \times 10}$

$= \dfrac{6000}{150 - 300 + 200}$

$= \dfrac{6000}{50}$ = 120 days

6. (2) A's 1 hour's work $= \dfrac{1}{4}$

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

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

$\therefore$ C's 1 hour's work

$= \dfrac{1}{2} - \dfrac{1}{4} = \dfrac{2-1}{4} = \dfrac{1}{4}$

and B's 1 hour's work

$= \dfrac{1}{3} - \dfrac{1}{4} = \dfrac{4-3}{12} = \dfrac{1}{12}$

Hence, B alone can do the work in 12 hours.

7. (3) A's 1 day's work $= \dfrac{1}{24}$

B's 1 day's work $= \dfrac{1}{6}$

C's 1 day's work $= \dfrac{1}{12}$

(A + B + C)'s 1 day's work

$= \dfrac{1}{24} + \dfrac{1}{6} + \dfrac{1}{12} = \dfrac{1+4+2}{24} = \dfrac{7}{24}$

$\therefore$ The work will be completed by

them in $\dfrac{24}{7}$ i.e., $3\dfrac{3}{7}$ days

Aliter : Using Rule 3,
Time taken

$= \dfrac{24 \times 6 \times 12}{24 \times 6 + 6 \times 12 + 24 \times 12}$

$= \dfrac{1728}{144 + 72 + 288}$

$= \dfrac{1728}{504} = \dfrac{24}{7} = 3\dfrac{3}{7}$ days

8. (3) (A + B)'s 1 day's work $= \dfrac{1}{10}$

A's 1 day's work $= \dfrac{1}{30}$

$\therefore$ B's 1 day's work $= \dfrac{1}{10} - \dfrac{1}{30}$

$= \dfrac{3-1}{30} = \dfrac{2}{30} = \dfrac{1}{15}$

Hence, B, alone can complete the work in 15 days.
Aliter : Using Rule 4,

Time taken by B $= \dfrac{30 \times 10}{30 - 10}$

$= 15$ days

9. (3) (A + B)'s 1 day's work

$= \dfrac{1}{72}$

(B + C)'s 1 day's work $= \dfrac{1}{120}$

(C + A)'s 1 day's work $= \dfrac{1}{90}$

Adding all three,
2(A + B + C)'s 1 day's work

$= \dfrac{1}{72} + \dfrac{1}{120} + \dfrac{1}{90}$

$= \dfrac{5+3+4}{360} = \dfrac{12}{360} = \dfrac{1}{30}$

$\therefore$ (A + B + C)'s 1 day's work

$= \dfrac{1}{60}$

Now, A's 1 day's work = (A + B + C)'s 1 day's work – (B + C)'s 1 day's work

$= \dfrac{1}{60} - \dfrac{1}{120} = \dfrac{2-1}{120} = \dfrac{1}{120}$

$\therefore$ A alone can complete the work in 120 days.
Aliter : Using Rule 19,
A alone can do in

$= \dfrac{2 \times 72 \times 120 \times 90}{72 \times 120 + 120 \times 90} - 72 \times 90$

$= \dfrac{2 \times 72 \times 120 \times 90}{8640 + 10800} - 6480$

$= \dfrac{144 \times 10800}{12960} = 120$ days

10. (3) (A + B)'s 1 day's work

$= \dfrac{1}{8}$ ...(i)

(B + C)'s 1 day's work

$= \dfrac{1}{6}$ ...(ii)

(C + A)'s 1 day's work

$= \dfrac{1}{10}$ ...(iii)

On adding,
2(A + B + C)'s 1 day's work

$= \dfrac{1}{8} + \dfrac{1}{6} + \dfrac{1}{10}$

$= \dfrac{15+20+12}{120} = \dfrac{47}{120}$

$\Rightarrow$ (A + B + C)'s 1 day's work

$= \dfrac{47}{240}$

$\therefore$ (A + B + C) together will complete the work in

$\dfrac{240}{47} = 5\dfrac{5}{47}$ days.

Aliter : Using Rule 5,
Time taken

$= \dfrac{2 \times 8 \times 6 \times 10}{8 \times 6 + 6 \times 10 + 10 \times 8}$

$= \dfrac{960}{48 + 60 + 80} = \dfrac{960}{188}$

$= \dfrac{240}{47} = 5\dfrac{5}{47}$ days

11. (4) (A + B)'s 1 day's work

$= \dfrac{1}{12}$ ...(i)

(B + C)'s 1 day's work

$= \dfrac{1}{8}$ ...(ii)

(C + A)'s 1 day's work

$= \dfrac{1}{6}$ ...(iii)

On adding,
2(A + B + C)'s 1 day's work

$= \dfrac{1}{12} + \dfrac{1}{8} + \dfrac{1}{6}$

$= \dfrac{2+3+4}{24} = \dfrac{9}{24}$

$\therefore$ (A + B + C)'s 1 day's work

$= \dfrac{9}{24 \times 2} = \dfrac{9}{48}$ ...(iv)

On, subtracting (iii) from (iv),

B's 1 day's work $= \dfrac{9}{48} - \dfrac{1}{6}$

$= \dfrac{9-8}{48} = \dfrac{1}{48}$

$\therefore$ B can complete the work in 48 days.
Aliter : Using Rule 19,
B alone can do in

$= \dfrac{2 \times 12 \times 8 \times 6}{12 \times 8 + 8 \times 6 + 6 \times 12}$

$= \dfrac{24 \times 48}{96 + 48 + 72}$

$= \dfrac{24 \times 48}{-96 + 120}$

$= \dfrac{24 \times 48}{24}$ = 48 days

12. (4) Work done by (A + B) in 1 day

$= \dfrac{1}{30}$

Work done by (B + C) in 1 day =

$\dfrac{1}{20}$

Work done by (C + A) in 1 day =

$\dfrac{1}{15}$

On adding,
Work done by 2 (A + B + C) in 1

day $= \dfrac{1}{30} + \dfrac{1}{20} + \dfrac{1}{15}$

$= \dfrac{2 + 3 + 4}{60}$

$= \dfrac{9}{60} = \dfrac{3}{20}$

∴ Work done by (A + B + C) in 1

day $= \dfrac{3}{40}$

∴ (A + B + C) will do the work in

$\dfrac{40}{3} = 13\dfrac{1}{3}$ days

Aliter : Using Rule 5,
Time taken

$= \dfrac{2 \times 30 \times 20 \times 15}{30 \times 20 + 20 \times 15 + 15 \times 30}$

$= \dfrac{18000}{600 + 300 + 450}$

$= \dfrac{18000}{1350} = 13\dfrac{1}{3}$ days

13. (1) Let A and C complete the work in x days

(A + B)'s 1 day's work = $\dfrac{1}{8}$

(B + C)'s 1 day's work = $\dfrac{1}{12}$

(C + A)'s 1 day's work = $\dfrac{1}{x}$

Then (A + B + B + C + C + A)'s 1

day's work = $\dfrac{1}{8} + \dfrac{1}{12} + \dfrac{1}{x}$

2(A + B + C)'s 1 day's work

$= \dfrac{3x + 2x + 24}{24x}$

(A + B + C)'s 1 day's work

$= \dfrac{5x + 24}{24x \times 2}$

According to the question,

(A + B + C)'s 1 day's work = $\dfrac{1}{6}$

$\dfrac{1}{6} = \dfrac{5x + 24}{48x}$

$\Rightarrow$ 30x + 144 = 48x

∴ $x = \dfrac{144}{18}$ = 8 days.

Aliter : Using Rule 5,
Let the time taken by A and C bc
x days
$\Rightarrow$ Total time taken

$= \dfrac{2 \times 8 \times 12 \times x}{8 \times 12 + 12 \times x + 8 \times x}$

6 $= \dfrac{192x}{96 + 20x}$

576 + 120x = 192x
72x = 576
x = 8
$\Rightarrow$ Time taken by A and C is 8 days.

14. (1) A's 1 day's work $= \dfrac{1}{12}$

(A+B)'s 1 day's work $= \dfrac{1}{8}$

∴ B's 1 day's work

$= \dfrac{1}{8} - \dfrac{1}{12} = \dfrac{3 - 2}{24} = \dfrac{1}{24}$

∴ B alone can do the work in 24 days.

Aliter : Using Rule 4,

Time taken by B $= \dfrac{12 \times 8}{12 - 8}$

$= 24$ days

15. (2) (A + B)'s 1 day's work = $\dfrac{1}{18}$

(B + C)'s 1 day's work = $\dfrac{1}{9}$

(A + C)'s 1 day's work $= \dfrac{1}{12}$

Adding all the above three,

2 (A + B + C)'s 1 day's work

$= \dfrac{1}{18} + \dfrac{1}{9} + \dfrac{1}{12}$

$= \dfrac{2 + 4 + 3}{36} = \dfrac{9}{36} = \dfrac{1}{4}$

∴ (A + B + C)'s 1 day's work = $\dfrac{1}{8}$

∴ B's 1 day's work = (A + B + C)'s 1 day's work – (A + C)'s 1 day's work

$= \dfrac{1}{8} - \dfrac{1}{12} = \dfrac{3 - 2}{24} = \dfrac{1}{24}$

Hence, B alone can do the work in 24 days.

Aliter : Using Rule 19,
B alone can do in

$= \dfrac{2 \times 18 \times 9 \times 12}{-18 \times 9 + 12 \times 9 + 12 \times 18}$

$= \dfrac{36 \times 108}{-162 + 108 + 216}$

$= \dfrac{36 \times 108}{162}$ = 24 days

16. (1) A alone can complete the work in 42 days working 1 hour daily. Similarly, B will take 56 days working 1 hour daily.

A 's 1 day's work = $\dfrac{1}{42}$

B 's 1 day's work = $\dfrac{1}{56}$

(A + B) 's 1 day's work

$= \dfrac{1}{42} + \dfrac{1}{56} = \dfrac{4 + 3}{168} = \dfrac{7}{168}$

∴ Time taken by (A + B) working

8 hours daily = $\dfrac{168}{7 \times 8}$ = 3 days

Aliter : Using Rule 21,
Here, h_1 = 6 hours, h_2 = 6 hours
d_1 = 6 days, d_2 = 8 days,
h = 8 hours
Required Time

$= \left[\dfrac{(6 \times 6) \times (6 \times 8)}{6 \times 6 + 6 \times 8} \right] \times \dfrac{1}{8}$

$= \dfrac{36 \times 64}{100} \times \dfrac{1}{8}$

$= \dfrac{36 \times 8}{100}$ = 2.88 ≈ 3 days

17. (3) (A + B)'s 1 day's work

$= \dfrac{1}{10}$ .... (i)

(B + C)'s 1 day's work

$= \dfrac{1}{12}$ .... (ii)

(C + A)'s 1 day's work

$= \dfrac{1}{15}$ .... (iii)

On adding all these,

2(A + B + C)'s 1 day's work

$= \dfrac{1}{10} + \dfrac{1}{12} + \dfrac{1}{15}$

$= \dfrac{6+5+4}{60} = \dfrac{1}{4}$

$\therefore$ (A + B + C)'s 1 day's work

$= \dfrac{1}{8}$ .... (iv)

$\therefore$ C's 1 day's work

$= \dfrac{1}{8} - \dfrac{1}{10} = \dfrac{5-4}{40} = \dfrac{1}{40}$

$\therefore$ C will finish the work in 40 days.

Aliter : Using Rule 19,

C alone can do in

$= \dfrac{2 \times 10 \times 12 \times 15}{10 \times 12 - 12 \times 15 + 10 \times 15}$

$= \dfrac{240 \times 15}{120 - 180 + 150}$

$= \dfrac{240 \times 15}{90}$ = 40 days

18. (1) (A + B)'s 1 day's work $= \dfrac{1}{15}$

B's 1 day's work $= \dfrac{1}{20}$

$\therefore$ A's 1 day's work

$= \dfrac{1}{15} - \dfrac{1}{20} = \dfrac{4-3}{60} = \dfrac{1}{60}$

$\therefore$ A alone will do the work in 60 days.

Aliter : Using Rule 4,

A alone do in $= \dfrac{15 \times 20}{20 - 15}$

$= \dfrac{15 \times 20}{5}$ = 60 days

19. (4) (A + B)'s 1 day's work $= \dfrac{1}{12}$

(B + C)'s 1 day's work $= \dfrac{1}{15}$

(C + A)'s 1 day's work $= \dfrac{1}{20}$

On adding,

2 (A + B + C)'s 1 day's work

$= \dfrac{1}{12} + \dfrac{1}{15} + \dfrac{1}{20}$

$= \dfrac{5+4+3}{60} = \dfrac{1}{5}$

$\therefore$ (A+B+C)'s 1 day's work $= \dfrac{1}{10}$

$\therefore$ B's 1 day's work

$= \dfrac{1}{10} - \dfrac{1}{20} = \dfrac{2-1}{20} = \dfrac{1}{20}$

$\therefore$ B alone can do the work in 20 days.

Aliter : Using Rule 19,

B alone can do in

$= \dfrac{2 \times 12 \times 15 \times 20}{-12 \times 15 + 15 \times 20 + 20 \times 12}$

$= \dfrac{24 \times 300}{-180 + 300 + 240}$

$= \dfrac{24 \times 300}{360}$ = 20 days

20. (3) (P + Q)'s 1 day's work

$= \dfrac{1}{12}$ ...(i)

(Q + R)'s 1 day's work $= \dfrac{1}{15}$ ...(ii)

(R + P)'s 1 day's work $= \dfrac{1}{20}$ ...(iii)

Adding all three equations,

2 (P + Q + R)'s 1 day's work

$= \dfrac{1}{12} + \dfrac{1}{15} + \dfrac{1}{20} = \dfrac{5+4+3}{60}$

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

$\therefore$ (P + Q + R)'s 1 day's work

$= \dfrac{1}{10}$ ...(iv)

$\therefore$ P's 1 day's work

$= \dfrac{1}{10} - \dfrac{1}{15} = \dfrac{3-2}{30} = \dfrac{1}{30}$

$\therefore$ P alone will complete the work in 30 days.

21. (3) (A + B)'s 1 day's work $= \dfrac{1}{8}$

(B + C)'s 1 day's work $= \dfrac{1}{12}$

(C + A)'s 1 day's work $= \dfrac{1}{8}$

On adding,

2 (A + B + C)'s 1 day's work

$= \dfrac{1}{8} + \dfrac{1}{12} + \dfrac{1}{8} = \dfrac{3+2+3}{24}$

$= \dfrac{8}{24} = \dfrac{1}{3}$

$\therefore$ (A + B + C)'s 1 day's work $= \dfrac{1}{6}$

Hence, the work will be completed in 6 days.

Method 2 :

$\boxed{\text{Quicker Approach}}$

Time $= \dfrac{2xyz}{xy + yz + zx}$

(Here, $x = 8$, $y = 12$; $z = 8$)

$= \dfrac{2 \times 8 \times 12 \times 8}{96 + 96 + 64} = \dfrac{2 \times 8 \times 12 \times 8}{256}$

= 6 days.

Aliter : Using Rule 5,

Time taken

$= \dfrac{2 \times 8 \times 12 \times 8}{8 \times 12 + 12 \times 8 + 8 \times 8}$

$= \dfrac{16 \times 96}{96 + 96 + 64}$

$= \dfrac{16 \times 96}{256}$ = 6 days

22. (3) (A + B)'s 1 day's work $= \dfrac{1}{10}$

(B + C)'s 1 day's work $= \dfrac{1}{6}$

(C + A)'s 1 day's work $= \dfrac{1}{12}$

Adding all three

2 (A + B + C)'s 1 day's work

$= \dfrac{1}{10} + \dfrac{1}{6} + \dfrac{1}{12} = \dfrac{6+10+5}{60}$

$= \dfrac{21}{60} = \dfrac{7}{20}$

$\therefore$ (A + B + C)'s 1 day's work $= \dfrac{7}{40}$

$\therefore$ All three together will complete the work in $\dfrac{40}{7} = 5\dfrac{5}{7}$ days

Aliter : Using Rule 5,

Time taken

$$= \frac{2 \times 10 \times 6 \times 12}{10 \times 6 + 6 \times 12 + 12 \times 10}$$

$$= \frac{1440}{60 + 72 + 120}$$

$$= \frac{1440}{252} = \frac{40}{7}$$

$$= 5\frac{5}{7} \text{ days}$$

23. (2) (A + B)'s 1 hour's work

$$= \frac{2}{9} \qquad\qquad .....(i)$$

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

$$\qquad\qquad ......(ii)$$

(C + A)'s 1 hour's work

$$= \frac{4}{9} \qquad\qquad .....(iii)$$

Adding all three equations,
2 (A + B + C)'s 1 hour's work

$$= \frac{2}{9} + \frac{1}{3} + \frac{4}{9} = \frac{2+3+4}{9} = 1$$

∴ A, B and C together will complete the work in 2 hours.
Aliter : Using Rule 5,
Time taken

$$= \frac{2 \times \frac{9}{2} \times 3 \times \frac{9}{4}}{\frac{9}{2} \times 3 + 3 \times \frac{9}{4} + \frac{9}{2} \times \frac{9}{4}}$$

$$= \frac{\frac{18 \times 27}{8}}{\frac{27}{2} + \frac{27}{4} + \frac{81}{8}}$$

$$= \frac{18 \times 27}{8} \times \frac{8}{(108 + 54 + 81)}$$

$$= \frac{18 \times 27}{243} = 2 \text{ hours}$$

24. (1) (A + B)'s 1 day's work $= \frac{1}{18}$

(B + C)'s 1 day's work $= \frac{1}{24}$

(A + C)'s 1 day's work $= \frac{1}{36}$

Adding all three,
2 (A + B + C)'s 1 day's work

$$= \frac{1}{18} + \frac{1}{24} + \frac{1}{36}$$

$$= \frac{4+3+2}{72} = \frac{1}{8}$$

∴ (A + B + C)' 1 day's work $= \frac{1}{16}$

∴ A, B and C together will complete the work in 16 days.
Aliter : Using Rule 5,
Total time taken

$$= \frac{2 \times 18 \times 24 \times 36}{18 \times 24 + 24 \times 36 + 36 \times 18}$$

$$= \frac{36 \times 24 \times 36}{432 + 864 + 648}$$

$$= \frac{31104}{1944} = 16 \text{ days}$$

25. (3) (A + B)'s 1 day's work $= \frac{1}{5}$

A's 1 day's work $= \frac{1}{8}$

∴ B's 1 day's work $= \frac{1}{5} - \frac{1}{8}$

$$= \frac{8-5}{40} = \frac{3}{40}$$

∴ B alone will complete the work

in $\frac{40}{3} = 13\frac{1}{3}$ days.

Aliter : Using Rule 4,

Time taken by B $= \frac{5 \times 8}{8 - 5}$

$$= \frac{40}{3} = 13\frac{1}{3} \text{ days}$$

26. (2) Work done by (A + B + C) in 1

minute $= \frac{1}{30}$

Work done by (A + B) in 1 minute

$$= \frac{1}{50}$$

∴ Work done by C alone in 1 minute

$$= \frac{1}{30} - \frac{1}{50}$$

$$= \frac{5-3}{150} = \frac{2}{150} = \frac{1}{75}$$

∴ C alone will complete the work in 75 minutes.

Aliter : Using Rule 4,

C alone can do in $= \frac{xy}{x-y}$

$$= \frac{50 \times 30}{50 - 30} = 75 \text{ minutes}$$

27. (1) (A + B)'s 1 day's work $= \frac{1}{8}$

(B + C)'s 1 day's work $= \frac{1}{24}$

(C + A)'s 1 day's work $= \frac{7}{60}$

On adding all three,
2 (A + B + C)'s 1 day's work

$$= \frac{1}{8} + \frac{1}{24} + \frac{7}{60}$$

$$= \frac{15 + 5 + 14}{120} = \frac{34}{120}$$

∴ (A + B + C)'s 1 day's work

$$= \frac{17}{120}$$

∴ C's 1 day's work

$$= \frac{17}{120} - \frac{1}{8} = \frac{17 - 15}{120} = \frac{1}{60}$$

∴ C alone will complete the work in 60 days.
Aliter : Using Rule 19,

C alone can do in $= \frac{2xyz}{xy - yz + zx}$

$$= \frac{2 \times 8 \times 24 \times \frac{60}{7}}{8 \times 24 - 24 \times \frac{60}{7} + \frac{60}{7} \times 8}$$

$$= \frac{\frac{23040}{7}}{192 - \frac{1440}{7} + \frac{480}{7}}$$

$$= \frac{\frac{23040}{7}}{\frac{1344 - 1440 + 480}{7}}$$

$$= \frac{23040}{7} \times \frac{7}{384} = 60 \text{ days}$$

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

(B + C)'s 1 day's work $= \frac{1}{12}$

(C + A)'s 1 day's work $= \dfrac{1}{15}$

On adding all three,
2(A + B + C)'s 1 day's work

$= \dfrac{1}{10} + \dfrac{1}{12} + \dfrac{1}{15}$

$= \dfrac{6+5+4}{60} = \dfrac{15}{60} = \dfrac{1}{4}$

$\therefore$ (A + B + C)'s 1 day's work $= \dfrac{1}{8}$

$\therefore$ A's 1 day's work $= = \dfrac{1}{8} - \dfrac{1}{12}$

$= \dfrac{3-2}{24} = \dfrac{1}{24}$

$\therefore$ A will complete the work in 24 days.

Aliter : Using Rule 19,
A alone can do in

$= \dfrac{2 \times x \times y \times z}{xy + yz - zx}$

$= \dfrac{2 \times 10 \times 12 \times 15}{10 \times 12 + 12 \times 15 - 15 \times 10}$

$= \dfrac{3600}{120 + 180 - 150}$

$= \dfrac{3600}{150}$ = 24 days

29. (3) (A + B)'s 1 day's work $= \dfrac{1}{20}$

(B + C)'s 1 day's work $= \dfrac{1}{10}$

(C + A)'s 1 day's work $= \dfrac{1}{12}$

On adding all three,
2 (A + B + C)'s 1 day's work

$= \dfrac{1}{20} + \dfrac{1}{10} + \dfrac{1}{12}$

$= \dfrac{3+6+5}{60} = \dfrac{14}{60} = \dfrac{7}{30}$

$\therefore$ (A + B + C)'s 1 day's work

$= \dfrac{7}{60}$

$\therefore$ Hence, the work will be completed in $\dfrac{60}{7} = 8\dfrac{4}{7}$ days.

Aliter : Using Rule 5,

Time taken $= \dfrac{2xyz}{xy + yz + zx}$

$= \dfrac{2 \times 20 \times 10 \times 12}{20 \times 10 + 10 \times 12 + 12 \times 20}$

$= \dfrac{4800}{200 + 120 + 240}$

$= \dfrac{4800}{560} = \dfrac{60}{7} = 8\dfrac{4}{7}$ days

30. (3) Work done by A, B and C in 1 day

$= \dfrac{1}{10} + \dfrac{1}{12} + \dfrac{1}{15} = \dfrac{6+5+4}{60}$

$= \dfrac{15}{60} = \dfrac{1}{4}$

$\therefore$ Required time = 4 days

Aliter : Using Rule 3,

Time Taken $= \dfrac{xyz}{xy + yz + zx}$

$= \dfrac{10 \times 12 \times 15}{10 \times 12 + 12 \times 15 + 15 \times 10}$

$= \dfrac{1800}{120 + 180 + 150}$

$= \dfrac{1800}{450}$ = 4 days

31. (1) A's 1 day's work

$= \dfrac{1}{12} - \dfrac{1}{30} = \dfrac{5-2}{60} = \dfrac{3}{60} = \dfrac{1}{20}$

Hence, A alone will complete the work in 20 days.

Aliter : Using Rule 4,

Time taken By A $= \dfrac{xy}{x - y}$

$= \dfrac{12 \times 30}{30 - 12}$

$= \dfrac{12 \times 30}{18}$ = 20 days

32. (3) (A + B + C)'s 1 day's work

$= \dfrac{1}{12} + \dfrac{1}{24} + \dfrac{1}{36}$

$= \dfrac{6+3+2}{72} = \dfrac{11}{72}$

$\therefore$ (A + B + C) together will complete the work in $\dfrac{72}{11}$ days

$= 6\dfrac{6}{11}$ days.

Aliter : Using Rule 3,

Time taken $= \dfrac{x \times y \times z}{xy + yz + zx}$

$= \dfrac{12 \times 24 \times 36}{12 \times 24 + 24 \times 36 + 12 \times 36}$

$= \dfrac{24 \times 36}{24 + 72 + 36} = \dfrac{24 \times 36}{132}$

$= \dfrac{72}{11}$ days $= 6\dfrac{6}{11}$ days

33. (4) (A + B)'s 1 day's work

$= \dfrac{1}{6} + \dfrac{1}{12} = \dfrac{2+1}{12} = \dfrac{1}{4}$

$\therefore$ A and B together will complete the work in 4 days.

Aliter : Using Rule 2,

Time taken $= \dfrac{xy}{x + y}$

$= \dfrac{6 \times 12}{6 + 12}$

$= \dfrac{72}{18}$ = 4 days

34. (2) (A + B)'s 1 day's work $= \dfrac{1}{36}$

(B + C)'s 1 day's work $= \dfrac{1}{60}$

(C + A)'s 1 day's work $= \dfrac{1}{45}$

Adding all three,
2(A + B + C)'s 1 day's work

$= \dfrac{1}{36} + \dfrac{1}{60} + \dfrac{1}{45} = \dfrac{5+3+4}{180} = \dfrac{1}{15}$

$\therefore$ (A + B + C)'s 1 day's work

$= \dfrac{1}{30}$

$\therefore$ C's 1 day's work $= \dfrac{1}{30} - \dfrac{1}{36}$

$= \dfrac{6-5}{180} = \dfrac{1}{180}$

Hence, C alone will finish the work in 180 days.

Aliter : Using Rule 19,
C alone can do in

$= \dfrac{2xyz}{xy - yz + zx}$ days

$= \dfrac{2 \times 36 \times 60 \times 45}{36 \times 60 - 60 \times 45 + 45 \times 36}$

$= \dfrac{2 \times 36 \times 60 \times 3}{144 - 180 + 108}$

$= \dfrac{72 \times 180}{252 - 180}$ = 180 days

35. (3) Ronald's 1 hour's work

$= \dfrac{32}{6} = \dfrac{16}{3}$ pages

[Pages typed in 6 hrs. = 32

∴ pages typed in 1 hr $= \dfrac{32}{6}$]

Elan's 1 hour's work = 8 pages
1 hour's work of the both

$= \dfrac{16}{3} + 8 = \dfrac{40}{3}$ pages

∴ Required time

$= \dfrac{110 \times 3}{40} = \dfrac{33}{4}$ hours

= 8 hours 15 minutes

36. (4) A 's 1day's work $= \dfrac{1}{20}$

B 's 1day's work $= \dfrac{1}{30}$

∴ (A + B)'s 1 day's work

$= \dfrac{1}{20} + \dfrac{1}{30} = \dfrac{3 + 2}{60} = \dfrac{1}{12}$

Hence, the work will be completed in 12 days. When worked together.

Aliter : Using Rule 2,

Time taken $= \dfrac{xy}{x + y}$ days

$= \dfrac{20 \times 30}{20 + 30}$ days

$= \dfrac{600}{50}$ = 12 days

37. (2) 9 hours 36 minutes

$= 9 + \dfrac{36}{60} = 9\dfrac{3}{5}$ hours

$= \dfrac{48}{5}$ hours

(A + B)'s 1 hour's work $= \dfrac{5}{48}$

C's 1 hour's work $= \dfrac{1}{48}$

(A + B + C)'s 1 hour's work

$= \dfrac{5}{48} + \dfrac{1}{48} = \dfrac{1}{8}$ .....(i)

A's 1 hours work = (B + C)'s 1 hour's work .....(ii)
From equations (i) and (ii),

2 × (A's 1 hour's work) $= \dfrac{1}{8}$

A's 1 hour's work $= \dfrac{1}{16}$

∴ B's 1 hour's work $= \dfrac{5}{48} - \dfrac{1}{16}$

$= \dfrac{5 - 3}{48} = \dfrac{1}{24}$

∴ B alone will finish the work in 24 hours

38. (1) Work done by A and B in 5 days

$= 5\left(\dfrac{1}{12} + \dfrac{1}{15}\right) = 5\left(\dfrac{5 + 4}{60}\right)$

$= 5 \times \dfrac{9}{60} = \dfrac{9}{12} = \dfrac{3}{4}$

Remaining work $= 1 - \dfrac{3}{4} = \dfrac{1}{4}$

∴ Time taken by A

$= \dfrac{1}{4} \times 12 = 3$ days

Aliter : Using Rule 20,
Here, m = 12, n = 15, p = 5
Time taken by A

$= \dfrac{mn - p(m + n)}{n}$ days

$= \dfrac{12 \times 15 - 5(12 + 15)}{15}$

$= \dfrac{180 - 135}{15}$ = 3 days

39. (2) B's 1 day's work = (A + B)'s 1 day's work – A's 1 day's work

$= \dfrac{1}{12} - \dfrac{1}{28} = \dfrac{7 - 3}{84}$

$= \dfrac{4}{84} = \dfrac{1}{21}$

∴ Required time = 21 days
Aliter : Using Rule 4,

Time taken by B $= \dfrac{xy}{x - y}$ days

$= \dfrac{12 \times 28}{28 - 12}$

$= \dfrac{12 \times 28}{16}$ = 21 days

40. (4) A's 1 day's work $= \dfrac{1}{m}$

B's 1 day's work $= \dfrac{1}{n}$

∴ (A + B)'s 1 day's work

$= \dfrac{1}{m} + \dfrac{1}{n}$

$= \dfrac{n + m}{mn} = \dfrac{m + n}{mn}$

∴ Required time $= \dfrac{mn}{m + n}$

41. (4) Let A, B and C together do the work in x hours.
∴ Time taken by A
= $(x + 6)$ hours
Time taken by B = $(x + 1)$ hours
Time taken by C = $2x$ hours

∴ $\dfrac{1}{x + 6} + \dfrac{1}{x + 1} + \dfrac{1}{2x} = \dfrac{1}{x}$

$\Rightarrow \dfrac{1}{x + 6} + \dfrac{1}{x + 1} = \dfrac{1}{x} - \dfrac{1}{2x}$

$= \dfrac{1}{2x}$

$\Rightarrow \dfrac{1}{x + 6} = \dfrac{1}{2x} - \dfrac{1}{x + 1}$

$= \dfrac{x + 1 - 2x}{2x(x + 1)}$

$\Rightarrow \dfrac{1}{x + 6} = \dfrac{1 - x}{2x^2 + 2x}$

$\Rightarrow 2x^2 + 2x = x + 6 - x^2 - 6x$

$\Rightarrow 3x^2 + 7x - 6 = 0$

$\Rightarrow 3x^2 + 9x - 2x - 6 = 0$

$\Rightarrow 3x(x + 3) - 2(x + 3) = 0$

$\Rightarrow (3x - 2)(x + 3) = 0$

$\Rightarrow 3x - 2 = 0$ as $x + 3 \neq 0$

$\Rightarrow x = \dfrac{2}{3}$

∴ Time taken by A $= 6 + \dfrac{2}{3}$

$= \dfrac{18 + 2}{3} = \dfrac{20}{3}$ hours

Time taken by B = 1 + $\frac{2}{3}$

= $\frac{5}{3}$ hours

∴ (A + B)'s 1 hour's work

= $\frac{3}{20}$ + $\frac{3}{5}$ = $\frac{3+12}{20}$

= $\frac{15}{20}$ = $\frac{3}{4}$

∴ Required time = $\frac{4}{3}$ hours

42. (2) Time taken by B and C
= x days (let)
∴ Time taken by A = $3x$ days
∴ Part of work done by A, B and C in 1 day

= $\frac{1}{x}$ + $\frac{1}{3x}$ = $\frac{3+1}{3x}$ = $\frac{4}{3x}$

∴ $\frac{4}{3x}$ = $\frac{1}{24}$ ⇒ 3x = 4 × 24

⇒ x = $\frac{4 \times 24}{3}$ = 32 days

∴ Time taken by A = 32 × 3
= 96 days

43. (4) A's 1 day's work = $\frac{1}{4}$

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

(A + B)'s 1 day's work

= $\frac{1}{4}$ + $\frac{1}{12}$

= $\frac{3+1}{12}$ = $\frac{4}{12}$ = $\frac{1}{3}$

∴ Required time = 3 days
Aliter : Using Rule 2,

Time taken = $\frac{xy}{x+y}$ days

= $\frac{4 \times 12}{4+12}$

$\frac{48}{16}$ = 3 days

44. (3) A does $\frac{1}{4}$ work in 10 days

∴ A will do 1 work in
10 × 4 = 40 days

Similarly, B will do the same work
in 20 × 3 = 60 days
∴ (A + B)'s 1 day's work

= $\frac{1}{40}$ + $\frac{1}{60}$

= $\frac{3+2}{120}$ = $\frac{5}{120}$ = $\frac{1}{24}$

∴ Required time = 24 days
Aliter : Using Rule 2,
Time taken by A to finish the work
= 40 days
Time taken by B to finish the work
= 60 days
Total time taken

= $\frac{x \times y}{x+y}$ days

= $\frac{40 \times 60}{40+60}$

= $\frac{40 \times 60}{100}$ = 24 days

45. (2) Using Rule 1,
$M_1 D_1 T_1 = M_2 D_2 T_2$
⇒ 15 × 20 × 8 = 20 × 12 × T_2

⇒ $T_2 = \frac{15 \times 20 \times 8}{20 \times 12}$ = 10 hours

46. (4) (Raj + Ram)'s 1 day's work

= $\frac{1}{10}$

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

∴ Ram's 1 day's work

= $\frac{1}{10} - \frac{1}{12} = \frac{6-5}{60} = \frac{1}{60}$

∴ Required time = 60 days
Aliter : Using Rule 4,

Time taken = $\frac{10 \times 12}{12-10}$

= 60 days

47. (2) A's 1 day's work = $\frac{1}{9}$

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

Work done in first 2 days = A's 1
day's work + B's 1 day's work

= $\frac{1}{9}$ + $\frac{1}{15}$ = $\frac{5+3}{45}$ = $\frac{8}{45}$

∴ Work done in first 10 days

= $\frac{8 \times 5}{45}$ = $\frac{8}{9}$

Remaining work = 1 – $\frac{8}{9}$ = $\frac{1}{9}$

Now, it is turn of 'A' for the eleventh day.

∴ Time taken by 'A' in doing $\frac{1}{9}$

work = $\frac{1}{9}$ × 9 = 1 day

∴ Required time = 10 + 1
= 11 days
48. (4) Using Rule 1,

15 men complete $\frac{1}{3}$ work in 7

days.

∴ Time taken in doing 1 work
= 3 × 7 = 21 days
∴ $M_1 D_1 = M_2 D_2$
⇒ 15 × 21 = M_2 × 5

⇒ $M_2 = \frac{15 \times 21}{5}$ = 63 days

49. (2) (x and y)'s 1 hour work

= $\frac{1}{4}$ + $\frac{1}{8}$ = $\frac{2+1}{8}$ = $\frac{3}{8}$

∴ Required time = $\frac{8}{3}$ hours

= $\left(\frac{8}{3} \times 60\right)$ minutes

= 160 minutes
Aliter : Using Rule 2,

Time taken = $\frac{xy}{x+y}$ hours

= $\frac{4 \times 8}{4+8}$ = 160 minutes

50. (1) Number of pages copied by

x in hour = $\frac{80}{20}$ = 4

Number of pages copied by x

and y in 1 hour = $\frac{135}{27}$ = 5

∴ Number of pages copied by
y in 1 hour = 5 – 4 = 1
∴ Required time = 20 hours.

51. (2) (A + B)'s 1 day's work

$= \dfrac{1}{15}$ ....(i)

(B + C)'s 1 day's work

$= \dfrac{1}{12}$ .... (ii)

(C + A)'s 1 day's work

$= \dfrac{1}{10}$ .... (iii)

On adding all three equations,

2 (A + B + C)'s 1 day's work

$= \dfrac{1}{15} + \dfrac{1}{12} + \dfrac{1}{10}$

$= \dfrac{4+5+6}{60} = \dfrac{15}{60} = \dfrac{1}{4}$

∴ (A + B + C)'s 1 day's work

$= \dfrac{1}{8}$ ....(iv)

By equation (iv) – (ii),

A's 1 day's work

$= \dfrac{1}{8} - \dfrac{1}{12}$

$= \dfrac{3-2}{24} = \dfrac{1}{24}$

∴ Required time = 24 days

Aliter : Using Rule 19,

A alone can do in $= \dfrac{2xyz}{xy + yz - zx}$

$= \dfrac{2 \times 15 \times 12 \times 10}{15 \times 12 + 12 \times 10 - 15 \times 10}$

$= \dfrac{2 \times 3 \times 12 \times 10}{36 + 24 - 30}$

$= \dfrac{720}{60 - 30} = 24$ days

52. (3) (A + B)'s 1 day's work

$= \dfrac{1}{25} + \dfrac{1}{30} = \dfrac{6+5}{150} = \dfrac{11}{150}$

∴ (A + B)'s 5 days' work

$= \dfrac{5 \times 11}{150} = \dfrac{11}{30}$

∴ Remaining work

$= 1 - \dfrac{11}{30} = \dfrac{30-11}{30} = \dfrac{19}{30}$

53. (3) (A + B)'s 1 day's work $= \dfrac{1}{6}$

A's 1 day's work $= \dfrac{1}{18}$

∴ B's 1 day's work $= \dfrac{1}{6} - \dfrac{1}{18}$

$= \dfrac{3-1}{18} = \dfrac{2}{18} = \dfrac{1}{9}$

∴ Required time = 9 days

Aliter : Using Rule 4,

Time taken by B $= \dfrac{xy}{x-y}$ days

$= \dfrac{6 \times 18}{18 - 6}$

= 9 days

54. (2) A's 2 days' work = B's 3 days' work

∴ Time taken by A = 8 days

∴ Time taken by B $= \dfrac{8}{2} \times 3$

= 12 days

55. (3) Using Rule 1,

Men	Working hours	Days
16↑	14↑	12↓
28	12	x↓

$\therefore \left.\begin{array}{c} 28:16 \\ 12:14 \end{array}\right\} :: 12 : x$

$\Rightarrow 28 \times 12 \times x = 16 \times 14 \times 12$

$\Rightarrow x = \dfrac{16 \times 14 \times 12}{28 \times 12} = 8$ days

56. (2) (A + B)'s 1 day's work $= \dfrac{1}{8}$

(B + C)'s 1 day's work $= \dfrac{1}{12}$

(A + B + C)'s 1 day's work $= \dfrac{1}{6}$

∴ C's 1 day's work $= \dfrac{1}{6} - \dfrac{1}{8}$

$= \dfrac{4-3}{24} = \dfrac{1}{24}$

A's 1 day's work

$= \dfrac{1}{6} - \dfrac{1}{12} = \dfrac{2-1}{12} = \dfrac{1}{12}$

∴ (A + C)'s 1 day's work

$= \dfrac{1}{12} + \dfrac{1}{24} = \dfrac{2+1}{24} = \dfrac{1}{8}$

∴ Required time = 8 days

Aliter : Using Rule 5,

Let the time taken by A and C is x days

$\Rightarrow 6 = \dfrac{2 \times x \times 8 \times 12}{8x + 96 + 12x}$

$6 = \dfrac{x \times 192}{20x + 96}$

120x + 576 = 192x

72x = 576

x = 8 days

57. (3) Using Rule 1,

$\dfrac{M_1 D_1 T_1}{W_1} = \dfrac{M_2 D_2 T_2}{W_2}$

$\Rightarrow \dfrac{90 \times 16 \times 12}{1} = \dfrac{70 \times 24 \times 8}{W_2}$

$\Rightarrow W_2 = \dfrac{70 \times 24 \times 8}{90 \times 16 \times 12} = \dfrac{7}{9}$ parts

58. (3) Let the work be completed in x days.

According to the question,

$\dfrac{x}{16} + \dfrac{x-8}{32} + \dfrac{x-6}{48} = 1$

$\Rightarrow \dfrac{6x + 3x - 24 + 2x - 12}{96} = 1$

$\Rightarrow 11x - 36 = 96$

$\Rightarrow 11x = 96 + 36 = 132$

$\Rightarrow x = \dfrac{132}{11} = 12$ days

59. (3) (A+B)'s 1 day's work $= \dfrac{1}{15}$

(B+C)'s 1 day's work $= \dfrac{1}{10}$

(A+C)'s 1 day's work $= \dfrac{1}{12}$

On adding all three,

2(A+B+C)'s 1 day's work

$= \dfrac{1}{15} + \dfrac{1}{10} + \dfrac{1}{12} = \dfrac{4+6+5}{60}$

$= \dfrac{15}{60} = \dfrac{1}{4}$

∴ (A + B + C)'s 1 day's work $= \dfrac{1}{8}$

∴ Required time = 8 days

Aliter : Using Rule 5,

Time taken = $\dfrac{2xyz}{xy + yz + zx}$

= $\dfrac{2 \times 15 \times 10 \times 12}{15 \times 10 + 10 \times 12 + 12 \times 15}$

= $\dfrac{3600}{150 + 120 + 180}$

= $\dfrac{3600}{450}$ = 8 days

60. (3) Let the whole work be completed in x days

A's 1 day's work = $\dfrac{1}{10}$

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

C's 1 day's work = $\dfrac{1}{15}$

According to the question,
A's $(x - 5)$ days' work + B's $(x - 3)$ days' work + C's x days' work = 1

⇒ $\dfrac{x - 5}{10} + \dfrac{x - 3}{12} + \dfrac{x}{15} = 1$

⇒ $\dfrac{6(x - 5) + 5(x - 3) + 4x}{60} = 1$

⇒ $6x - 30 + 5x - 15 + 4x = 60$
⇒ $15x - 45 = 60$
⇒ $15x = 60 + 45 = 105$

⇒ $x = \dfrac{105}{15}$ = 7 days

61. (*) A's 1 day's work = $\dfrac{1}{24}$

B's 1 day's work = $\dfrac{1}{5}$

C's 1 day's work = $\dfrac{1}{12}$

∴ (A + B + C)'s 1 day's work

= $\dfrac{1}{24} + \dfrac{1}{5} + \dfrac{1}{12}$

= $\dfrac{5 + 24 + 10}{120}$

= $\dfrac{39}{120}$ = $\dfrac{13}{40}$

∴ Required time

= $\dfrac{40}{13}$ = $3\dfrac{1}{13}$ days

Aliter : Using Rule 3,

Time taken = $\dfrac{xyz}{xy + yz + zx}$

= $\dfrac{24 \times 5 \times 12}{24 \times 5 + 5 \times 12 + 24 \times 12}$

= $\dfrac{1440}{120 + 60 + 288}$

= $\dfrac{1440}{468}$ = $\dfrac{40}{13}$ = $3\dfrac{1}{13}$ days

62. (4) Using Rule 1,

Women	Length	Days
20↑	100↓	10↓
10	50	x

∴ $\left.\begin{array}{l}10 : 20 \\ 100 : 50\end{array}\right\} :: 10 : x$

⇒ $10 \times 100 \times x = 20 \times 50 \times 10$

⇒ $x = \dfrac{20 \times 50 \times 10}{1000}$ = 10 days

63. (1) A's 1 day's work = $\dfrac{1}{9}$

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

∴ (A + B)'s 1 day's work

= $\dfrac{1}{9} + \dfrac{1}{12}$

= $\dfrac{4 + 3}{36}$ = $\dfrac{7}{36}$

∴ Required time

= $\dfrac{36}{7}$ = $5\dfrac{1}{7}$ days

64. (1) Let time taken by son be x hours.
∴ Father's and son's 1 day's

work = $\dfrac{1}{30}$ + $\dfrac{1}{x}$

∴ $\dfrac{1}{30} + \dfrac{1}{x} = \dfrac{1}{20}$

⇒ $\dfrac{1}{x} = \dfrac{1}{20} - \dfrac{1}{30}$

= $\dfrac{3 - 2}{60}$ = $\dfrac{1}{60}$

∴ x = 60 hours

65. (2) Work done by (A + B) in 5 days

= $5\left(\dfrac{1}{12} + \dfrac{1}{20}\right)$ = $5\left(\dfrac{5 + 3}{60}\right)$

= $\dfrac{40}{60}$ = $\dfrac{2}{3}$

Remaining work = $1 - \dfrac{2}{3}$ = $\dfrac{1}{3}$

∵ Time taken by C in doing $\dfrac{1}{3}$

work = 3 days
∴ Required time = 3 × 3
= 9 days

66. (3) A's 1 day's work = $\dfrac{1}{7}$

B's 1 day's work = $\dfrac{1}{9}$

∴ (A + B)'s 1 day's work

= $\dfrac{1}{7}$ + $\dfrac{1}{9}$

= $\dfrac{9 + 7}{63}$ = $\dfrac{16}{63}$

∴ Required time = $\dfrac{63}{16}$ days

= $3\dfrac{15}{16}$ days

67. (1) (A + B)'s 1 day's work = $\dfrac{1}{24}$

(A + B + C)'s 1 day's work = $\dfrac{1}{8}$

∴ C's 1 day's work = $\dfrac{1}{8}$ – $\dfrac{1}{24}$

= $\dfrac{3 - 1}{24}$ = $\dfrac{2}{24}$ = $\dfrac{1}{12}$

∴ Required time = 12 days

68. (4) (A + B)'s 1 day's work

= $\dfrac{1}{12} + \dfrac{1}{24}$

= $\dfrac{2 + 1}{24}$ = $\dfrac{3}{24}$ = $\dfrac{1}{8}$

∴ Required time = 8 days

69. (4) (A + B)'s 1 day's work

= $\dfrac{1}{11} + \dfrac{1}{20}$

= $\dfrac{20 + 11}{220}$ = $\dfrac{31}{220}$

(A + C)'s 1 day's work

$= \dfrac{1}{11} + \dfrac{1}{55}$

$= \dfrac{5+1}{55} = \dfrac{6}{55}$

Work done in first two days

$= \dfrac{31}{220} + \dfrac{6}{55}$

$= \dfrac{31+24}{220} = \dfrac{55}{220} = \dfrac{1}{4}$

∴ Required time = 2 × 4
= 8 days

70. (1) (A + B)'s 1 day's work $= \dfrac{1}{6}$

A's 1 day's work $= \dfrac{1}{9}$

∴ B's 1 day's work $= \dfrac{1}{6} - \dfrac{1}{9}$

$= \dfrac{3-2}{18} = \dfrac{1}{18}$

∴ Required time = 18 days

71. (2) ∵ A's 1 day's work $= \dfrac{1}{18}$

∴ A's 12 days' work $= \dfrac{12}{18} = \dfrac{2}{3}$

∴ Remaining work

$= 1 - \dfrac{2}{3} = \dfrac{1}{3}$

∵ Time taken by B in doing $\dfrac{1}{3}$

work = 8 days

∴ Time taken by B in doing whole work

= 3 × 8 = 24 days

72. (3) (A + B)'s 1 day's work

$= \dfrac{1}{8}$ .... (i)

(B + C)'s 1 day's work

$= \dfrac{1}{12}$ .... (ii)

(A + B + C)'s 1 day's work

$= \dfrac{1}{6}$ .... (iii)

By equations (i) + (ii) – (iii),
B's 1 day's work

$= \dfrac{1}{8} + \dfrac{1}{12} - \dfrac{1}{6}$

$= \dfrac{3+2-4}{24} = \dfrac{1}{24}$ .... (iv)

By equations (iii) – (iv),
(A + C)'s 1 day's work

$= \dfrac{1}{6} - \dfrac{1}{24}$

$= \dfrac{4-1}{24} = \dfrac{3}{24} = \dfrac{1}{8}$

∴ Required time = 8 days

73. (4) Let time taken by A be x days.
∴ Time taken by B = 3x days
According to the question,

$\dfrac{1}{x} + \dfrac{1}{3x} = \dfrac{1}{9}$

$\Rightarrow \dfrac{3+1}{3x} = \dfrac{1}{9}$

$\Rightarrow 3x = 4 \times 9$

$\Rightarrow x = \dfrac{4 \times 9}{3} = 12$ days

74. (4)

Cats	Rats	Days
100 ↑	100 ↓	100 ↓
4	4 ↓	x ↓

∴ $\left.\begin{array}{l} 4 : 100 \\ 100 : 4 \end{array}\right\}$: : 100 : x

$\Rightarrow 4 \times 100 \times x = 100 \times 100 \times 4$

$\Rightarrow x = \dfrac{100 \times 100 \times 4}{4 \times 100}$

= 100 days

75. (3) X's 1 day's work $= \dfrac{1}{p}$

Y's 1 day's work $= \dfrac{1}{q}$

(X + Y)'s 1 day's work

$= \dfrac{1}{p} + \dfrac{1}{q} = \dfrac{q+p}{pq}$

∴ Required time $= \dfrac{pq}{p+q}$

76. (2) A's 1 day's work $= \dfrac{1}{8}$

B's 1 day's work $= \dfrac{1}{10}$

(A + B)'s 1 day's work

$= \dfrac{1}{8} + \dfrac{1}{10} = \dfrac{5+4}{40} = \dfrac{9}{40}$

∴ Required time $= \dfrac{40}{9}$ days

77. (2) (A + B)'s 1 day's work $= \dfrac{1}{36}$

(B + C)'s 1 day's work $= \dfrac{1}{24}$

(A + C)'s 1 day's work $= \dfrac{1}{18}$

On adding all three,
2 (A + B + C)'s 1 day's work

$= \dfrac{1}{36} + \dfrac{1}{24} + \dfrac{1}{18}$

$= \dfrac{2+3+4}{72}$

$= \dfrac{9}{72} = \dfrac{1}{8}$

∴ (A + B + C)'s 1 day's work

$= \dfrac{1}{16}$

∴ Required time = 16 days

78. (3) Koushik's 1 day's work

$= \dfrac{1}{x}$

Krishnu's 1 day's work $= \dfrac{1}{y}$

∴ One day's work of both

$= \dfrac{1}{x} + \dfrac{1}{y} = \dfrac{x+y}{xy}$

∴ Required time $= \dfrac{xy}{x+y}$ days

79. (2) $M_1 D_1 = M_2 D_2$
$\Rightarrow 24 \times 12 = 36 \times D_2$

$\Rightarrow D_2 = \dfrac{24 \times 12}{36} = 8$ days

80. (3) (A + B)'s 1 day's work $= \dfrac{1}{18}$

(B + C)'s 1 day's work $= \dfrac{1}{24}$

(C + A)'s 1 day's work $= \dfrac{1}{36}$

On adding all three,
2 (A + B + C)'s 1 day's work

$$= \frac{1}{18} + \frac{1}{24} + \frac{1}{36} = \frac{4+3+2}{72}$$

$$= \frac{9}{72} = \frac{1}{8}$$

∴ (A + B + C)'s 1 day's work

$$= \frac{1}{16}$$

∴ Required time = 16 days

81. (1) A's 4 days' work = B's 5 days' work

⇒ A : B = 4 : 5

Again, B : C = 6 : 7

∴ A : B : C = 4 × 6 : 5 × 6 : 5 × 7

= 24 : 30 : 35

∵ Time taken by A = 7 days

∴ Time taken by C = $\frac{35}{24}$ × 7

$$= \frac{245}{24} = 10\frac{5}{24} \text{ days}$$

82. (2)

Men	Quantity of wheat	Days
42 ↑	144	15 ↓
30	48 ↓	x ↓

∴ $\left.\begin{array}{l} 30 : 42 \\ 144 : 48 \end{array}\right\}$ :: 15 : x

⇒ 30 × 144 × x = 42 × 48 × 15

⇒ x = $\frac{42 \times 48 \times 15}{30 \times 144}$ = 7 days

83. (2) Work done by two sons in an hour

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

∴ Work done by father in an hour = $\frac{1}{2}$

∴ Required time = 2 hours

84. (4) A's 1 day's work = $\frac{1}{10}$

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

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

∴ (A + B + C)'s 1 day's work

$$= \frac{1}{10} + \frac{1}{12} + \frac{1}{15}$$

$$= \frac{6+5+4}{60} = \frac{15}{60} = \frac{1}{4}$$

∴ Required time = 4 days.

85. (1)

Men	Time	Mats
5 ↓	5 ↓	5 ↓
10 ↓	10 ↓	x ↓

∴ $\left.\begin{array}{l} 5 : 10 \\ 5 : 10 \end{array}\right\}$ :: 5 : x

⇒ 5 × 5 × x = 10 × 10 × 5

⇒ x = $\frac{10 \times 10 \times 5}{5 \times 5}$

= 20 mats

86. (2) (A + B)'s 1 day's work = $\frac{1}{12}$

A's 1 day's work = $\frac{1}{30}$

∴ B's 1 day's work = $\frac{1}{12} - \frac{1}{30}$

$$= \frac{5-2}{60} = \frac{1}{20}$$

∴ Required time = 20 days

87. (2) (Ganesh + Ram + Sohan)'s 1 day's work = $\frac{1}{16}$

(Ganesh + Ram)'s 1 day's work

$$= \frac{1}{24}$$

∴ Sohan's 1 day's work

$$= \frac{1}{16} - \frac{1}{24} = \frac{3-2}{48} = \frac{1}{48}$$

∴ Required time = 48 days

88. (1) (A + B)'s 1 day's work

$$= \frac{1}{72} \quad\quad ..... \text{ (i)}$$

(B + C)'s 1 day's work

$$= \frac{1}{120} \quad\quad ..... \text{ (ii)}$$

(C + A)'s 1 day's work

$$= \frac{1}{90} \quad\quad ..... \text{ (iii)}$$

On adding all three,

2 (A + B + C)'s 1 day's work

$$= \frac{1}{72} + \frac{1}{120} + \frac{1}{90}$$

$$= \frac{5+3+4}{360} = \frac{12}{360} = \frac{1}{30}$$

∴ (A + B + C)'s 1 day's work

$$= \frac{1}{60} \quad\quad ..... \text{ (iv)}$$

∴ A's 1 day's work

= Equation (iv) – (ii),

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

∴ Required time = 120 days

89. (2) $M_1 D_1 = M_2 D_2$

⇒ 35 × 8 = M_2 × 10

⇒ M_2 = $\frac{35 \times 8}{10}$ = 28 men

90. (3) A's 1 day's work = $\frac{1}{30}$

B's 1 day's work = $\frac{1}{40}$

∴ (A + B)'s 1 day's work

$$= \frac{1}{30} + \frac{1}{40}$$

$$= \frac{4+3}{120} = \frac{7}{120}$$

∴ Required time = $\frac{120}{7}$

$$= 17\frac{1}{7} \text{ days}$$

TYPE-II

1. (2) ∵ A can finish the work in 18 days.

∴ A's one day's' work = $\frac{1}{18}$

Similarly, B's one day's work

$$= \frac{1}{24}$$

∴ (A + B)'s 8 days' work

$$= \left(\frac{1}{18} + \frac{1}{24}\right) \times 8 = \frac{7}{72} \times 8 = \frac{7}{9}$$

∴ Remaining work = $1 - \frac{7}{9} = \frac{2}{9}$

∴ Time taken to finish the remaining work by B is $\frac{2}{9} \times 24$

$$= \frac{16}{3} = 5\frac{1}{3} \text{ days}$$

Aliter : Using Rule 20,

Here, m = 18, n= 24 and p = 8

⇒ Required Time

$$= \frac{18 \times 24 - 8(18 + 24)}{18}$$

$$= \frac{432 - 336}{18} = \frac{96}{18}$$

$$= \frac{16}{3} = 5\frac{1}{3} \text{ days}$$

2. (4) (A+B)'s 2 days' work

$$= 2\left(\frac{1}{12} + \frac{1}{18}\right) = \frac{10}{36}$$

Remaining work

$$= 1 - \frac{10}{36} = \frac{26}{36}$$

Time taken by B to complete $\frac{26}{36}$ part of work

$= \dfrac{26}{36} \times 18$ = 13 days

Aliter : Using Rule 20,
Here, m = 12, n = 18, p = 2
Time taken by B

$= \dfrac{mn - p(m+n)}{m}$

$= \dfrac{12 \times 18 - 2(12+18)}{12}$

$= \dfrac{216 - 60}{12}$ = 13 days

3. (3) A's one day's work $= \dfrac{1}{6}$

B's one day's work $= \dfrac{1}{12}$

(A + B)'s one day's work

$= \dfrac{1}{6} + \dfrac{1}{12} = \dfrac{2+1}{12} = \dfrac{1}{4}$

(A + B)'s three day's work $= \dfrac{3}{4}$

Remaining work $= 1 - \dfrac{3}{4} = \dfrac{1}{4}$

∴ Total required number of days

$= \dfrac{1}{4} \times \dfrac{12}{1} + 3$ = 3 + 3 = 6 days

Aliter : Using Rule 20,
Here, m = 6, n= 12, and p = 3
Time taken by B

$= \dfrac{mn - (m+n)p}{m}$

$= \dfrac{6 \times 12 - (6+12) \times 3}{6}$

$= \dfrac{72 - 54}{6}$ = 3 days

∴ Total number of days taken to finish the works = 6 days

4. (1) (A + B)'s day's work $= \dfrac{1}{30}$

(B + C)'s 1 day's work $= \dfrac{1}{24}$

(C + A)'s 1 day's work $= \dfrac{1}{20}$

∴ 2 (A + B + C)'s 1 day's work

$= \dfrac{1}{30} + \dfrac{1}{24} + \dfrac{1}{20}$

$= \dfrac{4+5+6}{120} = \dfrac{15}{120} = \dfrac{1}{8}$

∴ (A + B + C)'s 1 day's work

$= \dfrac{1}{16}$

∴ (A + B + C)'s 10 days' work

$= \dfrac{10}{16} = \dfrac{5}{8}$

∴ Remaining work $= 1 - \dfrac{5}{8} = \dfrac{3}{8}$

This part of work is done by A alone.

Now A's 1 day's work $= \dfrac{1}{16} - \dfrac{1}{24}$

$= \dfrac{3-2}{48} = \dfrac{1}{48}$

∴ The required no. of days

$= \dfrac{3}{8} \times 48 = 18$ days

5. (2) (A+B)'s 1 day's work $= \dfrac{1}{30}$

(A + B)'s 20 day's work $= \dfrac{20}{30} = \dfrac{2}{3}$

Remaining work $= 1 - \dfrac{2}{3} = \dfrac{1}{3}$

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

∴ Whole work will be done by A alone in 20 × 3 = 60 days.

6. (3) Using Rule 1,
Work done by 8 men in 6 days

$= \dfrac{6}{12} = \dfrac{1}{2}$

Remaining work $= 1 - \dfrac{1}{2} = \dfrac{1}{2}$

4 more men are engaged.
∴ Total number of men
= 8 + 4 = 12
By work and time formula

$\dfrac{W_1}{M_1 D_1} = \dfrac{W_2}{M_2 D_2}$, we have

$\dfrac{1}{8 \times 12} = \dfrac{\dfrac{1}{2}}{12 \times D_2}$

$\Rightarrow D_2 = \dfrac{1}{2} \times \dfrac{8 \times 12}{12}$ = 4 days.

7. (3) Work done by (B + C) in 3

days. $= 3 \times \left(\dfrac{1}{9} + \dfrac{1}{12} \right)$

$= \dfrac{1}{3} + \dfrac{1}{4} = \dfrac{4+3}{12} = \dfrac{7}{12}$

Remaining work $= 1 - \dfrac{7}{12} = \dfrac{5}{12}$

This part of work is done by A alone.

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

∴ $\dfrac{5}{12}$ part of work will be done by

A in $= 24 \times \dfrac{5}{12}$ = 10 days.

8. (2) Originally, let there be x men
Now, more men, less days
$(x + 6) : x : : 55 : 44$

So, $\dfrac{x+6}{x} = \dfrac{55}{44} = \dfrac{5}{4}$

or $5x = 4x + 24$
or $x = 24$
Aliter : Using Rule 23,
Here, D = 55. a = 6, d = 11

No of people initially = $\dfrac{a(D-d)}{d}$

$= \dfrac{6(55-11)}{11}$ = 24

9. (3) Work done by 2 (A + B) in one day

$= \dfrac{1}{10} + \dfrac{1}{15} = \dfrac{3+2}{30} = \dfrac{5}{30} = \dfrac{1}{6}$

∴ Work done by (A + B) in one

day $= \dfrac{1}{12}$

∴ (A + B) can complete the work in 12 days

10. (3) Let A worked for x days.
According to question

$\dfrac{x}{28} + \dfrac{(x+17)}{35} = 1$

$\Rightarrow \dfrac{5x + 4(x+17)}{140} = 1$

$\Rightarrow 5x + 4x + 68 = 140$
$\Rightarrow 9x = 140 - 68 = 72$
$\Rightarrow x = 8$
∴ A worked for 8 days

11. (3) Work done by (A + B) in 1 day

$= \dfrac{1}{15} + \dfrac{1}{10} = \dfrac{2+3}{30} = \dfrac{5}{30} = \dfrac{1}{6}$

$\therefore$ (A + B)'s 2 days' work $= \dfrac{2}{6} = \dfrac{1}{3}$

Remaining work

$= 1 - \dfrac{1}{3} = \dfrac{2}{3}$

This part is done by A alone.

$\because$ one work is done by A in 15 days.

$\therefore \dfrac{2}{3}$ work is done in $15 \times \dfrac{2}{3}$

= 10 days.

$\therefore$ Total number of days

= 10 + 2 = 12 days

Aliter : Using Rule 20,

Here, m = 15, n = 10, p =2

A alone completed the work in

$= \dfrac{mn - p(m+n)}{n}$ days

$= \dfrac{15 \times 10 - 2(15 + 10)}{10}$

$= \dfrac{150 - 50}{10}$ = 10 days

Total time taken= 10 + 2 = 12 days

12. (1) A's 1 day's work $= \dfrac{1}{20}$

A's 4 days' work $= \dfrac{4}{20} = \dfrac{1}{5}$

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

This part is completed by A and B together.

Now, (A + B)'s 1 day's work

$= \dfrac{1}{20} + \dfrac{1}{12}$

$= \dfrac{3+5}{60} = \dfrac{8}{60} = \dfrac{2}{15}$

Now, $\dfrac{2}{15}$ work is done by (A + B) in 1 day.

$\therefore \dfrac{4}{5}$ work is done in

$= \dfrac{15}{2} \times \dfrac{4}{5}$ = 6 days.

Hence, the work lasted for 4 + 6 = 10 days.

13. (2) (A + B)'s 1 day's work

$= \left(\dfrac{1}{45} + \dfrac{1}{40} \right) = \dfrac{8+9}{360} = \dfrac{17}{360}$

Work done by B in 23 days

$= \dfrac{1}{40} \times 23 = \dfrac{23}{40}$

Remaining work $= 1 - \dfrac{23}{40} = \dfrac{17}{40}$

Now, $\dfrac{17}{360}$ work was done by

(A + B) in 1 day

$\therefore \dfrac{17}{40}$ work was done by

(A + B) in $1 \times \dfrac{360}{17} \times \dfrac{17}{40}$ = 9 days.

Hence, A left after 9 days.

Aliter : Using Rule 26,

Here, x = 45, y = 40, a = 23

$\Rightarrow$ Required time t= $\dfrac{(y-a)}{(x+y)} \times x$

t $= \dfrac{(40 - 23) \times 45}{45 + 40}$

$= \dfrac{17 \times 45}{85}$

t = 9 days

14. (1) Suppose a man can complete the work in x days and that boys in y days.

According to question

$\dfrac{24}{x} + \dfrac{24}{y} = 1$ ...(i) × 13

$\dfrac{26}{x} + \dfrac{20}{y} = 1$ ... (ii) × 12

$\dfrac{312}{x} + \dfrac{312}{y} = 13$

$\dfrac{312}{x} + \dfrac{240}{y} = 12$

$\dfrac{ - - -}{\dfrac{72}{y} = 1}$ $\Rightarrow y = 72$ days

$\therefore$ Boys alone can complete the work in 72 days

Aliter : Using Rule 9,

Here, a = 24, b = 24 – 6 = 18

d = 26 days

Total time taken by B alone to complete the work

$= \dfrac{bd}{a - b} - 6$

($\because$ man has work d or 6 days)

$= \dfrac{18 \times 26}{24 - 18} - 6$

= 78 – 6 = 72 days

15. (3) Time taken by A

$= \dfrac{8 \times 12}{128} = \dfrac{8 \times 12}{4} = 24$ days

Work done of by B $= \dfrac{4}{12} = \dfrac{1}{3}$

Remaining work

$= 1 - \dfrac{1}{3} = \dfrac{2}{3}$

$\because$ A can complete a work in 24 days

$\therefore$ A can complete $\dfrac{2}{3}$ part of work in $24 \times \dfrac{2}{3}$ = 16 days

16. (1) A's 1 day's work $= \dfrac{1}{12}$

B's 1 day's work $= \dfrac{1}{18}$

Part of work done by A and B in first two days

$= \dfrac{1}{12} + \dfrac{1}{18} = \dfrac{3+2}{36} = \dfrac{5}{36}$

Part of work done by A and B in

14 days $= \dfrac{35}{36}$

[14 days to be taken randomly]

Remaining work $= 1 - \dfrac{35}{36} = \dfrac{1}{36}$

Now A will work for 15th day.

A will do the $\dfrac{1}{36}$ work in $\dfrac{1}{36} \times 12$

$= \dfrac{1}{3}$ day.

$\therefore$ Total Work will be done in

$14\dfrac{1}{3}$ days.

17. (3) Let the work be completed in x days.

According to the question,

$\dfrac{x-5}{10} + \dfrac{x-3}{12} + \dfrac{x}{15} = 1$

$\Rightarrow \dfrac{6x - 30 + 5x - 15 + 4x}{60} = 1$

$\Rightarrow 15x - 45 = 60$

$\Rightarrow 15x = 105 \Rightarrow x = \dfrac{105}{15} = 7$

Hence, the work will be completed in 7 days.

18. (4) Work done by (A + C) in 2 days

$= 2\left(\dfrac{1}{10} + \dfrac{1}{20}\right)$

$= 2\left(\dfrac{2+1}{20}\right) = \dfrac{6}{20} = \dfrac{3}{10}$

Remaining work $= 1 - \dfrac{3}{10} = \dfrac{7}{10}$

(B + C)'s 1 day's work

$= \dfrac{1}{15} + \dfrac{1}{20} = \dfrac{4+3}{60} = \dfrac{7}{60}$

∴ Time taken by (B + C) to finish

$\dfrac{7}{10}$ part of the work

$= \dfrac{60}{7} \times \dfrac{7}{10} = 6$ days

∴ Total time = 2 + 6 = 8 days

19. (1) For the first 10 days 40 men worked.

Now, 40 men can complete the work in 40 days

∴ 1 man will complete the same work in 1600 days

∴ 1 man's 1 day's work $= \dfrac{1}{1600}$

∴ Part of work done in first 10

days $= \dfrac{1}{4}$

For the next 10 days 35 men worked.

Part of the work done

$= \dfrac{1 \times 35 \times 10}{1600} = \dfrac{7}{32}$

For the next 10 days, 30 men worked

Part of the work done

$= \dfrac{30 \times 10}{1600} = \dfrac{3}{16}$

For the next 10 days, 25 men worked. Part of the workdone

$= \dfrac{25 \times 10}{1600} = \dfrac{5}{32}$

Similarly, part of the work done by 20 men in next 10 days

$= \dfrac{20 \times 10}{1600} = \dfrac{1}{8}$

Work done in 50 days

$= \dfrac{1}{4} + \dfrac{7}{32} + \dfrac{3}{16} + \dfrac{5}{32} + \dfrac{1}{8}$

$= \dfrac{8 + 7 + 6 + 5 + 4}{32} = \dfrac{30}{32} = \dfrac{15}{16}$

∴ Remaining work

$= 1 - \dfrac{15}{16} = \dfrac{1}{16}$

Now 15 men remain to work

15 men's 1 day's work $= \dfrac{15}{1600}$

∴ Time taken to complete $\dfrac{1}{16}$

part of work

$= \dfrac{1600}{15} \times \dfrac{1}{16} = \dfrac{20}{3} = 6\dfrac{2}{3}$ days

∴ Total time = 50 + $6\dfrac{2}{3}$

$= 56\dfrac{2}{3}$ days

20. (4) Let the work be finished in x days.

According to the question,

A worked for x days while B worked for $(x - 3)$ days

∴ $\dfrac{x}{18} + \dfrac{x-3}{12} = 1$

$\Rightarrow \dfrac{2x + 3x - 9}{36} = 1$

$\Rightarrow 5x - 9 = 36$

$\Rightarrow 5x = 45$

$\Rightarrow x = \dfrac{45}{5} = 9$

Hence, the work was completed in 9 days.

Aliter : Using Rule 8,

Here, x = 18, y = 12, m = 3

Total time taken $= \left(\dfrac{y+m}{x+y}\right)x$

$= \left(\dfrac{12+3}{18+12}\right) \times 18 = 9$ days

21. (1) Let A and B worked together for x days

According to the question,

Part of work done by A for $(x + 10)$ days + part of work done by B for x days = 1

$\Rightarrow \dfrac{x+10}{20} + \dfrac{x}{30} = 1$

$\Rightarrow \dfrac{3x + 30 + 2x}{60} = 1$

$\Rightarrow 5x + 30 = 60$

$\Rightarrow 5x = 30$

$\Rightarrow x = \dfrac{30}{5} = 6$ days

Aliter : Using Rule 20,

Here, m = 20, n = 30, p = x and time taken by A alone = 10

$\Rightarrow 10 = \dfrac{mn - p(m+n)}{n}$

$10 = \dfrac{30 \times 20 - x(30+20)}{30}$

$300 = 600 - x\,50$

$50x = 300 \quad x = 6$

$\Rightarrow$ B worked for 6 days

22. (2) Let the work be completed in x days.

According to the question,

A worked for $(x-3)$ days, while B worked for x days.

∴ $\dfrac{x-3}{9} + \dfrac{x}{18} = 1$

$\Rightarrow \dfrac{2x - 6 + x}{18} = 1 \Rightarrow 3x - 6 = 18$

$\Rightarrow 3x = 18 + 6 = 24$

∴ $x = \dfrac{24}{3} = 8$ days

Aliter : Using Rule 8,

Here, x = 9, y = 18, m = 3

Total time taken

$= \dfrac{(x+m)y}{x+y}$

$= \dfrac{(9+3) \times 18}{9+18}$

$= \dfrac{12 \times 18}{27} = 8$ days

23. (3) (B + C)'s 2 days' work

$= 2\left(\dfrac{1}{20} + \dfrac{1}{30}\right) = 2\left(\dfrac{3+2}{60}\right)$

$= \dfrac{1}{6}$ part

Remaining work

$= 1 - \dfrac{1}{6} = \dfrac{5}{6}$ part

∴ Time taken by A to complete this part of work

$= \dfrac{5}{6} \times 18 = 15$ days

24. (3) Part of work done by B in 10

days $= 10 \times \dfrac{1}{15} = \dfrac{2}{3}$

Remaining work $= 1 - \dfrac{2}{3} = \dfrac{1}{3}$

$\therefore$ Time taken by A $= \dfrac{1}{3} \times 18$

= 6 days

25. (3) Part of work done by A and B in first two days

$= \dfrac{1}{9} + \dfrac{1}{12} = \dfrac{4+3}{36} = \dfrac{7}{36}$

Part of work done in first 10 days

$= \dfrac{35}{36}$

Remaining work $= 1 - \dfrac{35}{36} = \dfrac{1}{36}$

Now it is the turn of A.

$\therefore$ Time taken by A

$= \dfrac{1}{36} \times 9 = \dfrac{1}{4}$ day

$\therefore$ Total time $= 10 + \dfrac{1}{4} = 10\dfrac{1}{4}$ days

26. (4) B's 1 day's work

$= \dfrac{1}{12} - \dfrac{1}{20} = \dfrac{5-3}{60} = \dfrac{1}{30}$

$\therefore$ B's $\dfrac{1}{2}$ day's work $= \dfrac{1}{60}$

$\therefore$ (A + B)'s 1 day's work

$= \dfrac{1}{20} + \dfrac{1}{60} = \dfrac{3+1}{60} = \dfrac{1}{15}$

[$\because$ B works for half day daily]

Hence, the work will be completed in 15 days.

27. (3) Part of the work done by A and B in 4 days

$= 4\left(\dfrac{1}{12} + \dfrac{1}{15}\right) = 4\left(\dfrac{5+4}{60}\right)$

$= 4 \times \dfrac{9}{60} = \dfrac{3}{5}$

Remaining work $= 1 - \dfrac{3}{5} = \dfrac{2}{5}$

$\therefore$ Time taken by B to complete the remaining work

$= \dfrac{2}{5} \times 15 = 6$ days

Aliter : Using Rule 20,

Here, m = 12, n = 15, p = 4

B alone do the works in

$= \dfrac{mn - p(m+n)}{m}$

$= \dfrac{12 \times 15 - 4(12+15)}{12}$

$= \dfrac{180-108}{12} = \dfrac{72}{12} = 6$ days

28. (1) Part of the work done by X in 8 days.

$= \dfrac{8}{40} = \dfrac{1}{5}$

$\left[\because \text{work done in 1 day} = \dfrac{1}{40} \right]$

$\therefore$ Remaining work $= 1 - \dfrac{1}{5} = \dfrac{4}{5}$

This part of work is done by Y in 16 days.

$\therefore$ Time taken by Y in doing 1 work

$= \dfrac{16 \times 5}{4} = 20$ days

$\therefore$ Work done by X and Y in 1 day

$= \dfrac{1}{40} + \dfrac{1}{20} = \dfrac{1+2}{40} = \dfrac{3}{40}$

$\therefore$ Hence, both together will complete the work in $\dfrac{40}{3}$

i.e. $13\dfrac{1}{3}$ days.

29. (1) Work done in first two days

$= \dfrac{2}{30} + \dfrac{1}{20} + \dfrac{1}{10} = \dfrac{1}{15} + \dfrac{1}{20} + \dfrac{1}{10}$

$= \dfrac{4+3+6}{60} = \dfrac{13}{60}$

Work done in first 8 days $= \dfrac{52}{60}$

Remaining work

$= 1 - \dfrac{52}{60} = \dfrac{8}{60} = \dfrac{2}{15}$

(A + B)'s 1 day's work

$= \dfrac{1}{30} + \dfrac{1}{20} = \dfrac{2+3}{60} = \dfrac{1}{12}$

$\therefore$ Remaining work $= \dfrac{2}{15} - \dfrac{1}{12}$

$= \dfrac{8-5}{60} = \dfrac{3}{60} = \dfrac{1}{20}$

(A + C)'s 1 day's work

$= \dfrac{1}{30} + \dfrac{1}{10} = \dfrac{1+3}{30} = \dfrac{2}{15}$

$\therefore$ Time taken $= \dfrac{1}{20} \times \dfrac{15}{2}$

$= \dfrac{3}{8}$ day

Total time $= 9 + \dfrac{3}{8} = 9\dfrac{3}{8}$ days

30. (1) Work done by B in 9 days

$= \dfrac{9}{12} = \dfrac{3}{4}$ part

Remaining work

$= 1 - \dfrac{3}{4} = \dfrac{1}{4}$ which is done by A

$\therefore$ Time taken by A $= \dfrac{1}{4} \times 20$

= 5 days

31. (2) Work done by A in 6 days

$= \dfrac{6}{8} = \dfrac{3}{4}$ part

Work destroyed by B in 2 days

$= \dfrac{2}{3}$ part

Remaining work after destruction

$= \dfrac{3}{4} - \dfrac{2}{3} = \dfrac{9-8}{12} = \dfrac{1}{12}$

Now, time taken by A in doing

$\dfrac{11}{12}$ parts

$= \dfrac{11}{12} \times 8 = \dfrac{22}{3} = 7\dfrac{1}{3}$ days

32. (1) Work done by B in 10 days

$= \dfrac{10}{15} = \dfrac{2}{3}$

Remaining work $= 1 - \dfrac{2}{3} = \dfrac{1}{3}$

$\therefore$ Time taken by A to complete

the work $= \dfrac{1}{3} \times 18 = 6$ days

33. (1) Let the work done by each one of A, B and C per day be x, y, and z respectively.

$\therefore x + y = \dfrac{1}{12}$

$\Rightarrow x = \dfrac{1}{12} - y \qquad \ldots\ldots(i)$

$y + z = \dfrac{1}{16} \Rightarrow z = \dfrac{1}{16} - y$ ...(ii)

Again, $5x + 7y + 13z = 1$

$\Rightarrow 5\left(\dfrac{1}{12} - y\right) + 7y + 13\left(\dfrac{1}{16} - y\right) = 1$

$\Rightarrow \dfrac{5}{12} - 5y + 7y + \dfrac{13}{16} - 13y = 1$

$\Rightarrow 11y = \dfrac{5}{12} + \dfrac{13}{16} - 1$

$= \dfrac{20 + 39 - 48}{48} = \dfrac{11}{48}$

$\Rightarrow y = \dfrac{1}{48}$

∴ B alone will complete the work in 48 days.

34. (3) (A + B + C)'s 1 day's work

$= \dfrac{1}{20} + \dfrac{1}{30} + \dfrac{1}{60} = \dfrac{3 + 2 + 1}{60}$

$= \dfrac{1}{10}$

A's 2 days' work $= \dfrac{2}{20} = \dfrac{1}{10}$

Work done in first three days

$= \dfrac{1}{10} + \dfrac{1}{10} = \dfrac{2}{10} = \dfrac{1}{5}$

[A's work for 2 days + (A + B + C) work on 3rd day]
Hence, the work will be finished in 15 days.

35. (3) (A + B)'s 2 days' work $= \dfrac{2}{3}$

Remaining work $= 1 - \dfrac{2}{3} = \dfrac{1}{3}$

Time taken by A in doing $\dfrac{1}{3}$ work

= 2 days

∴ Time taken by A in completing the work = 6 days

∴ B's 1 day's work $= \dfrac{1}{3} - \dfrac{1}{6}$

$= \dfrac{2 - 1}{6} = \dfrac{1}{6}$

∴ B alone will complete the work in 6 days.

36. (3) Work done by A and B in 7 days

$= \dfrac{7}{20} + \dfrac{7}{30} = \dfrac{21 + 14}{60} = \dfrac{35}{60} = \dfrac{7}{12}$

So, Remaining work

$= 1 - \dfrac{7}{12} = \dfrac{5}{12}$

∴ Time taken by C

$= \dfrac{12}{5} \times 10 = 24$ days

37. (3) 45 men's 4 days' work $= \dfrac{1}{4}$

Remaining work

$= 1 - \dfrac{1}{4} = \dfrac{3}{4}$

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

$\Rightarrow \dfrac{45 \times 16}{1} = \dfrac{81 \times D_2}{\dfrac{3}{4}}$

$\Rightarrow D_2 = \dfrac{45 \times 16}{27 \times 4} = 6\dfrac{2}{3}$ days

Aliter : Using Rule 10,
Here, A = 45, a = 16
b = 4, B = 36
Required days

$= \dfrac{A(a - b)}{(A + B)}$ days

$= \dfrac{45(16 - 4)}{(45 + 36)}$

$= \dfrac{45 \times 12}{81} = \dfrac{5 \times 12}{9}$

$= \dfrac{20}{3} = 6\dfrac{2}{3}$ days

38. (4) Work done by A and B in first 6 days
= (A + B)'s 4 days' work + B's 2 days' work

$= 4 \times \dfrac{1}{8} + \dfrac{2}{12}$

$= \dfrac{1}{2} + \dfrac{1}{6} = \dfrac{3 + 1}{6} = \dfrac{4}{6} = \dfrac{2}{3}$

Remaining work

$= 1 - \dfrac{2}{3} = \dfrac{1}{3}$

∴ Time taken by C

$= \dfrac{1}{3} \times 12 = 4$ days

39. (1) (A + B) together do the work in 30 days.

∴ (A + B)'s 1 day's work $= \dfrac{1}{30}$

∴ (A + B)'s 20 days' work

$= \dfrac{20}{30} = \dfrac{2}{3}$

Remaining work = $1 - \dfrac{2}{3} = \dfrac{1}{3}$

∵ Time taken by A in doing $\dfrac{1}{3}$

work = 20 days

∴ Time taken in doing 1 work
= 20 × 3 = 60 days.
Aliter : Using Rule 9,
Here, a = 30, b = 20, d = 20
A alone can finish the work in

$= \dfrac{ad}{a - b}$ days

$= \dfrac{30 \times 20}{30 - 20} = 60$ days

40. (3) Remaining work

$= 1 - \dfrac{1}{8} = \dfrac{7}{8}$

(A + B)'s 1 day's work

$= \dfrac{1}{6} + \dfrac{1}{12} = \dfrac{2 + 1}{12} = \dfrac{3}{12} = \dfrac{1}{4}$

∴ Time taken in doing $\dfrac{7}{8}$ part

of work $= \dfrac{7}{8} \times 4 = \dfrac{7}{2}$

$= 3\dfrac{1}{2}$ days

41. (2) Work done by 12 men in 8 days ≡ Work done by 16 women in 12 days.
⇒ 12 × 8 men ≡ 16 × 12 women
⇒ 1 man ≡ 2 women
Now, work done by 12 men in 1

day $= \dfrac{1}{8}$

1 man's 1 day's work

$= \dfrac{1}{12 \times 8} = \dfrac{1}{96}$

∴ 16 men's 3 day's work

$= \dfrac{16 \times 3}{96} = \dfrac{1}{2}$

Remaining work $= 1 - \dfrac{1}{2} = \dfrac{1}{2}$

Now, $\dfrac{1}{2}$ work is done by 6 men and 4 women.

∴ 6 men + 4 women
= (6 + 2) men = 8 men

∴ $\dfrac{M_1 D_1}{W_1} = \dfrac{M_2 D_2}{W_2}$

$\Rightarrow \dfrac{12 \times 8}{1} = \dfrac{8 \times D_2}{\dfrac{1}{2}}$

$\Rightarrow D_2 = \dfrac{12 \times 8}{2 \times 8}$ = 6 days

42. (2) 40 men complete the work in 18 days.

∴ Their 1 day's work $= \dfrac{1}{18}$

∴ Their 8 days' work $= \dfrac{8}{18} = \dfrac{4}{9}$

Remaining work $= 1 - \dfrac{4}{9} = \dfrac{5}{9}$

New number of men = 40 + 10 = 50

∴ $\dfrac{M_1 D_1}{W_1} = \dfrac{M_2 D_2}{W_2}$

$\Rightarrow \dfrac{40 \times 18}{1} = \dfrac{50 \times D_2}{\dfrac{5}{9}}$

$\Rightarrow 40 \times 18 = 90 \times D_2$

$\Rightarrow D_2 = \dfrac{40 \times 18}{90}$ = 8 days

Aliter : Using Rule 10,
Here, A = 40, a = 18
b = 8, B = 10

Required Days $= \dfrac{A(a-b)}{A+B}$

$= \dfrac{40(18-8)}{40+10}$

$= \dfrac{40 \times 10}{50}$

= 8 days

43. (1) ∵ 12 men ≡ 24 boys
∴ 1 man ≡ 2 boys
∴ 15 men + 6 boys
= 30 boys + 6 boys = 36 boys
∴ $M_1 D_1 = M_2 D_2$
$\Rightarrow 24 \times 66 = 36 \times D_2$

$\Rightarrow D_2 = \dfrac{24 \times 66}{36}$ = 44 days

Aliter : Using Rule 12,
Here, A = 12, B = 24
a = 66, A_1 = 15, B_1 = 6

∴ Time taken $= \dfrac{a(A \times B)}{A_1 B + B_1 A}$

$= \dfrac{66(12 \times 24)}{15 \times 24 + 6 \times 12}$

$= \dfrac{66 \times 288}{360 + 72}$

$= \dfrac{66 \times 288}{432}$

= 44 days

44. (3) A, B and C together complete the work in 40 days.
∴ (A + B + C)'s 1 day's work

$= \dfrac{1}{40}$

∴ (A + B + C)'s 16 days work

$= \dfrac{16}{40} = \dfrac{2}{5}$

Remaining work $= 1 - \dfrac{2}{5} = \dfrac{3}{5}$

This part of work is done by B and C in 40 days.

∴ Time taken in doing $\dfrac{3}{5}$ work
= 40 days.

∴ Time taken in doing in 1 work

$= \dfrac{40 \times 5}{3} = \dfrac{200}{3}$ days

∴ A's day's work = (A + B + C)'s 1 day's work – (B + C)'s 1 day's work

$= \dfrac{1}{40} - \dfrac{3}{200} = \dfrac{5-3}{200} = \dfrac{2}{200}$

$= \dfrac{1}{100}$

∴ Required time = 100 days.

45. (2) Number of men originally
= x (let)
∴ $M_1 D_1 = M_2 D_2$
$\Rightarrow x \times 60 = (x + 8) \times 50$
$\Rightarrow 6x = 5x + 40$
$\Rightarrow 6x - 5x = 40$
$\Rightarrow x = 40$ men
Aliter : Using Rule 23,
Here, D= 60, a = 8, d =10

∴ Required number $= \dfrac{a(D-d)}{d}$

$= \dfrac{8(60-10)}{10}$ = 40

46. (4) Using Rule 1,
Number of men originally = x (let)
∴ $M_1 D_1 = M_2 D_2$
$\Rightarrow x \times 18 = (x - 6) \times 20$
$\Rightarrow x \times 9 = (x - 6) \times 10$
= 10x – 60
$\Rightarrow 10x - 9x = 60$
$\Rightarrow x = 60$ men

47. (4) Original number of men
= x (let)
∴ $M_1 D_1 = M_2 D_2$
$\Rightarrow x \times 40 = (x + 45) \times 25$
$\Rightarrow 8x = (x + 45) \times 5$
$\Rightarrow 8x = 5x + 225$
$\Rightarrow 8x - 5x = 225$
$\Rightarrow 3x = 225$

$\Rightarrow x = \dfrac{225}{3}$ = 75 men

Aliter : Using Rule 23,
Here, D = 40, a = 45,
d = (40 – 25) = 15

∴ Required number $= \dfrac{a(D-d)}{d}$

$= \dfrac{45(40-15)}{15}$

$= \dfrac{45 \times 25}{15}$

= 15 × 5 = 75

48. (2) Let A left the work after x days.

According to the question,

Work done by A in x days + work done by B in (23 + x) days = 1

$\Rightarrow \dfrac{x}{45} + \dfrac{23 + x}{40} = 1$

$\Rightarrow \dfrac{8x + 207 + 9x}{360} = 1$

$\Rightarrow 17x + 207 = 360$

$\Rightarrow 17x = 360 - 207 = 153$

$\Rightarrow x = \dfrac{153}{17} = 9$ days

Aliter : Using Rule 26,
Here, x = 45, y = 40, a = 23

A left after $= \dfrac{(y-a)}{x+y} \times x$

$= \dfrac{(40-23)}{45+40} \times 45$

$= \dfrac{17 \times 45}{85} = 9$ days

49. (2) Work done by 20 men in 3 days

$= \dfrac{3}{18} = \dfrac{1}{6}$ part

Remaining work

$= 1 - \dfrac{1}{6} = \dfrac{5}{6}$ part

$\therefore \dfrac{M_1 D_1}{W_1} = \dfrac{M_2 D_2}{W_2}$

$\Rightarrow \dfrac{20 \times 18}{1} = \dfrac{25 \times D_2}{\dfrac{5}{6}}$

$\Rightarrow 6 \times 25 \times D_2 = 5 \times 20 \times 18$

$\Rightarrow D_2 = \dfrac{5 \times 20 \times 18}{6 \times 25} = 12$ days

Aliter : Using Rule 10,
Here, A = 20, a = 18
b = 3. B = 5
Required number of days

$= \dfrac{A(a-b)}{A+B} = \dfrac{20(18-3)}{20+5}$

$= \dfrac{20 \times 15}{25} = 12$ days

50. (4) Let the work be completed in x days.
According to the question,
C worked for $(x-4)$ days.

$\therefore \dfrac{x}{24} + \dfrac{x}{30} + \dfrac{x-4}{40} = 1$

$\Rightarrow \dfrac{5x + 4x + 3(x-4)}{120} = 1$

$\Rightarrow \dfrac{12x - 12}{120} = 1$

$\Rightarrow \dfrac{12(x-1)}{120} = 1$

$\Rightarrow \dfrac{x-1}{10} = 1 \Rightarrow x - 1 = 10$

$\Rightarrow x = 10 + 1 = 11$ days

51. (2) Work done by Raja and Ramesh in 1 day

$= \dfrac{1}{20} + \dfrac{1}{25} = \dfrac{5+4}{100} = \dfrac{9}{100}$

Work done by Ramesh in 10 days

$= \dfrac{10}{25} = \dfrac{2}{5}$

Remaining work $= 1 - \dfrac{2}{5} = \dfrac{3}{5}$

$\therefore$ This part is done by Raja and Ramesh.

$\therefore$ Time taken

$= \dfrac{3}{5} \times \dfrac{100}{9} = \dfrac{20}{3} = 6\dfrac{2}{3}$ days

$\therefore$ Required time

$= 10 + 6\dfrac{2}{3} = 16\dfrac{2}{3}$ days

52. (2) Number of men initially
= x (let)
$\therefore M_1 D_1 = M_2 D_2$
$\Rightarrow x \times 40 = (x+8) \times 30$
$\Rightarrow 4x = 3x + 24$
$\Rightarrow 4x - 3x = 24$
$\Rightarrow x = 24$ men
Aliter : Using Rule 23,
Here, D = 40, a = 8, d = 10
Required number

$= \dfrac{a(D-d)}{d}$ men

$= \dfrac{8(40-10)}{10} = 24$ men

53. (3) Let Y alone complete the work in x days.
According to the question,
X's 16 days' work + Y's 12 days' work = 1

$\Rightarrow \dfrac{16}{24} + \dfrac{12}{x} = 1$

$\Rightarrow \dfrac{2}{3} + \dfrac{12}{x} = 1$

$\Rightarrow \dfrac{12}{x} = 1 - \dfrac{2}{3} = \dfrac{1}{3}$

$\Rightarrow x = 12 \times 3 = 36$ days

54. (3) Work done in 30 days = W$_2$

$\therefore \dfrac{M_1 D_1}{W_1} = \dfrac{M_2 D_2}{W_2}$

$\Rightarrow \dfrac{12 \times 90}{1} = \dfrac{12 \times 30}{W_2}$

$\Rightarrow W_2 = \dfrac{12 \times 30}{12 \times 90} = \dfrac{1}{3}$

Remaining work $= 1 - \dfrac{1}{3} = \dfrac{2}{3}$

New number of men = 18

$\therefore \dfrac{M_1 D_1}{1} = \dfrac{M_2 D_2}{W}$

$\Rightarrow \dfrac{12 \times 90}{1} = \dfrac{18 \times D_2}{\dfrac{2}{3}}$

$\Rightarrow 18 \times D_2 = 12 \times 90 \times \dfrac{2}{3}$

$= 12 \times 60$

$\Rightarrow D_2 = \dfrac{12 \times 60}{18} = 40$ days

55. (2) Work done by A and B in 5 days

$= 5\left(\dfrac{1}{10} + \dfrac{1}{15}\right) = 5\left(\dfrac{3+2}{30}\right)$

$= 5 \times \dfrac{5}{30} = \dfrac{5}{6}$

Remaining work $= 1 - \dfrac{5}{6} = \dfrac{1}{6}$

$\therefore$ Time taken by A

$= \dfrac{1}{6} \times 10 = \dfrac{5}{3}$ days $= 1\dfrac{2}{3}$ days

56. (4) (A + B)'s 1 day's work $= \dfrac{1}{30}$

$\therefore$ (A + B)'s 20 days' work

$= \dfrac{20}{30} = \dfrac{2}{3}$

Remaining work $= 1 - \dfrac{2}{3} = \dfrac{1}{3}$

Time taken by A in doing $\dfrac{1}{3}$ of

work = 20 days

$\therefore$ Time taken by A in doing whole work = 3 × 20 = 60 days

57. (4) Nuts cut by Ram and Hari in

1 day = $\dfrac{12}{2}$ kg. = 6 kg.   ....(i)

Nuts cut by them in 5 days
= 30 kg.
Amount of nuts cut by Ram alone
= 58 – 30 = 28 kg.
Time = 8 days
∴ Nuts cut by Ram in 1 day

= $\dfrac{28}{8}$ = 3.5 kg.

∴ From equation (i),
Nuts cut by Hari in 1 day
= (6 – 3.5) kg. = 2.5 kg.
∴ Time taken by Hari in cutting 10 kg. of nuts

= $\dfrac{10}{2.5}$ = 4 days

58. (4) Ramesh's 1 day's work = $\dfrac{1}{20}$

Rahman's 1 day's work = $\dfrac{1}{25}$

∴ (Ramesh + Rahman)'s 1 days'

work = $\dfrac{1}{20}$ + $\dfrac{1}{25}$

= $\dfrac{5+4}{100}$ = $\dfrac{9}{100}$

∴ Their 10 day's work

= $\dfrac{90}{100}$ = $\dfrac{9}{10}$

∴ Remaining work

= 1 – $\dfrac{9}{10}$ = $\dfrac{1}{10}$

∵ Suresh does $\dfrac{1}{10}$ work in 3

days.
∴ Time taken by Suresh in doing 1 work = 3 × 10 = 30 days

59. (3) Let C alone complete the work in x days.
According to the question,
A's 7 days' work + B's 3 days' work + C's 2 days' work = 1

$\Rightarrow \dfrac{7}{10} + \dfrac{3}{12} + \dfrac{2}{x} = 1$

$\Rightarrow \dfrac{2}{x} = 1 - \dfrac{7}{10} - \dfrac{1}{4}$

$= \dfrac{20-14-5}{20} = \dfrac{1}{20}$

$\Rightarrow x = 2 \times 20 = 40$ days

60. (2) Let the number of working men be x.
∴ $M_1 D_1 = M_2 D_2$
$\Rightarrow x \times 60 = (x + 6) \times 40$
$\Rightarrow 3x = 2x + 12$
$\Rightarrow 3x - 2x = 12$
$\Rightarrow x = 12$

61. (4) A's 1 day's work = $\dfrac{1}{20}$

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

(A + B + C)'s 1 day's work = $\dfrac{1}{5}$

∴ C's 1 day's work

= $\dfrac{1}{5} - \dfrac{1}{20} - \dfrac{1}{15}$

= $\dfrac{12-3-4}{60}$ = $\dfrac{5}{60}$ = $\dfrac{1}{12}$

∴ Required time = 12 days

62. (3) Let 5 men leave the work after x days.
∵ $M_1 D_1 = M_2 D_2 + M_3 D_3$
∴ $15 \times 40 = 15 \times x + 10 \times (45 - x)$
$\Rightarrow 600 = 15x + 450 - 10x$
$\Rightarrow 600 - 450 = 5x$
$\Rightarrow 5x = 150$

$\Rightarrow x = \dfrac{150}{5}$ = 30 days

63. (1) ∵ (A + B)'s 1 day's work

= $\dfrac{1}{12}$

∴ (A + B)'s 5 days' work = $\dfrac{5}{12}$

Remaining work = 1– $\dfrac{5}{12}$ = $\dfrac{7}{12}$

∵ A does $\dfrac{7}{12}$ work in 14 days

∴ A will do 1 work in

= $\dfrac{14 \times 12}{7}$ = 24 days

TYPE-III

1. (2) According to question,
(6M + 8B) × 10 = (26M + 48B) × 2
∴ 60M + 80B = 52M + 96B
or, 1M = 2B
∴ 15M + 20B = (30 + 20)B
= 50 boys and 6M + 8B
= (12 + 8) boys = 20 boys
∵ 20 boys can finish the work in 10 days
∴ 50 boys can finish the work in

$\dfrac{20 \times 10}{50}$ days

= 4 days
Aliter : Using Rule 11,
$A_1 = 6$, $B_1 = 8$, $D_1 = 10$
$A_2 = 26$, $B_2 = 48$, $D_2 = 2$
$A_3 = 15$, $B_3 = 20$
Required time

$= \dfrac{D_1 D_2 (A_1 B_2 - B_1 A_2)}{D_1 (A_1 B_3 - A_3 B_1) - D_2 (A_2 B_3 - A_3 B_2)}$ day

$= \dfrac{10 \times 2(6 \times 48 - 8 \times 26)}{10(6 \times 20 - 15 \times 8) - 2(26 \times 20 - 15 \times 48)}$ days

$= \dfrac{20(288 - 208)}{10(120 - 120) - 2(520 - 720)}$

$= \dfrac{20 \times 80}{400}$ = 4 days

2. (2) 5 × 6 men = 10 × 5 women
$\Rightarrow$ 3 men = 5 women
∴ 5 women + 3 men = 6 men
∵ 5 men complete the work in 6 days
∴ 6 men will complete the work in

$\dfrac{5 \times 6}{6}$ = 5 days

Aliter : Using Rule 14,
Here, A = 5, a = 6
B = 10, b = 5
$A_1 = 3$, $B_1 = 5$

Time taken = $\dfrac{1}{\dfrac{A_1}{A \times a} + \dfrac{B_1}{B \times b}}$

$= \dfrac{1}{\dfrac{3}{5 \times 6} + \dfrac{5}{10 \times 5}}$

$= \dfrac{1}{\dfrac{1}{10} + \dfrac{1}{10}}$ = 5 days

3. (3) 3m = 6w
∴ 1m = 2w
12m + 8w = (12 × 2w) + 8w
= 32w
∴ 6 women can do the work in 16 days.
∴ 32 women can do the work in

$\dfrac{16 \times 6}{32} = 3$ days

Aliter : Using Rule 12,
Here, A = 3, B = 6, a = 16
$A_1 = 12$, $B_1 = 8$

Time taken = $\dfrac{a(A \times B)}{A_1 B + B_1 A}$

$= \dfrac{16(3 \times 6)}{12 \times 6 + 8 \times 3}$

$= \dfrac{16 \times 18}{96}$ = 3 days

4. (4) 1 man's 1 day's work = $\frac{1}{3}$

1 woman's 1 day's work = $\frac{1}{4}$

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

(1 man + 1 woman)'s $\frac{1}{4}$ day's

work = $\frac{1}{4}\left(\frac{1}{3}+\frac{1}{4}\right)=\frac{7}{48}$

Remaining work

= $1-\frac{7}{48}=\frac{41}{48}$

Now,

1 boy's $\frac{1}{4}$ day's work = $\frac{1}{4}\times\frac{1}{12}$

= $\frac{1}{48}$

$\therefore$ $\frac{41}{48}$ work will be done by

$\frac{41}{48}$ × 48 = 41 boys.

5. (4) 16 men = 20 women
4 men = 5 women.
Now, according to question,
16 men complete the work in 25 days.

$\therefore$ 1 man one day's work

= $\frac{1}{25\times16}$

$\therefore$ 4 men one day's work

= $\frac{4}{25\times16}=\frac{1}{100}$

Similarly,
1 woman one day's work

= $\frac{1}{25\times20}$

$\therefore$ 5 women one day's work

= $\frac{5}{25\times20}=\frac{1}{100}$

$\therefore$ 28 men

= $\frac{28}{4}\times5=35$ women

[28 men + 15 women]
$\therefore$ 50 women one day's work

= $\frac{50}{25\times20}=\frac{1}{10}$

Therefore, 28 men and 15 women can complete the whole work in 10 days.
Aliter : Using Rule 12,
A = 16, B = 20, a = 25
A₁ = 28, B₁ = 15

Time taken = $\frac{a(A\times B)}{A_1B+B_1A}$

= $\frac{25(16\times20)}{28\times20+15\times16}$

= $\frac{25\times320}{560+240}$

= $\frac{25\times320}{800}$

= 10 days

6. (3) According to the question
5 men = 8 women

$\therefore$ 2 men = $\frac{8}{5}\times2=\frac{16}{5}$ women

$\therefore$ Total women = $\frac{16}{5}+4$

= $\frac{36}{5}$ women

$\therefore$ No. of days to do the same work

= $\frac{8\times12}{\frac{36}{5}}=\frac{8\times12\times5}{36}$

= $\frac{40}{3}=13\frac{1}{3}$ days

Aliter : Using Rule 12,
Here, A = 5, B = 8, a = 12
A₁ = 2 and B₁ = 4

Time taken = $\frac{a(A\times B)}{A_1B+B_1A}$

= $\frac{12(5\times8)}{2\times8+4\times5}$

= $\frac{12\times40}{36}$

= $33\frac{1}{3}$ days

7. (4) $\because$ 3 men = 4 women

$\therefore$ 1 man = $\frac{4}{3}$ women

$\therefore$ 7 men = $\frac{7\times4}{3}=\frac{28}{3}$ women

$\therefore$ 7 men + 5 women = $\frac{28}{3}+5$

= $\frac{28+15}{3}=\frac{43}{3}$ Women
Now, $M_1D_1=M_2D_2$

$\Rightarrow$ 4 × 43 = $\frac{43}{3}\times D_2$,

where D_2 = number of days

$\Rightarrow$ D_2 = $\frac{4\times3\times43}{43}$ = 12 days.

Aliter : Using Rule 12,
Here, A = 3, B = 4, a = 43
A₁ = 7 and B₁ = 5

Time taken = $\frac{a(A\times B)}{A_1B+B_1A}$

= $\frac{43(3\times4)}{7\times4+5\times3}$

= $\frac{43\times12}{43}$

= 12 days

8. (3) 6 men = 12 women
$\therefore$ 1 man = 2 women
Now, 8 men + 16 women
= (8 × 2 + 16) women
= 32 women
$\because$ 12 women can do a work in 20 days.
$\therefore$ 1 woman can do the work in 20 × 12 days.
$\therefore$ 32 women can do the twice work in

= $\frac{20\times12\times2}{32}$ = 15 days.

Aliter : Using Rule 12,
Here, A = 6, B= 12, a = 20
A₁ = 8, B₁ = 16
Time taken

= $\frac{a(A\times B)}{A_1B+B_1A}$

= $\frac{20(6\times12)}{8\times12+16\times6}$

= $\frac{20\times72}{192}=\frac{15}{2}$

They will do the twice as big work

in 2 × $\frac{15}{2}$ days = 15 days

9. (1) Work done by 1 woman in 1 day $= \dfrac{1}{3} - \dfrac{1}{6} - \dfrac{1}{18}$

$= \dfrac{6-3-1}{18} = \dfrac{1}{9}$

∴ Woman will do the work in 9 days.

Aliter : Using Rule 18,
Here, x = 3, y = 6 and z = 18
∴ Required time

$= \dfrac{xyz}{yz - x(y+z)}$ days

$= \dfrac{3 \times 6 \times 18}{6 \times 18 - 3(6+18)}$

$= \dfrac{324}{108 - 3 \times 24}$

$= \dfrac{324}{108 - 3 \times 24} = \dfrac{324}{36} = 9$

10. (3) 3 men's work = 5 women's work

1 man's work $= \dfrac{5}{3}$ women's work

∴ 6 men's work $= \dfrac{5}{3} \times 6$

= 10 women's work
∴ 6 men + 5 women
= 15 women
∴ 5 women can do work in 12 days.
Hence, 15 women can do it in

$\dfrac{5 \times 12}{15} = 4$ days

Aliter : Using Rule 12,
Here, A = 3, B = 5, a = 12
A_1 = 6 and B_1 = 5

Required time $= \dfrac{a(A \times B)}{A_1 B + B_1 A}$

$= \dfrac{12(3 \times 5)}{6 \times 5 + 5 \times 3}$

$= \dfrac{12 \times 15}{45}$

= 4 days

11. (1) 10 men ≡ 20 boys
∴ 1 man ≡ 2 boys
∴ 8 men + 4 boys
= (16 + 4) boys = 20 boys
Hence, 8 men and 4 boys will make 260 mats in 20 days.

12. (2) Work done in two days $= \dfrac{1}{6} \times 2$

$= \dfrac{1}{3}$, remaining work $= \dfrac{2}{3}$

$\Rightarrow \dfrac{M_1 D_1}{W_1} = \dfrac{M_2 D_2}{W_2}$

$\Rightarrow \dfrac{3 \times 2}{\dfrac{1}{3}} = \dfrac{6 \times D_2}{\dfrac{2}{3}}$

$\Rightarrow D_2 = \dfrac{3 \times 2 \times 2}{6} = 2$ days

Aliter : Using Rule 10,
Here, A = 3, a = 6
b = 2, B = 3

Required time $= \dfrac{A(a-b)}{(A+B)}$

$= \dfrac{3(6-2)}{3+3}$

$= \dfrac{3 \times 4}{6}$ = 2 days

13. (3) Work done by 1 woman in 1 day

$= \dfrac{1}{8} - \dfrac{1}{10} = \dfrac{5-4}{40} = \dfrac{1}{40}$

∴ One woman will complete the work in 40 days.

Aliter : Using Rule 4,
Here, x = 10 and y = 8
Woman can do work in

$= \left(\dfrac{xy}{x-y} \right)$ days

$= \left(\dfrac{10 \times 8}{10-8} \right)$ = 40 days

14. (3) Let 1 man's 1 day's work = x and
1 woman's 1 day's work = y

Then, $4x + 6y = \dfrac{1}{8}$ and

$3x + 7y = \dfrac{1}{10}$

From both equations,

we get $y = \dfrac{1}{400}$

∴ 10 women's 1 day's work

$= \dfrac{10}{400} = \dfrac{1}{40}$

∴ 10 women will finish the work in 40 days.

Aliter : Using Rule 11,
A_1 = 4, B_1 = 6, D_1 = 8
A_2 = 3, B_2 = 7, D_2 = 10
A_3 = 0, B_3 = 10
Required time =

$\dfrac{D_1 D_2 (A_1 B_2 - A_2 B_1)}{D_1 (A_1 B_3 - A_3 B_1) - D_2 (A_2 B_3 - A_3 B_2)}$

$= \dfrac{8 \times 10(4 \times 7 - 3 \times 6)}{8(4 \times 10 - 0 \times 6) - 10(3 \times 10 - 0 \times 7)}$

$= \dfrac{80 \times 10}{20}$ = 40 days

15. (1) Part of work done by 2 men and 2 women in 2 days.

$= 2 \left(\dfrac{2}{20} + \dfrac{8}{30} \right)$

$= 2 \left(\dfrac{1}{10} + \dfrac{8}{30} \right) = 2 \left(\dfrac{3+8}{30} \right)$

$= \dfrac{22}{30} = \dfrac{11}{15}$

Remaining work $= 1 - \dfrac{11}{15} = \dfrac{4}{15}$

Work done by 1 boy in 2 days

$= \dfrac{2}{60} = \dfrac{1}{30}$

∴ Number of boys required to

assist $= \dfrac{4}{15} \times 30 = 8$

Aliter : Using Rule 14,
Here, A = 1, B = 1, C = 1
a = 20, b = 30, c = 60
A_1 = 2, B_1 = 8,
Required time

$= \dfrac{1}{\dfrac{A_1}{A \times a} + \dfrac{B_1}{B \times b} + \dfrac{C_1}{C \times c}}$

$2 = \dfrac{1}{\dfrac{2}{1 \times 20} + \dfrac{8}{1 \times 30} + \dfrac{x}{1 \times 60}}$

$2 = \dfrac{10}{\dfrac{2}{2} + \dfrac{8}{3} + \dfrac{x}{6}}$

$2 = \dfrac{10}{\dfrac{6+16+x}{6}}$

$22 + x = 30$ $\boxed{x = 8}$

∴ Number of boys = 8

16. (3) 1 man = 2 women ≡ 3 boys
1 man + 1 woman + 1 boy

$= \left(3 + \dfrac{3}{2} + 1\right)$ boys $= \dfrac{11}{2}$ boys

$\therefore M_1 D_1 = M_2 D_2$

$\Rightarrow 3 \times 88 = \dfrac{11}{2} \times D_2$

$\Rightarrow D_2 = \dfrac{2 \times 3 \times 88}{11}$ = 48 days

Aliter : Using Rule 13,
Here, A = 1, B = 2, C = 3, a = 88
$A_1 = 1, B_1 = 1, C_1 = 1$

Time taken = $\dfrac{a}{\dfrac{A_1}{A} + \dfrac{B_1}{B} + \dfrac{C_1}{C}}$

$= \dfrac{88}{\dfrac{1}{1} + \dfrac{1}{2} + \dfrac{1}{3}}$

$= \dfrac{88 \times 6}{6 + 3 + 2}$

= 48 days

17. (2) 6m + 8w ≡ 10 days
$\Rightarrow 2 (3m + 4w) \equiv 10$ days
$\Rightarrow 3m + 4w \equiv 20$ days
[Since the workforce has become half of the original force, so number of days must be double].
Aliter : Using Rule 14,
Let us assume efficiency of 6 men = efficiency of 8 men.
A = 6, a = 20
B = 8, b = 20
$A_1 = 3, B_1 = 4$
∴ Required time

$= \dfrac{1}{\dfrac{A_1}{A \times a} + \dfrac{B_1}{B \times b}}$

$= \dfrac{1}{\dfrac{3}{6 \times 20} + \dfrac{4}{8 \times 20}}$

$= \dfrac{1}{\dfrac{1}{40} + \dfrac{1}{40}} = \dfrac{40}{2}$ = 20 days

18. (1) 12 (3 men + 4 boys)
≡ 10 (4 men + 3 boys)
$\Rightarrow$ 36 men + 48 boys
= 40 men + 30 boys
$\Rightarrow$ 4 men = 18 boys
$\Rightarrow$ 2 men = 9 boys
∴ 4 men + 3 boys

= 21 boys, who do the work in 10 days and
2 men + 3 boys = 12 boys
$\therefore M_1 D_1 = M_2 D_2$
$\Rightarrow 21 \times 10 = 12 \times D_2$

$\Rightarrow D_2 = \dfrac{21 \times 10}{12} = \dfrac{35}{2} = 17\dfrac{1}{2}$ days

Aliter : Using Rule 11,
Here, $A_1 = 3$, $B_1 = 4$, $D_1 = 12$
$A_2 = 4$, $B_2 = 3$, $D_2 = 10$
$A_3 = 2$, $B_3 = 3$
Required time =

$\dfrac{D_1 D_2 (A_1 B_2 - A_2 B_1)}{D_1 (A_1 B_3 - A_3 B_1) - D_2 (A_2 B_3 - A_3 B_2)}$ days

$= \dfrac{12 \times 10 (3 \times 3 - 4 \times 4)}{12(3 \times 3 - 2 \times 4) - 10(4 \times 3 - 2 \times 3)}$

$= \dfrac{120 \times -7}{12(9 - 8) - 10 \times 6}$

$= \dfrac{-840}{-48} = 17\dfrac{1}{2}$ days

19. (4) 10 men ≡ 20 women
1 man = 2 women = 5 children
1 woman = 2 children
∴ 5 men + 5 women + 5 children
= 20 + 10 + 5 = 35 children
$\therefore M_1 D_1 = M_2 D_2$
$\Rightarrow 40 \times 7 = 35 \times D_2$

$\Rightarrow D_2 = \dfrac{40 \times 7}{35}$ = 8 months

∴ 5 men, 5 women and 5 children can do half of the work in 8 months
Required time = 4 months.
Aliter : Using Rule 13,
Here, A = 10, B = 20, C = 40, a = 7
$A_1 = 5$, $B_1 = 5$, $C_1 = 5$
Time taken to do same work

$= \dfrac{a}{\dfrac{A_1}{A} + \dfrac{B_1}{B} + \dfrac{C_1}{C}}$

$= \dfrac{7}{\dfrac{5}{10} + \dfrac{5}{20} + \dfrac{5}{40}}$

$= \dfrac{7}{\dfrac{1}{2} + \dfrac{1}{4} + \dfrac{1}{8}}$

$= \dfrac{7}{\dfrac{4 + 2 + 1}{8}}$ = 8 months

Half of the work they do in 4 months.

20. (1) ∵ 8 men ≡ 12 boys
∴ 4 men ≡ 6 boys
$\Rightarrow$ 20 men ≡ 30 boys
$\Rightarrow$ 20 men + 6 boys = 36 boys
$\therefore M_1 D_1 = M_2 D_2$
$\Rightarrow 12 \times 16 = 36 \times D_2$

$\Rightarrow D_2 = \dfrac{12 \times 16}{36} = \dfrac{16}{3} = 5\dfrac{1}{3}$ days

Aliter : Using Rule 12,
Here, A = 8, B = 12, a = 16
$A_1 = 20$, $B_1 = 6$,
Required number of days

$= \dfrac{a}{\dfrac{A_1}{A} + \dfrac{B_1}{B}} = \dfrac{16}{\dfrac{20}{8} + \dfrac{6}{12}}$

$= \dfrac{16}{\dfrac{5}{2} + \dfrac{1}{2}} = \dfrac{16 \times 2}{6} = 5\dfrac{1}{3}$ days

21. (3) According to the question,
20 men + 30 boys = 24 men + 16 boys
∴ 4 men = 14 boys
$\Rightarrow$ 2 men = 7 boys
$\Rightarrow$ 2 men + 1 boy = 8 boys
$\Rightarrow$ 2 men + 3 boys = 10 boys
By $M_1 D_1 = M_2 D_2$
$\Rightarrow 10 \times 10 = 8 \times D_2$

$\Rightarrow D_2 = \dfrac{10 \times 10}{8} = \dfrac{25}{2}$

$= 12\dfrac{1}{2}$ days

Aliter : Using Rule 11,
Here, $A_1 = 2$, $B_1 = 3$, $D_1 = 10$
$A_2 = 3$, $B_2 = 2$, $D_2 = 8$
$A_3 = 2$, $B_3 = 1$
Required time =

$\dfrac{D_1 D_2 (A_1 B_2 - A_2 B_1)}{D_1 (A_1 B_3 - A_3 B_1) - D_2 (A_2 B_3 - A_3 B_2)}$ days

$= \dfrac{10 \times 8 (2 \times 2 - 3 \times 3)}{10(2 \times 1 - 2 \times 3) - 8(3 \times 1 - 2 \times 2)}$

$= \dfrac{80 \times -5}{-40 + 8} = 12\dfrac{1}{2}$ days

22. (2) 2 × 10 men + 3 × 10 women
= 3 × 8 men + 2 × 8 women
$\Rightarrow$ 20 men + 30 women
= 24 men + 16 women
$\Rightarrow$ 4 men = 14 women
or 2 men = 7 women

∴ 2 men + 3 women = 10 women

∴ 2 men + 1 woman = 8 women

∴ $M_1D_1 = M_2D_2$

$\Rightarrow$ 10 × 10 = 8 × D_2

$\Rightarrow D_2 = \dfrac{25}{2} = 12\dfrac{1}{2}$ days

Aliter : 22 (Using Rule 11),

Here, $A_1 = 2$, $B_1 = 3$, $D_1 = 10$

$A_2 = 3$, $B_2 = 2$, $D_2 = 8$

$A_3 = 2$, $B_3 = 1$

Required time

$= \dfrac{D_1D_2(A_1B_2 - A_2B_1)}{D_1(A_1B_3 - A_3B_1) - D_2(A_2B_3 - A_3B_2)}$ days.

$= \dfrac{10 \times 8\,(2 \times 2 - 3 \times 3)}{10(2 \times 1 - 2 \times 3) - 8(3 \times 1 - 2 \times 2)}$

$= \dfrac{80(4 - 9)}{10(2 - 6) - 8(3 - 4)}$

$= \dfrac{-400}{-40 + 8}$

$= \dfrac{-400}{-32} = \dfrac{25}{2}$

$= 12\dfrac{1}{2}$ days

23. (1) 12 (3 men + 4 boys)

= 10 (4 men + 3 boys)

$\Rightarrow$ 36 men + 48 boys

= 40 men + 30 boys

$\Rightarrow$ 4 men = 18 boys

or 2 men = 9 boys

∴ 4 men + 3 boys

= 21 boys who do the work in 10 days

and, 2 men + 3 boys = 12 boys

∴ $M_1D_1 = M_2D_2$

$\Rightarrow$ 21 × 10 = 12 ×D_2

$\Rightarrow D_2$

$= \dfrac{21 \times 10}{12} = \dfrac{35}{2} = 17\dfrac{1}{2}$ days

Aliter : Using Rule 11,

Here, $A_1 = 3$, $B_1 = 4$, $D_1 = 12$

$A_2 = 4$, $B_2 = 3$, $D_2 = 10$

$A_3 = 2$, $B_3 = 3$

Required time

$= \dfrac{D_1D_2(A_1B_2 - A_2B_1)}{D_1(A_1B_3 - A_3B_1) - D_2(A_2B_3 - A_3B_2)}$ days

$= \dfrac{12 \times 10\,(3 \times 3 - 4 \times 4)}{12(3 \times 3 - 2 \times 4) - 10(4 \times 3 - 2 \times 3)}$

$= \dfrac{-120 \times 7}{12 - 60} = \dfrac{-840}{-48} = \dfrac{70}{4}$

$= \dfrac{35}{2} = 17\dfrac{1}{2}$ days

24. (2) Using Rule 1,

4 men ≡ 6 women

1 men ≡ $\dfrac{6}{4} = \dfrac{3}{2}$ women

10 men + 3 women

$= 10 \times \dfrac{3}{2} + 3 = 18$ women

∴ $\dfrac{M_1D_1T_1}{W_1} = \dfrac{M_2D_2T_2}{W_2}$

$\Rightarrow \dfrac{6 \times 12 \times 7}{1} = \dfrac{18 \times D_2 \times 8}{W_2}$

$\Rightarrow D_2 = \dfrac{6 \times 12 \times 7 \times 2}{18 \times 8} = 7$ days

25. (3) Time taken by boy = x days

∴ $\dfrac{1}{10} + \dfrac{1}{24} + \dfrac{1}{x} = \dfrac{1}{6}$

$\Rightarrow \dfrac{1}{x} = \dfrac{1}{6} - \dfrac{1}{10} - \dfrac{1}{24}$

$= \dfrac{20 - 12 - 5}{120} = \dfrac{3}{120} = \dfrac{1}{40}$

$\Rightarrow x = 40$ days

Aliter : Using Rule 18,

Here , x = 6, y = 10, z = 24

Number of days

$= \dfrac{xyz}{yz - x(y + z)}$ days

$= \dfrac{6 \times 10 \times 24}{10 \times 24 - 6(10 + 24)}$

$= \dfrac{1440}{240 - 204}$

$= \dfrac{1440}{36} = 40$ days

26. (3) 40 men ≡ 60 women ≡ 80 children

∴ 10 men ≡ $\dfrac{80}{40} \times 10$

= 20 children

∴ 10 women ≡ $\dfrac{80}{60} \times 10$

$= \dfrac{40}{3}$ children

∴ 10 men + 10 women + 10 children

$= \left(20 + \dfrac{40}{3} + 10\right)$ children

$= \left(\dfrac{60 + 40 + 30}{3}\right)$ children

$= \dfrac{130}{3}$ children

∴ $\dfrac{M_1D_1}{W_1} = \dfrac{M_2D_2}{W_2}$

$D_2 = \dfrac{80 \times 6 \times 13}{130} = \dfrac{144}{13}$ months

∴ Half of the work can do

$= \dfrac{144}{13} \times \dfrac{1}{2} = \dfrac{72}{13} = 5\dfrac{7}{13}$ months

Aliter : Using Rule 13,

Here, A = 40, B= 60, C = 80, a = 6

$A_1 = 10$, $B_1 = 10$, $C_1 = 10$

Time taken $= \dfrac{a}{\dfrac{A_1}{A} + \dfrac{B_1}{B} + \dfrac{C_1}{C}}$

$= \dfrac{6}{\dfrac{10}{40} + \dfrac{10}{60} + \dfrac{10}{80}}$

$= \dfrac{6}{\dfrac{1}{4} + \dfrac{1}{6} + \dfrac{1}{8}}$

$= \dfrac{6}{\dfrac{6 + 4 + 3}{24}} = \dfrac{144}{13}$

Half of the work they do in

$= \dfrac{1}{2} \times \dfrac{144}{13}$ months

$= \dfrac{72}{13} = 5\dfrac{7}{13}$ months

27. (1) Using Rule 11,

According to the question,

1 man ≡ 2 women ≡ 4 boys

∴ 1 man + 1 woman + 1 boy

= (4 + 2 +1) boys = 7 boys

∴ $M_1 D_1 = M_2 D_2$

$\Rightarrow$ 7 × 7 = 1 × D_2

$\Rightarrow D_2$ = 49 days

28. (3) 1 man ≡ 2 women ≡ 3 boys

∴ 1 man + 1 woman + 1 boy

$= \left(3 + \dfrac{3}{2} + 1\right)$ boys

$= \left(\dfrac{6 + 3 + 2}{2}\right)$ boys

$= \dfrac{11}{2}$ boys

$\therefore M_1 D_1 = M_2 D_2$

$\Rightarrow 3 \times 88 = \dfrac{11}{2} \times D_2$

$\Rightarrow D_2 = \dfrac{3 \times 2 \times 88}{11} = 48$ days

Aliter : Using Rule 13,
Here, A = 1, B = 2, C = 3, a= 88
$A_1 = 1$, $B_1 = 1$, $C_1 = 1$

Required time $= \dfrac{a}{\dfrac{A_1}{A} + \dfrac{B_1}{B} + \dfrac{C_1}{C}}$

$= \dfrac{88}{\dfrac{1}{1} + \dfrac{1}{2} + \dfrac{1}{3}}$

$= \dfrac{88}{\dfrac{6+3+2}{6}}$

= 48 days

29. (2) $\because$ 3 men $\equiv$ 7 women

$\therefore$ 7 men $\equiv \dfrac{7 \times 7}{3}$

$= \dfrac{49}{3}$ women

$\therefore$ 7 men + 5 women

$= \left(\dfrac{49}{3} + 5\right)$ women

$= \left(\dfrac{49 + 15}{3}\right)$ women

$= \dfrac{64}{3}$ women

$\therefore \dfrac{M_1 D_1}{W_1} = \dfrac{M_2 D_2}{W_2}$

$\Rightarrow \dfrac{7 \times 32}{1} = \dfrac{64 \times D_2}{3 \times 2}$

$\Rightarrow D_2 = \dfrac{7 \times 32 \times 3 \times 2}{64}$

= 21 days

Aliter : Using Rule 12,
Here, A = 3, B = 7, a = 32
$A_1 = 7$, $B_1 = 5$

Required time $= \dfrac{a}{\dfrac{A_1}{A} + \dfrac{B_1}{B}}$

$= \dfrac{32}{\dfrac{7}{3} + \dfrac{5}{7}}$

$= \dfrac{32}{64} \times 21 = \dfrac{21}{2}$

They do the twice work in

$\dfrac{21}{2} \times 2 = 21$ days

30. (2) 1 man $\equiv$ 2 women $\equiv$ 3 boys

$\therefore$ 1 man + 1 woman + 1 boy

$\equiv 3$ boys + $\dfrac{3}{2}$ boys + 1 boy

$\equiv \left(3 + \dfrac{3}{2} + 1\right)$ boys $\equiv \dfrac{11}{2}$ boys

$\therefore$ By $M_1 D_1 = M_2 D_2$,

$3 \times 44 = \dfrac{11}{2} \times D_2$

$\Rightarrow D_2 = \dfrac{2 \times 3 \times 44}{11} = 24$ days

Aliter : Using Rule 13,
Here, A = 1, B= 2, C = 3, a = 44
$A_1 = 1$, $B_1 = 1$, $C_1 = 1$
Required time

$= \dfrac{a}{\dfrac{A_1}{A} + \dfrac{B_1}{B} + \dfrac{C_1}{C}}$ days

$= \dfrac{44}{\dfrac{1}{1} + \dfrac{1}{2} + \dfrac{1}{3}}$

$= \dfrac{44 \times 6}{11} = 24$ days

31. (3) Using Rule 1,
2 children $\equiv$ 1 man

$\therefore$ 8 children + 12 men $\equiv$ 16 men

$\therefore M_1 D_1 = M_2 D_2$

$\Rightarrow 16 \times 9 = 12 \times D_2$

$\Rightarrow D_2 = \dfrac{16 \times 9}{12} = 12$ days.

32. (1) Work done by 12 men + 16 boys in 5 days

$\equiv$ Work done 13 men + 24 boys in 4 days

$\Rightarrow$ (60 men + 80 boys)'s 1 day's work $\equiv$ (52 men + 96 boys)'s 1 day's work

$\Rightarrow$ (60 – 52) men $\equiv$ (96 – 80) boys

$\Rightarrow$ 8 men $\equiv$ 16 boys

$\Rightarrow$ 1 man $\equiv$ 2 boys

$\therefore$ Required ratio = 2 : 1

33. (2) 20 women complete 1 work in 16 days.
16 men complete same work in 15 days

$\therefore$ 16 × 15 men $\equiv$ 20 × 16 women

$\Rightarrow$ 3 men $\equiv$ 4 women

$\therefore$ Required ratio = 4 : 3

34. (4) 18 men $\equiv$ 36 boys

$\Rightarrow$ 1 man $\equiv$ 2 boys

$\therefore$ 24 men + 24 boys

$\equiv$ (24 + 12) men

$\equiv$ 36 men

$M_1 D_1 T_1 = M_2 D_2 T_2$

$\Rightarrow$ 18 × 24 × 6 = 36 × D_2 × 9

$\Rightarrow D_2 = \dfrac{18 \times 24 \times 6}{36 \times 9} = 8$ days

35. (3) $\because$ 5 men can do 1 work in 14 days.

$\therefore$ 3 men will do $\dfrac{3}{5}$ work in 14 days.

Remaining work $= 1 - \dfrac{3}{5} = \dfrac{2}{5}$

$\therefore$ 5 women do $\dfrac{2}{5}$ work in 14 days.

$\therefore$ Time taken by 5 women in doing 1 work

$= \dfrac{14 \times 5}{2} = 35$ days

$\therefore$ (5 men + 5 women)'s 1 day's work

$= \dfrac{1}{14} + \dfrac{1}{35} = \dfrac{5+2}{70} = \dfrac{7}{70} = \dfrac{1}{10}$

$\therefore$ Required time = 10 days.

TYPE-IV

1. (1) Using basics of Rule 2,

A's work per day $= \dfrac{1}{15}$

B's work per day $= \dfrac{1}{20}$

(A+ B)'s work per day

$= \dfrac{1}{15} + \dfrac{1}{20} = \dfrac{4+3}{60} = \dfrac{7}{60}$

$\therefore$ (A + B)'s work in 4 days

$= 4 \times \dfrac{7}{60} = \dfrac{7}{15}$

Left work $= 1 - \dfrac{7}{15} = \dfrac{15-7}{15} = \dfrac{8}{15}$

2. (3) Using basics of Rule 2,
The part of field cultivated by A in 1 day

$= \dfrac{2}{5 \times 6} = \dfrac{1}{15}$

The part of field cultivated by B in 1 day

$= \dfrac{1}{3 \times 10} = \dfrac{1}{30}$

∴ The part of field cultivated by A and B together

$= \dfrac{1}{15} + \dfrac{1}{30} = \dfrac{3}{30} = \dfrac{1}{10}$

∴ $\dfrac{4}{5}$ part of field cultivated by A and B together in

$= \dfrac{\dfrac{4}{5}}{\dfrac{1}{10}}$ days $= \dfrac{4 \times 10}{5} = 8$ days

3. (1) Using basics of Rule 2,
A can do the whole work in

$\dfrac{20 \times 5}{4} = 25$ days

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

∴ (A + B)'s 1 day's work $= \dfrac{1}{15}$

and A's 1 day's work $= \dfrac{1}{25}$

∴ B's 1 day's work

$= \dfrac{1}{15} - \dfrac{1}{25} \qquad = \dfrac{5-3}{75} = \dfrac{2}{75}$

∴ B can finish the work in $\dfrac{75}{2}$

days i.e., $37\dfrac{1}{2}$ days

4. (1) Using basics of Rule 2,

A's 1 day's work $= \dfrac{1}{18}$

B's 1 day's work $= \dfrac{1}{9}$

∴ (A + B)'s 1 day's work

$= \dfrac{1}{18} + \dfrac{1}{9} = \dfrac{1+2}{18} = \dfrac{3}{18} = \dfrac{1}{6}$

5. (3) Using basics of Rule 2,
Remaining work

$= 1 - \dfrac{7}{10} = \dfrac{3}{10}$

∵ (A + B) take 4 days to do $\dfrac{3}{10}$ work

∴ (A + B) will do the work in

$4 \times \dfrac{10}{3}$ days

$= \dfrac{40}{3} = 13\dfrac{1}{3}$ days

6. (2) Using basics of Rule 2,
Time taken by A and B

$= \dfrac{6 \times 12}{6 + 12} = \dfrac{6 \times 12}{18} = 4$

∴ Work done by A in 4 days

$= \dfrac{4}{6} = \dfrac{2}{3}$

7. (4) Using basics of Rule 3,

A can do $\dfrac{1}{2}$ work in 5 days.

∴ A can do 1 work in 10 days
Similarly,

B can do 1 work in $\dfrac{5}{3} \times 9$

$= 15$ days.

C can do 1 work in $8 \times \dfrac{3}{2}$

$= 12$ days.
Now,

A's 1 day's work $= \dfrac{1}{10}$

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

C's 1 day's work $= \dfrac{1}{12}$

∴ (A + B + C)'s 1 day's work

$= \dfrac{1}{10} + \dfrac{1}{15} + \dfrac{1}{12}$

$= \dfrac{6+4+5}{60} = \dfrac{15}{60} = \dfrac{1}{4}$

Hence, (A + B + C) together can complete the work in 4 days.

8. (3) Using basics of Rule 1,

Work	Days	Men
$\dfrac{7}{8}$	7	28
$\dfrac{1}{8}$	7	x

∴ $\dfrac{7}{8} : \dfrac{1}{8} :: 28 : x$

where x is no. of men

⇒ $\dfrac{7}{8} \times x = \dfrac{1}{8} \times 28$

⇒ $x = \dfrac{28 \times 8}{7 \times 8} = 4$

9. (2) Using basics of Rule 2,
Time taken by A alone in doing the work = 15 days
Time taken by B alone in doing

the work $= \dfrac{10 \times 5}{2} = 25$ days

∴ (A + B)'s 1 day's work

$= \dfrac{1}{15} + \dfrac{1}{25} = \dfrac{5+3}{75} = \dfrac{8}{75}$

∴ Hence, the work will be completed in $\dfrac{75}{8} = 9\dfrac{3}{8}$ days.

10. (3) Using basics of Rule 2,
Time taken by A to complete the

work $= \dfrac{4 \times 3}{2} = 6$ days

Time taken by B to complete the

work $= \dfrac{6 \times 5}{3} = 10$ days

∴ (A + B)'s 1 day's work

$= \dfrac{1}{6} + \dfrac{1}{10} = \dfrac{5+3}{30} = \dfrac{8}{30} = \dfrac{4}{15}$

∴ A and B together will complete

the work in $\dfrac{15}{4} = 3\dfrac{3}{4}$ days.

11. (2) Using basics of Rule 1,

Days	Work	Men
60 ↑	$\frac{3}{4}$	60 ↓
30	$\frac{1}{4}$ ↓	x ↓

$\therefore \left. \begin{array}{c} 30 : 60 \\ \dfrac{3}{4} : \dfrac{1}{4} \end{array} \right\} :: 60 : x$

$\Rightarrow 30 \times \dfrac{3}{4} \times x = 60 \times \dfrac{1}{4} \times 60$

$\Rightarrow x = \dfrac{60 \times 60}{30 \times 3} = 40$

∴ 20 men should be discharged.

12. (2) Time taken by P in completing 1 work = 10 × 4 = 40 days
Time taken by Q in completing 1

work $= \dfrac{15 \times 5}{2} = \dfrac{75}{2}$ days

Time taken by R in completing 1 work = 13 × 3 = 39 days
Time taken by S in completing 1 work = 7 × 6 = 42 days

Clearly, Q took the least time i.e.

$\dfrac{75}{2}$ or $37\dfrac{1}{2}$ days.

13. (3) Using basics of Rule 5,

(A + B)'s 1 day's work $=\dfrac{1}{72}$

(B + C)'s 1 day's work $=\dfrac{1}{120}$

(C + A)'s 1 day's work $=\dfrac{1}{90}$

On adding all three,
2 (A + B + C)'s 1 day's work

$=\dfrac{1}{72}+\dfrac{1}{120}+\dfrac{1}{90}=\dfrac{5+3+4}{360}=\dfrac{1}{30}$

∴ (A + B + C)'s 1 day's work

$=\dfrac{1}{60}$

∴ (A + B + C)'s 3 days' work

$=\dfrac{3}{60}=\dfrac{1}{20}$

14. (1) Using basics of Rule 2,
Time taken by A to finish the work
= 5 × 6 = 30 days
Time taken by B to complete the

work $=\dfrac{8\times 5}{2}$ = 20 days

∴ (A + B)'s 1 day's work

$=\dfrac{1}{30}+\dfrac{1}{20}=\dfrac{2+3}{60}=\dfrac{1}{12}$

∴ Required time = 12 days

15. (1) Using basics of Rule 2,
(A + B)'s 5 days' work

$=5\left(\dfrac{1}{20}+\dfrac{1}{40}\right)$

$=5\left(\dfrac{2+1}{40}\right)=\dfrac{15}{40}=\dfrac{3}{8}$

∴ Remaining work = $1-\dfrac{3}{8}=\dfrac{5}{8}$

16. (4) (A+B)'s 1 day's work

$=\dfrac{1}{20}+\dfrac{1}{30}=\dfrac{3+2}{60}=\dfrac{1}{12}$

∴ Work done in 6 days

$=\dfrac{6}{12}=\dfrac{1}{2}$

Aliter : Using basics of Rule 2,
Here, x = 20, y = 30

They do the work in

$=\dfrac{xy}{x+y}$ days

$=\dfrac{20\times 30}{20+30}$ = 12 days

Half of the work they do in 6 days

17. (1) Using basics of Rule 2,
Let B completes the work in x days.

∴ Work done by A in $\dfrac{3x}{4}$ days

$=\dfrac{1}{2}$

⇒ Time taken by A in completing the work = $2\times\dfrac{3x}{4}=\dfrac{3x}{2}$ days

∴ (A + B)'s 1 day's work

$=\dfrac{1}{x}+\dfrac{2}{3x}=\dfrac{3+2}{3x}=\dfrac{5}{3x}$

∴ $\dfrac{5}{3x}=\dfrac{1}{18}\Rightarrow 3x=90$

⇒ x = 30

Hence, time taken by B in completing the work = 30 days

18. (2) Using basics of Rule 2,
If B completes a work in x days, A will complete the same in

$\dfrac{2x}{3}$ days.

∴ $\dfrac{1}{x}+\dfrac{3}{2x}=\dfrac{1}{10}$

⇒ $\dfrac{2+3}{2x}=\dfrac{1}{10}\Rightarrow 2x=50$

⇒ x = 25 days

19. (4) Using basics of Rule 2,
Ratio of efficiency of A and B
= 3 : 2
Ratio of time taken = 2 : 3
∴ Time taken by A

$=\dfrac{2}{3}\times 18$ = 12 days

∴ (A + B)'s 1 day's work

$=\dfrac{1}{12}+\dfrac{1}{18}=\dfrac{3+2}{36}=\dfrac{5}{36}$

∴ Required time

$=\dfrac{36}{5}=7\dfrac{1}{5}$ days

20. (4) Using basics of Rule 2,

A does $\dfrac{7}{8}$ work in 28 days.

∴ A will complete the work in

$28\times\dfrac{8}{7}$ = 32 days.

B does $\dfrac{5}{6}$ work in 20 days.

∴ B will complete the work

in $\dfrac{20\times 6}{5}$ = 24 days

∴ (A + B)'s 1 day's work

$=\dfrac{1}{32}+\dfrac{1}{24}=\dfrac{3+4}{96}=\dfrac{7}{96}$

∴ Required time

$=\dfrac{96}{7}=13\dfrac{5}{7}$ days

21. (4) Time taken by A and B = x hours (let).
∴ According to the question,
Time taken by A alone
= (x + 8) hours.
Time taken by B alone

$=\left(x+\dfrac{9}{2}\right)$ hours.

∴ $\dfrac{1}{x+8}+\dfrac{1}{x+\dfrac{9}{2}}=\dfrac{1}{x}$

⇒ $\dfrac{1}{x+8}+\dfrac{2}{2x+9}=\dfrac{1}{x}$

⇒ $\dfrac{2x+9+2x+16}{(x+8)(2x+9)}=\dfrac{1}{x}$

⇒ $\dfrac{4x+25}{2x^2+16x+9x+72}=\dfrac{1}{x}$

⇒ $4x^2+25x=2x^2+25x+72$

⇒ $2x^2=72\Rightarrow x^2=\dfrac{72}{2}=36$

⇒ $x=\sqrt{36}$ = 6 hours

22. (1) Using Rule 1,

200 workers do $\dfrac{1}{4}$ work in 50 days.

How many workers will do $\dfrac{3}{4}$ work in 100 days ?
Number of additional workers
= x (let)

∴ $\dfrac{M_1 D_1}{W_1}=\dfrac{M_2 D_2}{W_2}$

$\Rightarrow \dfrac{200 \times 50}{\dfrac{1}{4}}$

$= \dfrac{(200 + x) \times 100}{\dfrac{3}{4}}$

$\Rightarrow (200 + x)\,100$
$= 3 \times 200 \times 50$
$\Rightarrow 200 + x = 300$
$\Rightarrow x = 300 - 200 = 100$

23. (2) Using basics of Rule 2,

x does $\dfrac{1}{4}$ work in 6 days

∴ x does 1 work in 24 days
Similarly,

y does $\dfrac{3}{4}$ work in 12 days

∴ y does 1 work in $\dfrac{12 \times 4}{3}$

= 16 days
$(x + y)$'s 1 day's work

$= \dfrac{1}{24} + \dfrac{1}{16} = \dfrac{2+3}{48} = \dfrac{5}{48}$

∴ Required time $= \dfrac{48}{5}$

$= 9\dfrac{3}{5}$ days

24. (4) Let the time taken by B in doing the work alone $= x$ days
According to the question,
Time taken by A

$= 2 \times \dfrac{3x}{4} = \dfrac{3x}{2}$ days

∴ $\dfrac{1}{x} + \dfrac{1}{\dfrac{3x}{2}} = \dfrac{1}{18}$

$\Rightarrow \dfrac{1}{x} + \dfrac{2}{3x} = \dfrac{1}{18}$

$\Rightarrow \dfrac{3+2}{3x} = \dfrac{1}{18}$

$\Rightarrow 3x = 18 \times 5$

$\Rightarrow x = \dfrac{18 \times 5}{3} = 30$ days

25. (2) Part of work done by A and

B $= \dfrac{19}{23}$

∴ Part of work done by C

$= 1 - \dfrac{19}{23} = \dfrac{4}{23}$

Part of work done by B and C

$= \dfrac{8}{23}$

∴ Part of work done by B

$= \dfrac{8}{23} - \dfrac{4}{23} = \dfrac{4}{23}$

∴ Part of work done by A

$= \dfrac{19}{23} - \dfrac{4}{23} = \dfrac{15}{23}$

∴ Ratio of the shares of wages of A, B and C

$= \dfrac{15}{23} : \dfrac{4}{23} : \dfrac{4}{23} = 15 : 4 : 4$

∴ A's share

$= \dfrac{15}{23} \times 5290 = $ Rs. 3450

26. (4) Using basics of Rule 2
Work done by A and B in 1 day

$= \dfrac{1}{10} + \dfrac{1}{20} = \dfrac{2+1}{20} = \dfrac{3}{20}$

∴ (A + B)'s 5 days' work

$= \dfrac{5 \times 3}{20} = \dfrac{3}{4}$

∴ Remaining work

$= 1 - \dfrac{3}{4} = \dfrac{1}{4}$

27. (2) According to the question,
(4×8) men + (6×8) women ≡ (2×8) men + (9×8) women
$\Rightarrow$ 4 men + 6 women ≡ 2 men + 9 women
$\Rightarrow$ (4 – 2) men ≡ (9 – 6) women
$\Rightarrow$ 2 men ≡ 3 women
∴ 4 men + 6 women ≡ 12 women
∴ $M_1D_1 = M_2D_2$
$\Rightarrow 12 \times 8 = 18 \times D_2$

$\Rightarrow D_2 = \dfrac{12 \times 8}{18} = \dfrac{16}{3} = 5\dfrac{1}{3}$ days

Aliter : Using Rule 1,
Here, $A_1 = 4$, $B_1 = 6$, $D_1 = 8$
$A_2 = 2$, $B_2 = 9$, $D_2 = 8$
$A_3 = 0$, $B_3 = 18$

Required time

$= \dfrac{D_1D_2(A_1B_2 - A_2B_1)}{D_1(A_1B_3 - A_3B_1) - D_2(A_2B_3 - A_3B_1)}$ days

$= \dfrac{8 \times 8(4 \times 9 - 2 \times 6)}{8(4 \times 18 - 0 \times 6) - 8(2 \times 18 - 0 \times 6)}$

$= \dfrac{64 \times 24}{8 \times 72 - 36 \times 8} = \dfrac{192}{36}$

$= \dfrac{16}{3} = 5\dfrac{1}{3}$ days

28. (1) Let time taken by A alone in doing work be x days.
∴ Time taken by B alone
= 3x days

∵ A and B together finish $\dfrac{2}{5}$ work in 9 days.

∴ TIme taken by A and B in doing whole work

$= \dfrac{9 \times 5}{2} = \dfrac{45}{2}$ days

∴ $\dfrac{1}{x} + \dfrac{1}{3x} = \dfrac{2}{45}$

$\Rightarrow \dfrac{3+1}{3x} = \dfrac{2}{45}$

$\Rightarrow \dfrac{4}{3x} = \dfrac{2}{45} \Rightarrow 2 \times 3x = 4 \times 45$

$\Rightarrow x = \dfrac{4 \times 45}{2 \times 3} = 30$ days

∴ Time taken by B = 3x days
= 3 × 30 = 90 days
Aliter : Using Rule 22,
Here, n = 3 and D

$= \dfrac{9 \times 5}{2} = \dfrac{45}{2}$ days

(Time taken to finish whole work)
Time taken by B = (n + 1)D

$= (3 + 1) \times \dfrac{45}{2}$

= 90 days

29. (4) Using Rule 1,

Column 1:

$$\begin{array}{ccc} \text{Men} & \text{Working hours} & \text{Days} \\ 12 \uparrow & 8 \uparrow & 10 \downarrow \\ 16 & 7\frac{1}{2} & x \end{array}$$

$\therefore$ $\left.\begin{array}{c} 16 : 12 \\ \frac{15}{2} : 8 \end{array}\right\} : : 10 : x$

$\Rightarrow 16 \times \dfrac{15}{2} \times x = 12 \times 8 \times 10$

$\Rightarrow 8 \times 15 \times x = 12 \times 8 \times 10$

$\Rightarrow x = \dfrac{12 \times 8 \times 10}{8 \times 15} = 8$ days

30. (4) Using Rule 1,
Remaining work

$= 1 - \dfrac{5}{8} = \dfrac{3}{8}$;

Remaining time = 4 days

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

$\Rightarrow \dfrac{20 \times 12}{\frac{5}{8}} = \dfrac{M_2 \times 4}{\frac{3}{8}}$

$\Rightarrow \dfrac{20 \times 12}{5} = \dfrac{M_2 \times 4}{3}$

$\Rightarrow 4 \times 12 = \dfrac{M_2 \times 4}{3}$

$\Rightarrow M_2 = 12 \times 3 = 36$

$\therefore$ Number of additional workers

$= 36 - 20 = 16$

31. (3) Using Rule 1,

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

$\Rightarrow \dfrac{10}{\frac{2}{3}} = \dfrac{D_2}{\frac{3}{5}}$

$\Rightarrow \dfrac{30}{2} = \dfrac{5D_2}{3}$

$\Rightarrow D_2 = \dfrac{30}{2} \times \dfrac{3}{5} = 9$ days

32. (4) According to the question,

John does $\dfrac{1}{2}$ work in 3 hours.

$\therefore$ Time taken by John in doing whole work = 6 hours

Joe does $\dfrac{1}{8}$ work in 1 hour.

$\therefore$ Time taken by Joe in doing

Column 2:

whole work = 8 hours

Remaining work = $\dfrac{1}{2} - \dfrac{1}{8}$

$= \dfrac{4-1}{8} = \dfrac{3}{8}$ parts

$\therefore$ Time taken by George

$= \dfrac{8 \times 5}{3} = \dfrac{40}{3}$ hours

Work done by all three in 1 hour

$= \dfrac{1}{6} + \dfrac{1}{8} + \dfrac{3}{40}$

$= \dfrac{20 + 15 + 9}{120} = \dfrac{44}{120}$

$= \dfrac{11}{30}$

$\therefore$ Required time = $\dfrac{30}{11}$

$= 2\dfrac{8}{11}$ hours

33. (4) Remaining work = $1 - \dfrac{2}{5}$

$= \dfrac{3}{5}$ parts

$\because$ (A + B) together do $\dfrac{3}{5}$th part of work in 6 days.

$\therefore$ Time taken by A and B in doing whole work = $\dfrac{6 \times 5}{3}$

= 10 days

A does $\dfrac{2}{5}$th part of work in 9 days.

$\therefore$ Time taken by A in doing whole work = $\dfrac{9 \times 5}{2} = \dfrac{45}{2}$ days

$\therefore$ B's 1 day's work = $\dfrac{1}{10} - \dfrac{2}{45}$

$= \dfrac{9-4}{90} = \dfrac{5}{90} = \dfrac{1}{18}$

$\therefore$ Required time = 18 days

34. (1) Remaining work

$= 1 - \dfrac{37}{100}$

$= \dfrac{100 - 37}{100} = \dfrac{63}{100}$

$\therefore$ Time taken by (A + B) in doing

$\dfrac{63}{100}$ part of work

= 7 days

Column 3:

$\therefore$ Time taken by them in doing

whole work = $\dfrac{100}{63} \times 7$

$= \dfrac{100}{9}$ days

Respective ratio of time taken by A and B in doing the work
= 5 : 4

$\therefore$ $\dfrac{1}{4x} + \dfrac{1}{5x} = \dfrac{9}{100}$

$\Rightarrow \dfrac{5+4}{20x} = \dfrac{9}{100}$

$\Rightarrow 20x = 100 \Rightarrow x = 5$

$\therefore$ Required time

$= 4 \times 5 = 20$ days

35. (4) $\because$ Dhiru digs $\dfrac{1}{a}$ part of field

in 20 hours.

$\therefore$ Dhiru digs 1 part of field in 20a hours.

$= \dfrac{1}{60} - \dfrac{1}{20a} = \dfrac{a-3}{60a}$

$\therefore$ Part of field dug by Kaku in 1 hour

$= \dfrac{20(a-3)}{60a} = \dfrac{a-3}{3a}$

36. (2) A can do a work in 12 days. B is 60% more efficient than A.

$\therefore$ Time taken by B

$= \left(\dfrac{100}{160} \times 12\right)$ days

$= \dfrac{15}{2} = 7\dfrac{1}{2}$ days

37. (3) $\because$ B completes $\dfrac{1}{3}$ work in 12 days.

$\therefore$ B will complete 1 work in 12 × 3 = 36 days.

$\therefore$ B's 1 day's work = $\dfrac{1}{36}$

(A + B)'s 1 day's work = $\dfrac{1}{24}$

$\therefore$ A's 1 day's work = $\dfrac{1}{24} - \dfrac{1}{36}$

$= \dfrac{3-2}{72} = \dfrac{1}{72}$

$\therefore$ Time taken by A in doing 1

work = 72 days

Remaining work = $1 - \dfrac{1}{3} = \dfrac{2}{3}$

∴ Time taken by A in doing $\dfrac{2}{3}$

work = $\dfrac{2}{3} \times 72 = 48$ days

38. (3) ∵ A does $\dfrac{1}{3}$rd part of work in 5 days.

∴ A will do 1 work in 5 × 3 = 15 days.

∵ B does $\dfrac{2}{5}$th of work in 10 days.

∴ B will do 1 work in $\dfrac{10 \times 5}{2}$ = 25 days.

∴ (A + B)'s 1 day's work

= $\dfrac{1}{15} + \dfrac{1}{25}$

= $\dfrac{5+3}{75} = \dfrac{8}{75}$

∴ Required time = $\dfrac{75}{8}$

= $9\dfrac{3}{8}$ days

39. (4) Work done by A and B together

= $\dfrac{9}{11}$ parts

∴ Work done by C

= $1 - \dfrac{9}{11} = \dfrac{2}{11}$ parts

Total amount = Rs. 440

∴ C's share = Rs. $\left(\dfrac{2}{11} \times 440 \right)$

= Rs. 80

40. (3) ∵ P does $\dfrac{1}{4}$th work in 10 days.

∴ P will do 1 work in 10 × 4 = 40 days

∵ Q, does 40% part of work in 40 days

∴ Q will do 100% work in

$\dfrac{40 \times 100}{40}$ = 100 days

∵ R, does $\dfrac{1}{3}$rd work in 13 days.

∴ R will do 1 work in 13 × 3 = 39 days

TYPE-V

1. (3) Let B does the whole work in x days

∴ Work done by B in 1 day = $\dfrac{1}{x}$

According to question

A does the $\dfrac{1}{2}$ work in $\dfrac{x}{6}$ days

∴ A does the whole work in $\dfrac{2x}{6}$

or = $\dfrac{x}{3}$ days

∴ Work done by A in one day = $\dfrac{3}{x}$

∴ Work done by A and B together in one day

= $\dfrac{1}{x} + \dfrac{3}{x} = \dfrac{4}{x}$

∴ Time taken to complete the whole work by A and B together

= $\dfrac{1}{\dfrac{4}{x}} = \dfrac{x}{4}$ days

Again, given that

$\dfrac{x}{4} = 10$

∴ x = 40 days

Aliter : Using Rule 22,

Here, n = 3, d = 10

∵ A is 3 times more efficient than B.

Time taken by B = (n + 1) × D

= (3 + 1) × 10

= 40 days

2. (3) Ratio of efficiency of Babu and

Asha = 1 : $\dfrac{7}{4}$ = 4 : 7.

As the time taken is inversely proportional to efficiency, therefore, if Babu takes $7x$ days to complete work, Asha will take $4x$ days.

∴ $\dfrac{1}{7x} + \dfrac{1}{4x} = \dfrac{1}{7}$ ⇒ $\dfrac{4+7}{28x} = \dfrac{1}{7}$

⇒ 28x = 11 × 7

⇒ $x = \dfrac{11 \times 7}{28} = \dfrac{11}{4}$

∴ Asha will complete the work

in 4x = $4 \times \dfrac{11}{4}$ = 11 days.

Aliter : Using Rule 22,

Here, n = $\dfrac{7}{4}$, D = 7

∴ Time taken by Asha

= $\left(\dfrac{n+1}{n} \right) \times D$ days

= $\left(\dfrac{\dfrac{7}{4}+1}{\dfrac{7}{4}} \right) \times 7$

= $\dfrac{11}{7} \times 7$ = 11 days

3. (2) Using Rule 1,

∵ Jyothi can do $\dfrac{3}{4}$th of a job in 12 days.

∴ Jyothi can do 1 job in

$\dfrac{12 \times 4}{3} = 16$ days.

As Mala is twice as efficient as Jyothi,

∴ Mala will finish the job in 8 days.

4. (3) A : B = D_2 : D_1

⇒ 100 : 140 = D_2 : 70

⇒ 100 × 70 = 140 ×D_2

⇒ $D_2 = \dfrac{100 \times 70}{140} = 50$ days.

Aliter : Using Rule 17,

Here, x = 70, r = 40%

Time taken by B

= $x \times \dfrac{100}{100+R}$

= $\dfrac{70 \times 100}{100+40}$ = 50 days

5. (4) Using Rule 1,

Ratio of the working capabilities of a man, a woman and a child = 5 : 4 : 2

∴ Ratio of man, woman and child

equivalence = $\dfrac{1}{5} : \dfrac{1}{4} : \dfrac{1}{2}$

= $\dfrac{1}{5} \times 20 : \dfrac{1}{4} \times 20 : \dfrac{1}{2} \times 20$

= 4 : 5 : 10

or 4 men ≡ 5 women ≡ 10 children

4 men = 10 children

∴ 2 men ≡ 5 children and 6 men ≡ 15 children

5 women = 10 children

∴ 3 women ≡ 6 children

4 women ≡ 8 children

∴ 2 men + 3 women + 4 Children = 15 children

6 men + 4 women + 7 children
= 30 children

Children	Field	Days
15 ↑	10 ↓	10 ↓
30 ┃	16 ↓	x ↓

$\Rightarrow \left.\begin{array}{c} 30 : 15 \\ 10 : 16 \end{array}\right\} :: 10 : x$

where, x is no. of days

$\Rightarrow 30 \times 10 \times x = 15 \times 16 \times 10$

$\Rightarrow x = \dfrac{15 \times 16 \times 10}{30 \times 10} = 8$ days

6. (1) Using basics of Rule 2,
Let B alone can do the work in x days.

$\therefore$ A can do the work in $\dfrac{3x}{2}$ days.

According to the question,

$\dfrac{1}{x} + \dfrac{2}{3x} = \dfrac{1}{18} \Rightarrow \dfrac{3+2}{3x} = \dfrac{1}{18}$

$\Rightarrow \dfrac{5}{3x} = \dfrac{1}{18} \Rightarrow 3x = 18 \times 5$

$\Rightarrow x = \dfrac{18 \times 5}{3} = 30$ days

7. (3) Using basics of Rule 2,
According to the question,
If A takes x days to complete the work, B will take $2x$ days and C will take $4x$ days,
Now, (A + B)'s 1 day's work

$= \dfrac{1}{4}$

$\Rightarrow \dfrac{1}{x} + \dfrac{1}{2x} = \dfrac{1}{4} \Rightarrow \dfrac{2+1}{2x} = \dfrac{1}{4}$

$\Rightarrow 2x = 12 \Rightarrow x = 6$

$\therefore$ C will complete the work in $4x$ i.e. 24 days.

8. (*) Ratio of the work of A and B done in 1 day = 3 : 2
[$\because$ B's work doen = x (let), then

A's work done = $\dfrac{x+50}{100} x = \dfrac{3}{2} x$

So, (A : B)'s work done = $\dfrac{3}{2} x : x$

or 3 : 2]

$\because$ Work done by A and B together

in 1 day = $\dfrac{1}{15}$

$\therefore$ A's 1 day's work = $\dfrac{1}{15} \times \dfrac{3}{5}$

$= \dfrac{1}{25}$

Hence, A alone will finish the work in 25 days.
Aliter : Using Rule 22,

Here, n = $\dfrac{3}{2}$ because A is 50% more efficient than B.
D = 15
Time taken by A

$= \left(\dfrac{n+1}{n}\right) \times D$ days

$= \left(\dfrac{\dfrac{3}{2}+1}{\dfrac{3}{2}}\right) \times 15$

= 25 days

9. (2) Using Rule 2,
If Tapas alone takes x days to complete the work, then

$\dfrac{1}{x} + \dfrac{1}{2x} = \dfrac{1}{12}$

$\Rightarrow \dfrac{2+1}{2x} = \dfrac{1}{12}$

$\Rightarrow 2x = 36$

$\Rightarrow x = 18$ days

10. (3) (A + B)'s 1 day's work

$= \dfrac{1}{12}$ .... (i)

(B + C)'s 1 day's work

$= \dfrac{1}{15}$ .... (ii)

$\therefore$ Difference between A and C's 1 day's work

$= \dfrac{1}{12} - \dfrac{1}{15} = \dfrac{5-4}{60} = \dfrac{1}{60}$

If A alone completes the work in x days, C will do the same in $2x$ days.

$\therefore \dfrac{1}{x} - \dfrac{1}{2x} = \dfrac{1}{60}$

$\Rightarrow \dfrac{2-1}{2x} = \dfrac{1}{60} \Rightarrow \dfrac{1}{2x} = \dfrac{1}{60}$

$\Rightarrow x = 30$

$\therefore$ B's 1 day's work

$= \dfrac{1}{12} - \dfrac{1}{30}$ [From equation (i)]

$= \dfrac{5-2}{60} = \dfrac{3}{60} = \dfrac{1}{20}$

Hence, B alone will complete the work in 20 days.

11. (2) If B alone completes the work in x days, A will do the same in $2x$ days.

$\therefore$ (A + B)'s 1 day's work

$= \dfrac{1}{x} + \dfrac{1}{2x} = \dfrac{2+1}{2x} = \dfrac{3}{2x}$

and C's 1 day's work = $\dfrac{3}{4x}$

$\therefore \dfrac{3}{4x} = \dfrac{1}{20}$

$\Rightarrow 4x = 3 \times 20$

$\Rightarrow x = \dfrac{3 \times 20}{4} = 15$

$\therefore$ (A + B + C)'s 1 day's work

$= \dfrac{1}{2x} + \dfrac{1}{x} + \dfrac{3}{4x} = \dfrac{1}{30} + \dfrac{1}{15} + \dfrac{1}{20}$

$= \dfrac{2+4+3}{60} = \dfrac{9}{60} = \dfrac{3}{20}$

Hence, all three together will complete the work in

$\dfrac{20}{3}$ or $6\dfrac{2}{3}$ days.

12. (2) Using Rule 2,
If A completes the work in x days, B will do the same in $3x$ days.

$\therefore 3x - x = 60$

$\Rightarrow 2x = 60$

$\Rightarrow x = 30$ and $3x = 90$

$\therefore$ (A + B)'s 1 day's work

$= \dfrac{1}{30} + \dfrac{1}{90} = \dfrac{3+1}{90}$

$= \dfrac{4}{90} = \dfrac{2}{45}$

$\therefore$ A and B together will do the

work in $\dfrac{45}{2}$ or $22\dfrac{1}{2}$ days.

13. (2) A does 20% less work than B.
$\therefore$ Ratio of time taken = 5 : 4

A completes a work in $\dfrac{15}{2}$ hours

$\therefore$ Time taken by B to do the same work

$= \dfrac{15}{2} \times \dfrac{4}{5} = 6$ hours.

14. (3) Using Rule 15,
Efficiency and time taken are inversely proportional Bimal : Kamal = 150 : 100 (work)
$\Rightarrow$ 100 : 150 (Time) = 2 : 3
$\therefore$ 3 units $\Rightarrow$ 15 days

$\therefore$ 2 units $\Rightarrow \dfrac{15}{3} \times 2 = 10$

Hence, Bimal complete the work in 10 days

15. (3) Let time taken by C to complete the work = x days
$\therefore$ Time taken by A to complete the work = $3x$ days
and time taken by B to complete

the work = $\dfrac{3x}{2}$ days

According to the question,

$\dfrac{1}{3x} + \dfrac{1}{\dfrac{3x}{2}} + \dfrac{1}{x} = 1$

$\Rightarrow \dfrac{1}{3x} + \dfrac{2}{3x} + \dfrac{1}{x} = 1$

$\Rightarrow \dfrac{1 + 2 + 3}{3x} = 1$

$\Rightarrow \dfrac{6}{3x} = 1 \Rightarrow \dfrac{2}{x} = 1$

$\Rightarrow x = 2$

$\therefore$ Time taken by A
$= 3x = 3 \times 2 = 6$ days

16. (4) Using Rule 2,
Time taken by A to complete the work = x days
$\therefore$ Time taken by B to complete the work = $3x$ days
So, $3x - x = 2x = 40$
$\Rightarrow x = 20$ and $3x = 60$
$\therefore$ (A + B)'s 1 day's work

$= \dfrac{1}{20} + \dfrac{1}{60} = \dfrac{3 + 1}{60}$

$= \dfrac{4}{60} = \dfrac{1}{15}$

$\therefore$ A and B together will complete the work in 15 days.

17. (2) Using Rule 2,
If A completes the work in x days, B will take $2x$ days.

$\therefore \dfrac{1}{x} + \dfrac{1}{2x} = \dfrac{1}{14} \Rightarrow \dfrac{2 + 1}{2x} = \dfrac{1}{14}$

$\Rightarrow 2x = 42 \Rightarrow x = 21$ days

18. (3) Time taken by B

$= \dfrac{21 \times 100}{140} = 15$ days

Aliter : Using Rule 17,
Here, x = 21, R = 40%
Time taken By B

$= \text{x} \times \dfrac{100}{100 + \text{R}}$ days

$= 21 \times \dfrac{100}{140}$ days

= 15 days

19. (3) Using Rule 2,
If the time taken by B to complete the work be x days, then time taken by A
= $(x - 5)$ days

$\therefore \dfrac{1}{x} + \dfrac{1}{x - 5} = \dfrac{9}{100}$

$\Rightarrow \dfrac{x - 5 + x}{x(x - 5)} = \dfrac{9}{100}$

$\Rightarrow 9x^2 - 45x = 200x - 500$
$\Rightarrow 9x^2 - 245x + 500 = 0$
$\Rightarrow 9x^2 - 225x - 20x + 500 = 0$
$\Rightarrow 9x (x - 25) - 20 (x - 25) = 0$
$\Rightarrow (x - 25)(9x - 20) = 0$

$\Rightarrow x = 25$ because $x \neq \dfrac{20}{9}$

20. (1) Using Rule 2,
Let time taken by B in completing the work = x days
$\therefore$ Time taken by A = $(x - 10)$ days

$\therefore \dfrac{1}{x} + \dfrac{1}{x - 10} = \dfrac{1}{12}$

$\Rightarrow \dfrac{x - 10 + x}{x(x - 10)} = \dfrac{1}{12}$

$\Rightarrow 24x - 120 = x^2 - 10x$
$\Rightarrow x^2 - 34x + 120 = 0$
$\Rightarrow x^2 - 30x - 4x + 120 = 0$
$\Rightarrow x (x - 30) - 4 (x - 30) = 0$
$\Rightarrow (x - 4)(x - 30) = 0$
$\Rightarrow x = 30$ because $x \neq 4$

21. (3) Time taken by

B $= 9 \times \dfrac{100}{150} = 6$ days

Aliter : Using Rule 17,
Here, x = 9, R = 50%
Time taken by B

$= \text{x} \times \dfrac{100}{100 + \text{R}}$ days

$= 9 \times \dfrac{100}{150} = 6$ days

22. (2) Using Rule 2,
Time taken by B

$= \dfrac{130}{100} \times 23 = \dfrac{299}{10}$ days

(A + B)'s 1 day's work

$= \dfrac{1}{23} + \dfrac{10}{299}$

$= \dfrac{13 + 10}{299} = \dfrac{23}{299} = \dfrac{1}{13}$

$\therefore$ Time taken by (A + B) = 13 days

23. (2) $5m + 2w = 4m + 4w$
$\Rightarrow m = 2w$
$\therefore$ Required ratio = 2 : 1

24. (1) Time taken by B

$= 12 \times \dfrac{100}{160} = \dfrac{15}{2} = 7\dfrac{1}{2}$ days

Aliter : Using Rule 17,
Here, x = 12, R = 60%
Time taken by B

$= \text{x} \times \dfrac{100}{100 + \text{R}}$ days

$= 12 \times \dfrac{100}{160}$ days

$= \dfrac{15}{2}$ days $= 7\dfrac{1}{2}$ days

25. (4) Time taken by B in completing the work

$= 12 \times \dfrac{100}{160} = \dfrac{15}{2}$ days

$\therefore$ (A+B)'s 1 day's work

$= \dfrac{1}{12} + \dfrac{2}{15} = \dfrac{5 + 8}{60} = \dfrac{13}{60}$

Hence, the work will be completed in $\dfrac{60}{13}$ days

Aliter : Using Rule 17,
Here, x = 12, R = 60%
Time taken by B

$= x \times \dfrac{100}{100+R}$ days

$= 12 \times \dfrac{100}{160}$ days

$= \dfrac{15}{2}$ days

Now using Rule 2,
Time taken by A and B

$= \dfrac{xy}{x+y}$

$= \dfrac{12 \times \dfrac{15}{2}}{12 + \dfrac{15}{2}}$

$= \dfrac{12 \times 15}{39} = \dfrac{60}{13}$ days

26. (3) Using Rule 2,
If A alone completes the work in x days, B will complete the same in $2x$ days.

$\therefore \dfrac{1}{x} + \dfrac{1}{2x} = \dfrac{1}{12}$

$\Rightarrow \dfrac{2+1}{2x} = \dfrac{1}{12}$

$\Rightarrow 2x = 36$

$\therefore$ B alone will complete the work in 36 days (i.e. $2x$).

27. (1) Using Rule 2,
Let time taken by P = x days
Then, time taken by Q = $3x$ days
$\therefore 3x - x = 48 \Rightarrow x = 24$
$\therefore$ (P + Q)'s 1 day's work

$= \dfrac{1}{24} + \dfrac{1}{72} = \dfrac{3+1}{72} = \dfrac{1}{18}$

$\therefore$ Required time = 18 days

28. (2) Using Rule 2 and 3,
If B does the work in $3x$ days, (A + C) will do the same work in x days.
If C does that work in $2y$ days. (A + B) will do it in y days.

$\therefore \dfrac{1}{x} + \dfrac{1}{3x} = \dfrac{1}{10}$

$\Rightarrow \dfrac{4}{3x} = \dfrac{1}{10}$

$\Rightarrow 3x = 40$

$\Rightarrow x = \dfrac{40}{3}$

Again, $\dfrac{1}{y} + \dfrac{1}{2y} = \dfrac{1}{10}$

$\Rightarrow \dfrac{3}{2y} = \dfrac{1}{10} \Rightarrow y = 15$

$\therefore$ (A + B + C)'s 1 day's work $= \dfrac{1}{10}$

$\Rightarrow \dfrac{1}{A} + \dfrac{1}{40} + \dfrac{1}{30} = \dfrac{1}{10}$

$\Rightarrow \dfrac{1}{A} = \dfrac{1}{10} - \dfrac{1}{40} - \dfrac{1}{30}$

$= \dfrac{12 - 3 - 4}{120} = \dfrac{5}{120} = \dfrac{1}{24}$

$\therefore$ A alone will complete the work in 24 days.

29. (1) Ratio of A's and B's efficiency = 4 : 5
Ratio of time taken = 5 : 4

$\therefore$ Time taken by B $= \dfrac{6 \times 4}{5}$

$= \dfrac{24}{5} = 4\dfrac{4}{5}$ days

Aliter : Using Rule 17,
Here, x = 6, R = 25%
Time taken by B

$= x \times \dfrac{100}{100+R}$ days

$= 6 \times \dfrac{100}{125} = 6 \times \dfrac{4}{5}$

$= \dfrac{24}{5} = 4\dfrac{4}{5}$ days

30. (2) Using Rule 2,
If A alone does the work in x days and B alone does the work in y days, then

$\dfrac{1}{x} + \dfrac{1}{y} = \dfrac{1}{5}$ .....(i)

Again, $\dfrac{2}{x} + \dfrac{1}{3y} = \dfrac{1}{3}$ ....(ii)

By equation (ii) × 3 – (i),

$\dfrac{6}{x} + \dfrac{1}{y} - \dfrac{1}{x} - \dfrac{1}{y} = 1 - \dfrac{1}{5}$

$\Rightarrow \dfrac{6}{x} - \dfrac{1}{x} = \dfrac{4}{5}$

$\Rightarrow \dfrac{6-1}{x} = \dfrac{4}{5}$

$\Rightarrow x = \dfrac{25}{4} = 6\dfrac{1}{4}$ days

31. (4) Using Rule 3,
Time taken by Ramesh

$= 4 \times \dfrac{2}{3} = \dfrac{8}{3}$ days

Work done by all three in 1 day

$= \dfrac{1}{4} + \dfrac{1}{6} + \dfrac{3}{8} = \dfrac{6+4+9}{24} = \dfrac{19}{24}$

$\therefore$ Required time

$= \dfrac{24}{19} = 1\dfrac{5}{19}$ days

32. (3) Time taken by Sonia

= 3x days (let)

$\therefore$ Time taken by Pratibha

= x days

$\therefore 3x - x = 60 \Rightarrow 2x = 60$

$\Rightarrow x = 30$ days

$\therefore$ Time taken by Sonia

= 3x days = 3 × 30 = 90 days.

33. (1) Using Rule 3,
Let time taken by A = x days
$\therefore$ Time taken by B = 2x days
Time taken by C = 3x days
According to the question,

$\dfrac{1}{x} + \dfrac{1}{2x} + \dfrac{1}{3x} = \dfrac{1}{6}$

$\Rightarrow \dfrac{6+3+2}{6x} = \dfrac{1}{6}$

$\Rightarrow \dfrac{11}{6x} = \dfrac{1}{6}$

$\Rightarrow 6x = 6 \times 11$

$\Rightarrow x = \dfrac{6 \times 11}{6} = 11$

$\therefore$ Time taken by C alone = 3x
= 3 × 11 = 33 days

34. (4) A is twice as good as B.
$\therefore$ Time taken by A = x days
Time taken by B = 2x days
According to the question,

$\dfrac{1}{x} + \dfrac{1}{2x} = \dfrac{1}{16}$

$\Rightarrow \dfrac{2+1}{2x} = \dfrac{1}{16}$

$\Rightarrow \dfrac{3}{x} = \dfrac{1}{8}$

$\Rightarrow x = 3 \times 8 = 24$ days

35. (2) According to the question,

1 man ≡ 2 boys

∴ 3 men + 4 boys

≡ (3 + 2) men ≡ 5 men

∴ $M_1D_1 = M_2D_2$

$\Rightarrow 5 \times D_1 = 10 \times 8$

$\Rightarrow D_1 = \dfrac{10 \times 8}{5} = 16$ days

36. (1) A is twice efficient than B.

∴ Time taken by B = 12 days

$\Rightarrow$ Time taken by A = 6 days

∴ (A + B)'s 1 day's work

$= \dfrac{1}{6} + \dfrac{1}{12} = \dfrac{2+1}{12} = \dfrac{1}{4}$

∴ Required time = 4 days

37. (1) In second case, the efficiency of a man is twice to that in the first case.

$\boxed{\begin{array}{l} \therefore\ M_1D_1 = 2\ M_2D_2 \\ \Rightarrow\ 10 \times 20 = 2 \times 20 \times D_2 \end{array}}$

$\Rightarrow D_2 = \dfrac{10 \times 20}{2 \times 20} = 5$ days.

38. (2) Time taken by Shashi in doing 1 work = 20 days

Tanya is 25% more efficient than Shashi.

∴ Time taken by Tanya

$= \dfrac{100}{125} \times 20 = 16$ days

TYPE-VI

1. (2) Less persons, more days (Indirect)

More working hours/day, less days (Indirect)

Let required no. of days be x.

Persons   Working hours/day   Days

39↑   5↑   12↓

30| 6| x↓

$\therefore \left.\begin{array}{c} 30\ :\ 39 \\ 6\ :\ 5 \end{array}\right\} :: 12 : x$

$\Rightarrow 30 \times 6 \times x = 39 \times 5 \times 12$

$\Rightarrow x = \dfrac{39 \times 5 \times 12}{30 \times 6} = 13$ days

Aliter : Using Rule 1,

Here, $M_1 = 39$, $D_1 = 12$, $T_1 = 5$

$M_2 = 30$, $D_2 = ?$, $T_2 = 6$

$M_1D_1T_1 = M_2D_2T_2$

$39 \times 12 \times 5 = 30 \times D_2 \times 6$

$D_2 = \dfrac{39 \times 12 \times 5}{30 \times 6}$

$D_2 = 13$ days

2. (1) Using Rule 1,

We know that

$\dfrac{W_1}{M_1D_1} = \dfrac{W_2}{M_2D_2}$

$\Rightarrow \dfrac{280}{72 \times 21} = \dfrac{100}{x \times 18}$,

Where x = number of men

$\Rightarrow x \times 18 \times 280 = 100 \times 72 \times 21$

$\Rightarrow x = \dfrac{100 \times 72 \times 21}{18 \times 280} = 30$

3. (1) Using Rule 1,

7 men ≡ 10 women

or 1 man $= \dfrac{10}{7}$ women

14 men + 20 women

$= \left(\dfrac{10 \times 14}{7} + 20\right)$ women

= 40 women

Now, more work, more days

More women, less days

$\left.\begin{array}{ccc} \text{Work} & 1 & : & 6 \\ \text{Women} & 40 & : & 10 \end{array}\right\} :: 10 : x$

Where x = number of days

$\Rightarrow 1 \times 40 \times x = 6 \times 10 \times 10$

or $x = \dfrac{600}{40} = 15$

4. (1) Using Rule 1,

More persons, less working hours/day

Less days, more working hours/day

$\left.\begin{array}{ccc} \text{Persons} & 7 & : & 5 \\ \text{Days} & 4 & : & 8 \end{array}\right\} :: 7 : x$

where, x is hours/days

∴ $7 \times 4 \times x = 5 \times 8 \times 7$

∴ $x = \dfrac{5 \times 8 \times 7}{7 \times 4} = 10$ hours

5. (4) Using Rule 1,

Weaver   Days   Mats

4↓   4↓   4↓

8↓   8↓   x↓

$\left.\begin{array}{ccc} 4 & : & 8 \\ 4 & : & 8 \end{array}\right\} :: 4 : x$

where, x is no. of mats

$\Rightarrow 4 \times 4 \times x = 8 \times 8 \times 4$

$\therefore x = \dfrac{8 \times 8 \times 4}{4 \times 4} = 16$

6. (1) Using Rule 1,

Men   Days   Working hours

10 ↑   18 ↑   6 ↓

15   12   x

where, x is working hrs/days

$\therefore \left.\begin{array}{c} 15 : 10 \\ 12 : 18 \end{array}\right\} :: 6 : x$

$\Rightarrow 15 \times 12 \times x = 10 \times 18 \times 6$

$\Rightarrow x = \dfrac{10 \times 18 \times 6}{15 \times 12} = 6$ hours

7. (1) Work   Days   Persons

1↓   9↑   2↓

2↓   12↑   x↓

where x = number of persons

$\left.\begin{array}{c} 1 : 2 \\ 12 : 9 \end{array}\right\} :: 2 : x$

$\Rightarrow 1 \times 12 \times x = 2 \times 9 \times 2$

$\Rightarrow x = \dfrac{2 \times 9 \times 2}{12} = 3$

Aliter : Using Rule 1,

Here, $M_1 = 2$, $W_1 = 1$, $D_1 = 9$

$M_2 = ?$, $W_2 = 2$, $D_2 = 12$

$M_1D_1W_2 = M_2D_2W_1$

$2 \times 9 \times 2 = M_2 \times 12 \times 1$

$M_2 = \dfrac{36}{12}$ $M_2 = 3$

8. (4) ∵ P men working P hours/day for P days produce P units of work.

∴ 1 man working 1 hour/day for 1 day produce

$\dfrac{P}{P^3} = \dfrac{1}{P^2}$ units of work

∴ n men working n hours a da

for n day's produce $\dfrac{n^3}{P^2}$ units of

work

Aliter : Using Rule 1,

Here, $M_1 = p$, $D_1 = p$, $T_1 = p$, $W_1 = p$

$M_2 = n$, $D_2 = n$, $T_2 = n$, $W_2 = ?$

$M_1D_1T_1W_2 = M_2D_2T_2W_1$

$p \times p \times p \times w_2 = n \times n \times n \times p$

$$w_2 = \frac{n^3}{p^2}$$

9 (2)

Men	Days
10 ↑	12 ↓
12	x

Where x = number of days

$\Rightarrow 12 : 10 :: 12 : x$

$\Rightarrow 12 \times x = 10 \times 12$

$\Rightarrow x = \dfrac{10 \times 12}{12} = 10$ days

Aliter : Using Rule 1,
Here, $M_1 = 10$, $D_1 = 12$
$M_2 = 12$, $D_1 = ?$
$M_1 D_1 = M_2 D_2$
$10 \times 12 = 12 \times D_2$
$D_2 = 10$ days

10. (3)

Work	Days	Men
1 ↓	12 ↑	7 ↓
2	8	x

$\therefore \left. \begin{array}{c} 1 : 2 \\ 8 : 12 \end{array} \right\} :: 7 : x$

where, x is no. of men

$\Rightarrow 1 \times 8 \times x = 2 \times 12 \times 7$

$\Rightarrow x = \dfrac{2 \times 12 \times 7}{8} = 21$

$\therefore$ Number of additional men
$= 21 - 7 = 14$
Metod 2 :
Using Rule 1,
$M_1 D_1 W_2 = M_2 D_2 W_1$
$\Rightarrow 7 \times 12 \times 2 = M_2 \times 8 \times 1$

$\Rightarrow M_2 = \dfrac{7 \times 12 \times 2}{8} = 21$

$\therefore$ No. of additional men
$= 21 - 7 = 14$

11. (3)

Men	Days
x ↑	30 ↓
$x + 6$	20

$x + 6 : x : : 30 : 20$

$\Rightarrow \dfrac{x+6}{x} = \dfrac{30}{20} = \dfrac{3}{2}$

$\Rightarrow 2x + 12 = 3x$

$\Rightarrow 3x - 2x = 12$

$\Rightarrow x = 12$
Aliter : Using Rule 1,
Here, $M_1 = x$, $D_1 = 30$
$M_2 = x + 6$, $D_2 = 20$

$M_1 D_1 = M_2 D_2$
x × 30 = (x + 6) × 20

$3x = 2x + 12$

x = 12

12. (2) Using Rule 1,
Let the original number of carpenters be x.
$M_1 D_1 = M_2 D_2$
$\Rightarrow x \times 9 = (x - 5) \times 12$
$\Rightarrow 9x = 12x - 60$
$\Rightarrow 3x = 60 \Rightarrow x = 20$

13. (2) Using Rule 1,
2 men + 3 women ≡ 4 men
$\Rightarrow$ 2 men ≡ 3 women
$\therefore$ 3 men + 3 women ≡ 5 men
$\therefore M_1 D_1 = M_2 D_2$
$\Rightarrow 4 \times 20 = 5 \times D_2$

$\Rightarrow D_2 = \dfrac{4 \times 20}{5} = 16$ days

14. (1)

Days	working hours/day
18 ↑	8 ↓
12	x

$\Rightarrow \dfrac{12}{18} = \dfrac{8}{x}$

where x is hours/days
$\Rightarrow 12x = 18 \times 8$

$\Rightarrow x = \dfrac{18 \times 8}{12} = 12$ hours

Aliter : Using Rule 1,
Here, $M_1 = 1$, $D_1 = 18$, $T_1 = 8$
$M_2 = 1$, $D_2 = 12$, $T_2 = ?$
$M_1 T_1 = M_2 D_2 T_2$
$1 \times 18 \times 8 = 1 \times 12 \times T_2$

$T_2 = \dfrac{18 \times 8}{12}$

$T_2 = 12$ hours

15. (4) Using Rule 1,

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

$\Rightarrow \dfrac{M \times 12}{W} = \dfrac{2M \times D_2}{\dfrac{W}{2}}$

$\Rightarrow \dfrac{M \times 12}{W} = \dfrac{4M D_2}{W}$

$\Rightarrow D_2 = 3$ days

16. (4) Using Rule 1,

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

$\therefore \dfrac{W_1}{W_2} = \dfrac{M_1 D_1}{M_2 D_2}$

$\therefore \dfrac{9}{10} = \dfrac{(x-1)(x+1)}{(x+2)(x-1)} = \dfrac{x+1}{x+2}$

$\Rightarrow 10x + 10 = 9x + 18$
$\Rightarrow x = 18 - 10 = 8$

17. (3) Using Rule 1,
$M_1 D_1 T_1 = M_2 D_2 T_2$
$\Rightarrow 80 \times 16 \times 6 = 64 \times 15 \times T_2$

$\Rightarrow T_2 = \dfrac{80 \times 16 \times 6}{64 \times 15} = 8$ hours

18. (1) Using Rule 1,
$M_1 D_1 = M_2 D_2$
$\Rightarrow 18 \times 24 = 27 \times D_2$

$\Rightarrow D_2 = \dfrac{18 \times 24}{27} = 16$ days

19. (3) Using Rule 1,
1 hour's work of 1 man and 4

boys $= \dfrac{1}{160}$

[$\because$ 2 men and 8 boys can do the work in 80 hrs.]
1 hour's work of 1 man 3 women

and 4 boys $= \dfrac{1}{96}$

1 hour's work of 3 women

$= \dfrac{1}{96} - \dfrac{1}{160} = \dfrac{10 - 6}{960} = \dfrac{1}{240}$

1 hour's work of 2 men

$= \dfrac{1}{120} - \dfrac{1}{240} = \dfrac{1}{240}$

1 hour's work of 4 boys

$= \dfrac{1}{160} - \dfrac{1}{480}$

$= \dfrac{3-1}{480} = \dfrac{1}{240}$

$\therefore$ 2 men = 3 women = 4 boys
$\therefore$ 2 men + 8 boys = 12 boys
5 men + 12 boys = 22 boys
$\therefore$ By $M_1 D_1 = M_2 D_2$
$\Rightarrow 12 \times 80 = 22 \times D_2$

$\Rightarrow D_2 = \dfrac{12 \times 80}{22}$

$= \dfrac{480}{11} = 43\dfrac{7}{11}$ hours

20. (3) Using Rule 1,
$M_1 D_1 = M_2 D_2$
$\Rightarrow x \cdot x = y \cdot D_2$

$\Rightarrow D_2 = \dfrac{x^2}{y}$ days

21. (2) Using Rule 1,
$M_1D_1 = M_2D_2$
$\Rightarrow 30 \times 18 = 36 \times D_2$

$\Rightarrow D_2 = \dfrac{30 \times 18}{36}$ = 15 days

22. (1) 20 men $\equiv$ 24 women
$\Rightarrow$ 5 men $\equiv$ 6 women
$\therefore$ 30 men + 12 women
= 40 men
$\therefore M_1D_1 = M_2D_2$
$\Rightarrow 20 \times 20 = 40 \times D_2$

$\Rightarrow D_2 = \dfrac{20 \times 20}{40}$ = 10 days

Aliter : Using Rule 12,
Here, A = 20, B = 24, a = 20
A_1 = 30, B_1 = 12

Required time = $\dfrac{a(A \times B)}{A_1B + B_1A}$

$= \dfrac{20(20 \times 24)}{30 \times 24 + 12 \times 20}$

$= \dfrac{9600}{720 + 240}$

$= \dfrac{9600}{960}$ = 10 days

23. (3) 8 men $\equiv$ 17 women

$\Rightarrow$ 12 men $\equiv \dfrac{17}{8} \times 12$

$= \dfrac{51}{2}$ women

$\therefore$ 12 men + 24 women

$= \dfrac{51}{2} + 24 = \dfrac{99}{2}$ women

By $\dfrac{M_1D_1}{W_1} = \dfrac{M_2D_2}{W_2}$

$\dfrac{17 \times 33}{1} = \dfrac{99 \times D_2}{2 \times 3}$

$\Rightarrow D_2 = \dfrac{17 \times 33 \times 6}{99}$ = 34 days

Aliter : Using Rule 12,
Here, A = 8, B = 17, a = 33
A_1 = 12, B_1 = 24

Number of days $= \dfrac{a(A \times B)}{A_1B + B_1A}$

$= \dfrac{33 \times (8 \times 17)}{12 \times 17 + 24 \times 8}$

$= \dfrac{4488}{204 + 192} = \dfrac{4488}{396}$

No. of days to paint 3 houses

$= \dfrac{4488}{396} \times 3$ = 34 days

24. (4) 3 × 5 men + 7 × 5 women
= 4 × 4 men + 6 × 4 women
$\Rightarrow$ 16 men – 15 men = 35 women
– 24 women
$\therefore$ 1 man = 11 women
$\Rightarrow$ 3 men + 7 women = 40 women
$\therefore M_1D_1 = M_2D_2$
$\Rightarrow 40 \times 5 = 10 \times D_2$
$\Rightarrow D_2$ = 20 days
Aliter : Using Rule 11,
Here, A_1 = 3, B_1 = 7, D_1 = 5
A_2 = 4, B_2 = 6, D_2 = 4
A_3 = 0, B_3 = 10
Required days

$= \dfrac{D_1D_2(A_1B_2 - A_2B_1)}{D_1(A_1B_3 - A_3B_1) - D_2(A_2B_3 - A_3B_1)}$ days

$= \dfrac{5 \times 4(3 \times 6 - 4 \times 7)}{5 \times (3 \times 10 - 0) - 4(4 \times 10 - 0)}$

$= \dfrac{20 \times (-10)}{150 - 160}$ = 20 days

25. (4) Using Rule 1,

$\dfrac{M_1D_1}{W_1} = \dfrac{M_2D_2}{W_2}$

$\Rightarrow \dfrac{110 \times 48}{\dfrac{3}{5}} = \dfrac{M_2 \times 44}{\dfrac{2}{5}}$

$\Rightarrow M_2 \times 44 \times 3 = 110 \times 48 \times 2$

$\Rightarrow M_2 = \dfrac{110 \times 48 \times 2}{44 \times 3}$ = 80

$\therefore$ Number of men can be withdrawn
= 110 – 80 = 30

26. (2) Using Rule 1,

200 men do $\dfrac{1}{4}$ work in 50 days.

$\therefore \dfrac{M_1D_1}{W_1} = \dfrac{M_2D_2}{W_2}$

$\Rightarrow \dfrac{200 \times 50}{\dfrac{1}{4}} = \dfrac{M_2 \times 100}{\dfrac{3}{4}}$

$\Rightarrow M_2 \times 100$
$= 200 \times 50 \times 3$
$\Rightarrow M_2$ = 300
$\therefore$ Additional men = 100

27. (2) Using Rule 1,

Remaining work $= 1 - \dfrac{2}{3} = \dfrac{1}{3}$;

Remaining days = 124 – 64 = 60

$\therefore \dfrac{M_1D_1}{W_1} = \dfrac{M_2D_2}{W_2}$

$\Rightarrow \dfrac{120 \times 64}{\dfrac{2}{3}} = \dfrac{M_2 \times 60}{\dfrac{1}{3}}$

$\Rightarrow M_2 = \dfrac{120 \times 64}{2 \times 60}$ = 64

$\therefore$ No. of men can be discharged
= 120 – 64 = 56 men

28. (2) Using Rule 1,

$\dfrac{M_1D_1T_1}{W_1} = \dfrac{M_2D_2T_2}{W_2}$

$\Rightarrow \dfrac{7 \times 7 \times 7}{7} = \dfrac{5 \times 5 \times 5}{W_2}$

$\Rightarrow 49 \times W_2 = 125$

$\Rightarrow W_2 = \dfrac{125}{49}$

29. (1) Using Rule 1,
$M_1D_1 = M_2D_2$
$\Rightarrow 75 \times 90 = M_2 \times 18$

$\Rightarrow M_2 = \dfrac{75 \times 90}{18}$ = 375

$\therefore$ Number of additional men
= 375 – 75 = 300

30. (*) 4 men $\equiv$ 8 women
$\Rightarrow$ 1 man $\equiv$ 2 women
$\therefore$ 6 men + 12 women
$\equiv$ 12 women + 12 women
$\equiv$ 24 women
$\therefore M_1D_1 = M_2D_2$
$\Rightarrow 8 \times 15 = 24 \times D_2$

$$\Rightarrow D_2 = \frac{8 \times 15}{24} = 5 \text{ days}$$

Aliter : Using Rule 12,
Here, A = 4, B = 8, a = 15
$A_1 = 6$, $B_1 = 12$
Required number of days

$$= \frac{a(A \times B)}{A_1 B + B_1 A}$$

$$= \frac{15(4 \times 8)}{6 \times 8 + 12 \times 4}$$

$$= \frac{15 \times 32}{96} = 5 \text{ days}$$

31. (1) $M_1 D_1 = M_2 D_2$
$\Rightarrow 24 \times 17 = M_2 \times 51$

$$\Rightarrow M_2 = \frac{24 \times 17}{51} = 8 \text{ men}$$

TYPE-VII

1. (2) Ratio of Suman's and Sumati's

1 day's work = $\frac{1}{3} : \frac{1}{2} = 2 : 3$

Sum of the ratios = 2 + 3 = 5

Suman's share = $\frac{2}{5} \times 150 = ₹ 60$

Aliter : Using Rule 24,
Here, m = 3, n = 2, R = 150

Share of suman = $\frac{n}{m+n} \times R$

$$= \frac{2}{3+2} \times 150$$

$$= \frac{2}{5} \times 150 = 60$$

2. (2) Total wages of 500 workers
= 500 × 200 = ₹ 100000
Now, according to question,
Correct Average

$$= \frac{(100000 - 180 - 20 + 80 + 220)}{500}$$

$$= \frac{100100}{500} = ₹ 200.20$$

3. (3) Using Rule 25,
C's 1 day's work

$$= \frac{1}{4} - \left(\frac{1}{8} + \frac{1}{12}\right) = \frac{1}{4} - \left(\frac{3+2}{24}\right)$$

$$= \frac{1}{4} - \frac{5}{24} = \frac{6-5}{24} = \frac{1}{24}$$

$$A : B : C = \frac{1}{8} : \frac{1}{12} : \frac{1}{24} = 3 : 2 : 1$$

C's share = $₹ \left(\frac{1}{6} \times 4500\right) = ₹ 750$

4. (3)

More persons,
more earning
Less working   }Direct proportion
hours, less
earning

$\begin{array}{c} 6 : 9 \\ 8 : 6 \end{array}\}$: : 8400 : x,

where x = required earning
Therefore,
∴ 6 × 8 × x = 9 × 6 × 8400

or $x = \frac{9 \times 6 \times 8400}{6 \times 8} = ₹ 9450$

Aliter : Using Rule 1,
Here, $M_1 = 6$, $T_1 = 8$, wages = x
$M_2 = 9$, $T_2 = 6$, wages = 8400
6 × 8 × x = 9 × 6 × 8400

$x = \frac{9 \times 6 \times 8400}{6 \times 8}$ = Rs. 9450

5. (2) Using Rule 25,

A's 1 day's work = $\frac{1}{6}$

B's 1 day's work = $\frac{1}{8}$

(A + B + C)'s 1 day's work = $\frac{1}{3}$

∴ C's 1day's work

$$= \frac{1}{3} - \frac{1}{6} - \frac{1}{8} = \frac{8-4-3}{24} = \frac{1}{24}$$

∴ Ratio of their one day's work respectively

$$= \frac{1}{6} : \frac{1}{8} : \frac{1}{24} = 4 : 3 : 1$$

Sum of the ratios = 4 + 3 + 1 = 8
∴ C's share

$$= ₹ \frac{1}{8} \times 3200 = ₹ 400$$

6. (4) A's 1 day's work = $\frac{1}{15}$

B's 1 day's work = $\frac{1}{10}$

Ratio = $\frac{1}{15} : \frac{1}{10} = 2 : 3$

Sum of the ratios = 2 + 3 = 5
∴ A's share

$$= ₹ \frac{2}{5} \times 30000 = ₹ 12000$$

Aliter : Using Rule 24,
Here, m = 15, n = 10, R = 30,000

Share of A = $\frac{n}{m+n} \times R$

$$= \frac{10}{15+10} \times 30,000$$

$$= \frac{10}{25} \times 30,000$$

$$= ₹ 12,000$$

7. (4) Man : boy = 3 : 1

∴ Boy's share = $\frac{1}{4} \times 800 = ₹ 200$

∴ The daily wages of boy

$$= ₹ \left(\frac{200}{5}\right) = ₹ 40$$

Aliter : Using Rule 16,
A:B = 3x:x and A:B = t:3t

Share of boy = $\frac{t}{t+3t} \times 800$

$$= 200$$

Daily wages of boy

$$= \frac{200}{5} = ₹ 40$$

8. (2) It is required to find the highest common factor of 5750 and 5000, because his daily wage is their common factor.

```
5000) 5750 (1
      5000
       750) 5000 (6
            4500
             500) 750 (1
                  500
                  250) 500 (2
                       500
                        ×
```

Hence, the daily wage is ₹ 250.

9. (2) Using Rule 25,
Ratio of wages of A, B and C respectively
= 5 × 6 : 6 × 4 : 4 × 9
= 30 : 24 : 36 = 5 : 4 : 6
∴ Amount received by A

$= \dfrac{5}{5+4+6} \times 1800$

$= \dfrac{5}{15} \times 1800 = ₹\ 600$

10. (3) Total salary for 20 days
$= ₹\ (75 \times 20) = ₹\ 1500$
Actual salary received $= ₹\ 1140$
Difference $= ₹\ (1500 - 1140)$
$= ₹\ 360$
Money deducted for 1 day's absence from work
$= ₹\ (15 + 75) = ₹\ 90$
∴ Number of days he was

absent $= \dfrac{360}{90} = 4$ days

11. (3) Using Rule 25,

First man's 1 day's work $= \dfrac{1}{7}$

Second man's 1 day's work $= \dfrac{1}{8}$

Let, Boy's 1 day's work $= \dfrac{1}{x}$

$\therefore \dfrac{1}{7} + \dfrac{1}{8} + \dfrac{1}{x} = \dfrac{1}{3}$

$\Rightarrow \dfrac{1}{x} = \dfrac{1}{3} - \dfrac{1}{7} - \dfrac{1}{8}$

$= \dfrac{56 - 24 - 21}{168} = \dfrac{11}{168}$

∴ Ratio of their one day's work

$= \dfrac{1}{7} : \dfrac{1}{8} : \dfrac{11}{168} = 24 : 21 : 11$

Sum of the ratios
$= 24 + 21 + 11 = 56$
∴ Boy's share in wages

$= \dfrac{11}{56} \times 1400 = ₹\ 275$

12. (4) 5 men ≡ 7 women
[Both earn same amount in 1 day]

$\therefore 7$ men $\equiv \dfrac{7}{5} \times 7 = \dfrac{49}{5}$ women

∴ 7 men + 13 women

$= \dfrac{49}{5} + 13 = \dfrac{114}{5}$ women

Now,
∵ 7 women ≡ ₹ 5250

$\therefore \dfrac{114}{5}$ women

$\equiv \dfrac{5250}{7} \times \dfrac{114}{5} = ₹\ 17100$

13. (1) According to the question,
(2 × 14) men + 14 women
= 16 men + 32 women
⇒ (28 – 16) men
=(32–14) women
⇒ 12 men = 18 women
⇒ 2 men = 3 women

$\therefore 1$ woman $= \dfrac{2}{3}$ man

∴ Amount received by 1 woman

per day$= \dfrac{2}{3} \times 600 = ₹\ 400$

14. (3) Using Rule 25,
Work done by the third person in 1 day

$= \dfrac{1}{8} - \dfrac{1}{16} - \dfrac{1}{24} = \dfrac{6 - 3 - 2}{48} = \dfrac{1}{48}$

Ratio of their 1 day's work

$= \dfrac{1}{16} : \dfrac{1}{24} : \dfrac{1}{48}$

$= 3 : 2 : 1$
∴ Share of the third person

$= \dfrac{1}{(3+2+1)} \times 960 = \dfrac{960}{6} = ₹\ 160$

15. (1) Using Rule 25,
Required ratio
= 15 × 22 : 11 × 25 = 6 : 5

16. (4) Expert's 1 day's work

$= \dfrac{1}{12} - \dfrac{1}{36} - \dfrac{1}{48}$

$= \dfrac{12 - 4 - 3}{144} = \dfrac{5}{144}$

∴ Ratio of their respective work for 1 day

$= \dfrac{1}{36} : \dfrac{1}{48} : \dfrac{5}{144} = 4 : 3 : 5$

∴ Expert's share

$= \dfrac{5}{12} \times 28800 = ₹\ 12000$

17. (1) Using Rule 25,
According to the question,

$\dfrac{1}{15} + \dfrac{1}{12} + \dfrac{1}{C} = \dfrac{1}{5}$

Let C's work in day be $\dfrac{1}{C}$

$\Rightarrow \dfrac{1}{C} = \dfrac{1}{5} - \dfrac{1}{15} - \dfrac{1}{12}$

$= \dfrac{12 - 4 - 5}{60} = \dfrac{1}{20}$

$\therefore A : B : C = \dfrac{1}{15} : \dfrac{1}{12} : \dfrac{1}{20}$

= 4 : 5 : 3
∴ C's share

$= \dfrac{3}{12} \times 1200 = ₹\ 300$

18. (4) A's 1 day's work $= \dfrac{1}{21}$

B's 1 day's work $= \dfrac{1}{28}$

Total work done by both

$= \dfrac{1}{21} + \dfrac{1}{28} = \dfrac{4+3}{84} = \dfrac{1}{12}$

∴ Amount is sufficient to pay 12 days wages of both.
Aliter : Using Rule 2,
Here, x = 21, y = 28
Required days

$= \dfrac{x \times y}{x+y} = \dfrac{21 \times 28}{21+28}$

$= \dfrac{21 \times 28}{49} = 12$ days

19. (4) Rule 2 and Rule 25,
Work done by A and B in 5 days

$= 5\left(\dfrac{1}{12} + \dfrac{1}{15}\right) = 5\left(\dfrac{5+4}{60}\right)$

$= \dfrac{9}{12} = \dfrac{3}{4}$

Time taken by C in doing $\dfrac{1}{4}$ work

= 5 days
∴ C will complete in 20 days.

$\therefore$ Ratio of wages $= \dfrac{1}{12} : \dfrac{1}{15} : \dfrac{1}{20}$

= 5 : 4 : 3
∴ Amount received by A

$= \dfrac{5}{12} \times 960 = ₹\ 400$

20. (2) The daily earning of 'C' = Daily earning of (A + C) and
(B + C) – Daily earning of
(A + B + C) = 94 + 76 – 150
= ₹ 20

21. (3) Rule 3 and Rule 25,
If the fourth person completes the work in x days, then

$\dfrac{3}{8} + \dfrac{3}{12} + \dfrac{3}{16} + \dfrac{3}{x} = 1$

$\Rightarrow \dfrac{1}{x} = \dfrac{1}{3} - \dfrac{1}{8} - \dfrac{1}{12} - \dfrac{1}{16}$

$= \dfrac{16 - 6 - 4 - 3}{48} = \dfrac{1}{16}$

$\therefore$ $x = 16$

$\therefore$ Ratio of wages

$= \dfrac{1}{8} : \dfrac{1}{12} : \dfrac{1}{16} : \dfrac{1}{16}$

$= 6 : 4 : 3 : 3$

Sum of ratios = 6 + 4 + 3+3 = 16

$\therefore$ Fourth person's share

$= \dfrac{3}{16} \times 1200$ = ₹ 225

22. (1) Rule 3 and Rule 25,

If C alone completes the work in x days, then

$\dfrac{1}{16} + \dfrac{1}{24} + \dfrac{1}{x} = \dfrac{1}{6}$

$\Rightarrow \dfrac{1}{x} = \dfrac{1}{6} - \dfrac{1}{16} - \dfrac{1}{24}$

$= \dfrac{8 - 3 - 2}{48} = \dfrac{1}{16}$

$\Rightarrow x = 16$ days

$\therefore$ Ratio of their remuneration

$= \dfrac{1}{16} : \dfrac{1}{24} : \dfrac{1}{16}$

$= 3 : 2 : 3$

$\therefore$ A's remuneration

$= \dfrac{3}{8} \times 400$ = ₹ 150

B's remuneration $= \dfrac{2}{8} \times 400$

= ₹ 100

C's remuneration $= \dfrac{3}{8} \times 400$

= ₹ 150

$\Rightarrow$ A : 150, B : 100, C : 150

23. (4) Using Rule 25,

Skilled : half skilled : unskilled

$= \dfrac{1}{3} : \dfrac{1}{4} : \dfrac{1}{6}$

$= \left(\dfrac{1}{3} \times 12\right) : \left(\dfrac{1}{4} \times 12\right) : \left(\dfrac{1}{6} \times 12\right)$

$= 4 : 3 : 2$

Share of the trained labourer

$= \dfrac{28}{(7 \times 4 + 8 \times 3 + 2 \times 10)} \times 369$

$= \dfrac{28}{(28 + 24 + 20)} \times 369$

$= \dfrac{28}{72} \times 369$ = ₹ 143.50

24. (2) Work done by B

$= 1 - \dfrac{19}{23} = \dfrac{23 - 19}{23} = \dfrac{4}{23}$

$\therefore$ (A + C) : B $= \dfrac{19}{23} : \dfrac{4}{23} = 19 : 4$

$\therefore$ Sum of ratios = 19 + 4 = 23

$\therefore$ B's share

$= \dfrac{4}{23} \times 575$ = ₹ 100

25. (4) Earning in the first one

hour $= \dfrac{2000}{50}$ = Rs. 40

Earnings for additional 5 hours

$= 40 \times \dfrac{3}{2} \times 5$ = Rs. 300

26. (3) (2 men + 1 woman)'s 14 days' work

$\equiv$ (4 women + 2 men)'s 8 days' work

$\Rightarrow$ 28 men + 14 women

$\equiv$ 32 women + 16 men

$\Rightarrow$ (28 – 16) = 12 men

$\equiv$ (32 – 14) = 18 women

$\Rightarrow$ 2 men $\equiv$ 3 women

$\therefore$ 1 woman $\equiv \dfrac{2}{3}$ man

$\because$ Wages per day of 1 man = Rs. 180

$\therefore$ Wages per day of 1 woman

$= \dfrac{2}{3} \times 180$ = Rs. 120

27. (1) Time taken by A $= \dfrac{63}{3.50}$

= 18 days

Time taken by B $= \dfrac{75}{2.5}$

= 30 days

(A + B)'s 1 day's work

$= \dfrac{1}{18} + \dfrac{1}{30}$

$= \dfrac{5 + 3}{90} = \dfrac{8}{90} = \dfrac{4}{45}$

$\therefore$ Required time $= \dfrac{45}{4}$ days

$\therefore$ Total wages

$= $ Rs. $\dfrac{45}{4} \times (3.50 + 2.50)$

$= $ Rs. $\left(\dfrac{45}{4} \times 6\right)$ = Rs. 67.5

28. (3) Ratio of A's and B's 1 day's work

$= \dfrac{1}{12} : \dfrac{1}{15}$ 15 : 12 = 5 : 4

Sum of the terms of ratio = 5 + 4 = 9

$\therefore$ A's share $= $ Rs. $\left(\dfrac{5}{9} \times 450\right)$

= Rs. 250

29. (1) Part of work done by C

$= 1 - \dfrac{7}{11} = \dfrac{4}{11}$

Total amount received = Rs. 550

$\therefore$ C's share = Rs. $\left(\dfrac{4}{11} \times 550\right)$

= Rs. 200

30. (1) Let C alone complete the work in x days.

According to the question,

$\dfrac{1}{5} + \dfrac{1}{15} + \dfrac{1}{x} = \dfrac{1}{3}$

$\Rightarrow \dfrac{1}{x} = \dfrac{1}{3} - \dfrac{1}{5} - \dfrac{1}{15}$

$= \dfrac{5 - 3 - 1}{15} = \dfrac{1}{15}$

$\therefore$ $x = 15$ days = Time taken by C alone.

Ratio of the 1 day's work of A, B and C $= \dfrac{1}{5} : \dfrac{1}{15} : \dfrac{1}{15}$

$= 3 : 1 : 1$

Sum of the terms of ratio = 3 + 1 + 1 = 5

$\therefore$ C's share = Rs. $\left(\dfrac{1}{5} \times 250\right)$ = Rs. 50

31. (1) Let daily wages of a man be Rs. x.

$\therefore$ Daily wages of a woman

$= $ Rs. $\left(x - \dfrac{1}{2}\right)$

According to the question,

$600x + 400\left(x - \dfrac{1}{2}\right)$

$= 1000 \times 2.55$

$\Rightarrow 600x + 400x - 200 = 2550$

$\Rightarrow 1000x = 2550 + 200 = 2750$

$\Rightarrow x = \dfrac{2750}{1000}$ = Rs. 2.75

$\therefore$ Daily wages of a woman

= Rs. (2.75 – 0.5)

= Rs. 2.25

TYPE-VIII

1. (1) Let initially the number of men be x.

$\Rightarrow$ According to question,

$M_1 D_1 W_2 = M_2 D_2 W_1$

x × 30 = (x + 5) × (30 – 10)

x × 30 = 20x + 100

30x – 20x = 100

10x = 100

x = 10

Aliter : Using Rule 23,

Here, D = 30, a = 5, d = 10

Required number = $\dfrac{a(D-d)}{d}$

= $\dfrac{5(30-10)}{10}$ = 10

2. (4) Using Rule 1,

Tricky Approach

Expenditure Days Hours/ Burners
day

450 ↓   8 ↑   6 ↑   6 ↓
625 ↓   10 ↑   5 ↑ x ↓

$\therefore$ $\begin{matrix} 450 & : & 625 \\ 10 & : & 8 \\ 5 & : & 6 \end{matrix}$ $\Bigg\} :: 6 : x$

$\Rightarrow$ 450 × 10 × 5 × x

= 625 × 8 × 6 × 6

$\Rightarrow$ x = $\dfrac{625 \times 8 \times 6 \times 6}{450 \times 10 \times 5}$ = 8

3. (1) Work done by A in 15 days

= $\dfrac{1}{60} \times 15 = \dfrac{1}{4}$

Remaining work = $\left(1 - \dfrac{1}{4}\right) = \dfrac{3}{4}$

Now, $\dfrac{3}{4}$ work is done by B in 30 days

Whole work will be done by B in

$\dfrac{30 \times 4}{3}$ = 40 days

A's 1 day's work = $\dfrac{1}{60}$ and B's 1 day's work = $\dfrac{1}{40}$

(A + B)'s 1 day's work

= $\dfrac{1}{60} + \dfrac{1}{40} = \dfrac{2+3}{120} = \dfrac{5}{120} = \dfrac{1}{24}$

Hence, both will finish the work in 24 days.

4. (3) A's 1 day's work

= (B +C)'s 1 day's work   ...(i)

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

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

(A + B + C)'s 1 day's work

= $\dfrac{1}{10} + \dfrac{1}{50} = \dfrac{5+1}{50} = \dfrac{6}{50} = \dfrac{3}{25}$

...(iii)

(A + A)'s 1 day's work = $\dfrac{3}{25}$

(By (i) & (iii))

A's 1 day's work = $\dfrac{3}{50}$

B's 1 day's work = $\dfrac{1}{10} - \dfrac{3}{50}$

= $\dfrac{5-3}{50} = \dfrac{2}{50} = \dfrac{1}{25}$

Hence, B alone will complete the work in 25 days

5. (3) Using Rule 2,

Let the son take x days to do the work.

$\therefore \dfrac{1}{5} + \dfrac{1}{x} = \dfrac{1}{3}$

$\Rightarrow \dfrac{x+5}{5x} = \dfrac{1}{3}$

$\Rightarrow$ 3x + 15 = 5x

$\Rightarrow$ 2x = 15 $\Rightarrow x = \dfrac{15}{2}$

= $7\dfrac{1}{2}$ days

6. (4) Let the number of men in the beginning = x

Then, $\dfrac{x+8}{x} = \dfrac{60}{50}$

$\Rightarrow \dfrac{x+8}{x} = \dfrac{6}{5}$

$\Rightarrow$ 6x = 5x + 40 $\Rightarrow x$ = 40

Aliter : Using Rule 23,

Here, D = 60, a = 8, d = 10

Required number = $\dfrac{a(D-d)}{d}$

= $\dfrac{8(60-10)}{10}$ = 40

7. (1) 12 persons can complete a work in 4 days.

$\Rightarrow$ 24 persons can complete the work in 2 days.

$\Rightarrow$ 24 persons can complete the 8 times work in 16 days

$\Rightarrow$ 24 × 8 persons = 192 persons can complete the 8 times work in 2 days.

Aliter : Using Rule 1,

Here, M_1 = 12, W_1 = 1, D_1 = 4

M_2 = ?, W_2 = 8, D_2 = 2

$M_1 D_1 W_2 = M_2 D_2 W_1$

12 × 4 × 8 = M_2 × 2 × 1

M_2 = 192

8. (2) Let the original number of workers = x. Then,

x × 100 = (x – 10) × 110

$\Rightarrow$ 10x = 11x – 110

$\Rightarrow x$ = 110

Aliter : Using Rule 23,

Here, D = 100, a = 10,

d = (110 - 100) = 10

Required number = $\dfrac{a(D+d)}{d}$

= $\dfrac{10(100+10)}{10}$ = 110

9. (3) Work done by 12 men in 6 days = $\dfrac{1}{2}$

Remaining work

= $1 - \dfrac{1}{2} = \dfrac{1}{2}$

6 men leave the work.

$\therefore$ Time taken = $\dfrac{12 \times 12}{6 \times 2}$

= 12 days

10. (2) Using Rule 1,

60 men can complete a work in 250 days.

$\therefore$ Work done by 60 men in 1 day

= $\dfrac{1}{250}$

$\Rightarrow$ Work done by 60 men in 200 days = $\dfrac{200}{250} = \dfrac{4}{5}$

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

Work is stopped for 10 days.

Now, $\frac{1}{5}$ work is to be complete by x men in 40 days.

60 men can complete $\frac{1}{5}$ work in 50 days.

Days   Men

50 ↑   60 ↓

40 | x ↓

∴ 40 : 50 : : 60 : x

⇒ 40 x = 50×60

⇒ $x = \dfrac{50 \times 60}{40} = 75$

Hence, 15 more men should be engaged.

11. (1) Using Rule 2,

Working 5 hours a day, A can complete a work in 8 days.

i.e. A can complete the work in 40 hours.

Similarly,

B will complete the same work in 60 hours.

∴ (A + B)'s 1 hour's work

$= \dfrac{1}{40} + \dfrac{1}{60} = \dfrac{3+2}{120}$

$= \dfrac{5}{120} = \dfrac{1}{24}$

Hence, A and B together will complete the work in 24 hours.

∴ They can complete the work in 3 days working 8 hours a day.

12. (4) According to the question,

2 persons with equal abilities can do 1 job in 1 day

∴ Time taken by 1 man to complete 1 job = 2 days

⇒ Time taken by 100 persons in completing 100 jobs = 2 days

13. (2) Part of the field mowed by Ganga and Saraswati in first 2

hours $= \dfrac{1}{8} + \dfrac{1}{12} = \dfrac{3+2}{24} = \dfrac{5}{24}$

∴ Part of the field mowed in first

8 hours $= \dfrac{5 \times 4}{24} = \dfrac{20}{24} = \dfrac{5}{6}$

Remaining work $= 1 - \dfrac{5}{6} = \dfrac{1}{6}$

Now, it is the turn of Ganga, part of work done by Ganga in 1 hour

$= \dfrac{1}{8}$

Remaining work $= \dfrac{1}{6} - \dfrac{1}{8}$

$= \dfrac{4-3}{24} = \dfrac{1}{24}$

Now, time taken by Saraswati in completing this part of work

$= \dfrac{1}{24} \times 12 = \dfrac{1}{2}$ hour

∴ Total time $= 9\dfrac{1}{2}$ hours

The mowing starts at 9 am. Hence, the mowing will be completed at 6.30 pm.

14. (3) Using Rule 1,

Remaining work

$= 5 - \dfrac{7}{2} = \dfrac{3}{2}$

$M_1 \times D_1 \times W_2 = M_2 \times D_2 \times W_1$

⇒ $280 \times 80 \times \dfrac{3}{2}$

$= M_2 \times 20 \times \dfrac{7}{2}$

⇒ $M_2 = \dfrac{280 \times 80 \times 3}{20 \times 7} = 480$

∴ Required number of additional men = 480 – 280 = 200

15. (1) Let B alone do the work in x days.

∴ $6 \times \dfrac{1}{12} + 3 \times \dfrac{1}{x} = 1$

⇒ $\dfrac{1}{2} + \dfrac{3}{x} = 1$

⇒ $\dfrac{3}{x} = \dfrac{1}{2} \Rightarrow x = 6$ days

16. (4) Using Rule 15,

Efficiency and time taken are inversely proportional.

∴ Required ratio = 4 : 3

17. (3) Scheduled time to complete the work = 40 days

25 men in 24 days do $\dfrac{1}{3}$ work

∴ 1 man in 1 day does

$\dfrac{1}{3 \times 25 \times 24} = \dfrac{1}{1800}$ work.

Work remaining $= 1 - \dfrac{1}{3} = \dfrac{2}{3}$

The work is to be completed 4 days before schedule i.e., in (40 – 4) 36 days

No. of days left for $\dfrac{2}{3}$ rd work

= 36 – 24 = 12 days

$\dfrac{1}{1800}$ work is done in 1 day by 1man.

∴ $\dfrac{2}{3}$ work will be done in 12 days by

$1800 \times \dfrac{2}{3} \times \dfrac{1}{12} = 100$ men

25 men are already working

∴ Extra men to be employed

= 100 – 25 = 75

18. (2) 20 × 16 women

≡ 16 × 15 men

⇒ 4 women ≡ 3 men

⇒ $\dfrac{\text{men}}{\text{women}} = \dfrac{4}{3}$

Hence, working capacity of man : woman = 4 : 3

19. (1) Man : Woman (efficiency)

= 3 : 2

i.e., Woman completes $\dfrac{2}{5}$ th work in 18 days.

∴ Time taken by the woman to complete the whole work

$= \dfrac{18 \times 5}{2} = 45$ days

20. (1) 1 man's 1 day's work $= \dfrac{1}{2x}$

1 woman's 1 day's work $= \dfrac{1}{3y}$

∴ Required ratio $= \dfrac{1}{2x} : \dfrac{1}{3y}$

= 3y : 2x

21. (2) Using Rule 1,

$D_1 T_1 = D_2 T_2$

⇒ 18 × 6 = 12 × T_2

$\Rightarrow T_2 = \dfrac{18 \times 6}{12} = 9$ hours

22. (3) Using Rule 1,

Carpenters	Working hours/day	Days	Chairs
12 ↓	6 ↓	240 ↓	460 ↓
18 ↓	8 ↓	36 ↓	x ↓

$\therefore \left. \begin{array}{ccc} 12 & : & 18 \\ 6 & : & 8 \\ 240 & : & 36 \end{array} \right\} : : 460 : x$

$\Rightarrow 12 \times 6 \times 240 \times x$

$\Rightarrow = 18 \times 8 \times 36 \times 460$

$\Rightarrow x = \dfrac{18 \times 8 \times 36 \times 460}{12 \times 6 \times 240} = 138$

23. (3) Using Rule 1,

Length	Breadth	Height	Working hours	days	workers
18 ↓	2 ↓	12 ↓	9 ↑	10 ↑	8 ↓
32 ↓	3 ↓	9 ↓	6 ↑	8 ↑	x ↓

$\therefore \left. \begin{array}{ccc} 18 & : & 32 \\ 2 & : & 3 \\ 12 & : & 9 \\ 6 & : & 9 \\ 8 & : & 10 \end{array} \right\} : : 8 : x$

$\Rightarrow 18 \times 2 \times 12 \times 6 \times 8x = 32 \times 3 \times 9 \times 9 \times 10 \times 8$

$\Rightarrow x = \dfrac{32 \times 3 \times 9 \times 9 \times 10 \times 8}{18 \times 2 \times 12 \times 6 \times 8}$

$= 30$ days

24. (2) (P + Q)'s 1 day's work $= \dfrac{1}{6}$

(Q + R)'s 1 day's work $= \dfrac{7}{60}$

Let P alone do the work in x days.

According to the question,

$\dfrac{3}{x} + \dfrac{6 \times 7}{60} = 1$

$\Rightarrow \dfrac{3}{x} = 1 - \dfrac{7}{10} = \dfrac{3}{10}$

$\Rightarrow x = 10$ days

$\therefore$ Q's 1 day's work

$= \dfrac{1}{6} - \dfrac{1}{10} = \dfrac{5-3}{30} = \dfrac{1}{15}$

R's 1 day's work

$= \dfrac{7}{60} - \dfrac{1}{15} = \dfrac{7-4}{60} = \dfrac{1}{20}$

$\therefore$ Time taken by R = 20 days

$\therefore$ Required answer = 20 – 10

= 10 days

25. (3) Let 150 workers complete the work in x days.

$\therefore$ 150 × x = 150 + 146 + ... to (x + 8) terms

On putting x = 17

LHS = 150 × 17 = 2550

RHS = 150 + 146 + ... to 25 terms

a = 150, d = –4, n = 25

$\therefore$ S $= \dfrac{n}{2}$ $[2a + (n{-}1)\, d]$

$= \dfrac{25}{2}$ $[2 \times 150 + 24 \times (-4)]$

$= \dfrac{25}{2}$ $(300 - 96) = \dfrac{25 \times 204}{2} =$ 2550

Note : It is better to solve by options.

26. (1) Using Rule 1,

According to the question,

$M_1 D_1 = M_2 D_2$

$\Rightarrow (x + 4)\,(x + 5)$

$= (x - 5)\,(x + 20)$

$\Rightarrow x^2 + 5x + 4x + 20$

$= x^2 - 5x + 20x - 100$

$\Rightarrow 9x + 20 = 15x - 100$

$\Rightarrow 15x - 9x = 100 + 20$

$\Rightarrow 6x = 120$

$\Rightarrow x = \dfrac{120}{6} = 20$

27. (3) Let the work be finished in x days.

$\dfrac{x}{50} + \dfrac{x-1}{50} + \dfrac{x-2}{50} + ... +$

$\dfrac{1}{50} = 1$

$\Rightarrow x + x - 1 + x - 2 + ... + 1$

= 50

i.e., 10 + 9 + 8 + ... + 1

= 55

9 + 8 + ... + 1 = 45

$\therefore$ Required time = 10 days

28. (3)

Men	Days	Working hours/day
20 ↑	21 ↑	8 ↓
48 ↑	7 ↑	x ↓

$\therefore \left. \begin{array}{ccc} 48 & : & 20 \\ 7 & : & 21 \end{array} \right\} : : 8 : x$

$\Rightarrow 48 \times 7 \times x = 20 \times 21 \times 8$

$\Rightarrow x = \dfrac{20 \times 21 \times 8}{48 \times 7} = 10$ days

29. (2) Area of the four walls and ceiling of the room

= 2h (l + b) + lb

= 2 × 10 (25 + 12) + 25 × 12

= (20 × 37 + 300) sq. metre

= (740 + 300) sq. metre

= 1040 sq. metre

Area painted by A in 1 day

$= \dfrac{200}{5} = 40$ sq. metre

Area painted by B in 1 day

$= \dfrac{250}{2} = 125$ sq. metre

Area painted by both in 1 day

= (125 + 40) sq. metre

= 165 sq. metre

$\therefore$ Required time $= \dfrac{1040}{165}$

$= \dfrac{208}{33} = 6\dfrac{10}{33}$ days

30. (1) Here, the length of wall is same in both cases.

$\therefore$ $M_1 D_1 = M_2 D_2$

$\Rightarrow 36 \times 21 = M_2 \times 14$

$\Rightarrow M_2 = \dfrac{36 \times 21}{14} = 54$ days

31. (2) Number of days in April and May = 30 + 31 = 61

$\because$ Requirement of rice for 7 days = 56 kg.

$\therefore$ Requirement of rice for 61 days

$= \left(\dfrac{56}{7} \times 61 \right)$ kg.

= 488 kg.

32. (1) Total working time of school

= (45 × 8) minutes

= 360 minutes

If 9 periods are held per day,

Working time of each period

$= \dfrac{360}{9} = 40$ minutes

TEST YOURSELF

1. A alone takes as much time as B and C together take to complete a piece of work. If A and B together take 10 days and B alone takes 50 days to complete it, in what time can A and C together do the work?

(1) $7\frac{1}{2}$ days   (2) $7\frac{1}{7}$ days

(3) $8\frac{1}{7}$ days   (4) $15\frac{1}{7}$ days

2. A can do a work in 12 days and B can do it in 16 days. A and B started the work jointly and A left 2 days before the work is finished. Find the number of days they took to finish the work.

(1) 6 days   (2) 7 days

(3) 9 days   (4) 8 days

3. A and B can do a piece of work in 10 days, B and C in 15 days and C and A in 20 days. C alone can do the work in :

(1) 60 days   (2) 120 days

(3) 80 days   (4) 30 days

4. 12 men and 18 boys working $7\frac{1}{2}$ hours a day can do a work in 60 days. If one man works equal to 2 boys, then the number of boys required to help 21 men to do twice the work in 50 days working 9 hours a day will be :

(1) 42   (2) 44

(3) 46   (4) None of these

5. Rita, Sita and Meeta are employed to do a piece of work for ₹625. Rita and Sita together are supposed to do $\frac{17}{23}$ of the work. What should Meeta be paid?

(1) ₹162.04   (2) ₹163.04

(3) ₹161.04   (4) None of these

6. A contract is to be completed in 50 days and 105 men were set to work, each working 8 hours a day. After 25 days, $\frac{2}{5}$ th of the work is finished.

How many additional men be employed so that the work may be completed on time, each man now working 9 hours a day?

(1) 35   (2) 40

(3) 45   (4) None of these

7. If *A* alone can do a work in 12 days and *B* alone can do it in 8 days, Working together, in how many days will they complete it?

(1) $4\frac{4}{5}$ days   (2) 4 days

(3) $3\frac{4}{5}$ days   (4) 6 days

8. *A* can do $\frac{1}{2}$ of a work in 9 days while *B* can do $\frac{1}{3}$ of the same work in 6 days. How long would it take for *A* and *B* together to complete the work?

(1) 8 days   (2) 9 days

(3) 10 days   (4) 7 days

9. *A* and *B* can do a work in 8 days. *B* alone can do it in 24 days. In how many days, *A* alone can do the same work?

(1) 10 days   (2) 9 days

(3) 12 days   (4) 14 days

10. *A* and *B* can do a piece of work in 12 days, *B* and *C* in 15 days; *C* and *A* in 20 days. In how many days will they finish it working together? In what time can *A* do it separately?

(1) 45 days   (2) 20 days

(3) 60 days   (4) 30 days

11. *A*, *B* and *C* can complete a work in 8 days. *B* alone can do it in 18 days and *C* alone can do it in 24 days. In how many days can *A* alone do the same work?

(1) 36 days   (2) 24 days

(3) 38 days   (4) 30 days

12. *A* can do a piece of work in 40 days. He works on it for 5 days and then *B* completes it in 21 days. How long will *A* and *B* together take to complete the work?

(1) 10 days   (2) 15 days

(3) 20 days   (4) 25 days

13. Ram can do a piece of work in 20 days and Shyam in 30 days. They work together for 10 days. After that Shyam leaves and rest of the work is completed by Ram alone. How long does it take Ram to finish the remaining work?

(1) 3 days   (2) $2\frac{1}{3}$ days

(3) $3\frac{1}{3}$ days   (4) $4\frac{1}{3}$ days

14. *A* and *B* can complete a piece of work in 45 and 40 days respectively. Both started to work together, but after some days *A* left and *B* alone completed the rest work in 23 days. For how many days did *A* work?

(1) 12 days   (2) 10 days

(3) 8 days   (4) 9 days

15. *A* and *B* together can finish a work in 15 days. *A* and *C* take 2 days more to complete the same work than that of *B* and *C*. *A*, *B* and *C* together complete the work in 8 days. In how many days will A finish it separately?

(1) 40 days   (2) 24 days

(3) $17\frac{1}{7}$ days   (4) 20 days

16. *A* and *B* together can do a piece of work in 30 days, *B* and *C* together can do it in 20 days. *A* starts the work and works on it for 5 days, then *B* takes it up and works for 15 days. Finally *C* finishes the work in 18 days. In how many days can C do the work when doing it separately?

(1) 40 days   (2) 24 days

(3) 120 days   (4) 60 days

17. *A* and *B* can do a piece of work in 30 days while *B* and *C* can do the same work in 24 days and *C* and *A* in 20 days. They all work for 10 days when *B* and *C* leave. How many days more will *A* take to complete the work?

(1) 16 days   (2) 15 days

(3) 18 days   (4) 20 days

18. *A*, *B* and *C* can complete a work separately in 24, 36 and 48 days respectively. They started together but *C* left after 4 days of start and *A* left 3 days before the completion of work. In how many days will the work be completed?

(1) 20 days (2) 18 days

(3) 16 days (4) 15 days

19. *A* can complete a work in 24 days, *B* in 32 days and *C* in 64 days. They start together. *A* works for 6 days and leaves and *B* leaves 6 days before the work is finished. In how many days was the work finished?

(1) 20 days (2) 21 days

(3) 22 days (4) 25 days

20. *A* can complete a work in 10 days, *B* can complete the same work in 20 days and *C* in 40 days. *A* starts working on the first day, *B* works for second day and *C* works for third day. Again *A* works for fourth day and *B* for fifth day and so on. If they continued working in the same way, in how many days will the work be completed?

(1) 15 days (2) 16.5 days

(3) 15.5 days (4) 17 days

21. *A* can do a piece of work in 120 days and *B* can do it in 150 days. They work together for 20 days. Then *B* leaves and *A* alone continues the work. 12 days after that *C* joins *A* and the work is completed in 48 days more. In how many days can *C* do it if he works alone?

(1) 230 days (2) 225 days

(3) 240 days (4) 220 days

■ SHORT ANSWERS ■

1. (2)	**2.** (4)	**3.** (2)	**4.** (1)
5. (2)	**6.** (1)	**7.** (1)	**8.** (2)
9. (3)	**10.** (4)	**11.** (1)	**12.** (2)
13. (3)	**14.** (4)	**15.** (1)	**16.** (2)
17. (3)	**18.** (4)	**19.** (1)	**20.** (2)
21. (3)			

■ EXPLANATIONS ■

1. (2) (A + B)'s 1 day's work = $\dfrac{1}{10}$

B's 1 day's work = $\dfrac{1}{50}$

A's 1 day's work = $\dfrac{1}{10} - \dfrac{1}{50}$ =

$\dfrac{5-1}{50} = \dfrac{2}{25}$

(B + C)'s 1 day's work = $\dfrac{2}{25}$

C's 1 day's work = $\dfrac{2}{25} - \dfrac{1}{50}$

= $\dfrac{4-1}{50} = \dfrac{3}{50}$

(A + C)'s 1 day's work

= $\dfrac{2}{25} + \dfrac{3}{50}$

= $\dfrac{4+3}{50} = \dfrac{7}{50}$

∴ (A + C) will complete the work

in $\dfrac{50}{7} = 7\dfrac{1}{7}$ days.

2. (4) Let the required number of days be *x*.

∴ A's work in (*x* – 2) days

= $\dfrac{x-2}{12}$

B's work in *x* days = $\dfrac{x}{16}$

∴ $\dfrac{x-2}{12} + \dfrac{x}{16} = 1$

⇒ $\dfrac{4x-8+3x}{48} = 1$

⇒ 7*x* = 48 + 8 = 56

⇒ *x* = 8 days

3. (2) According to the question

Work done by A and B together

in one day = $\dfrac{1}{10}$ part

Work done by B and C together

in one day = $\dfrac{1}{15}$ part

Work done by C and A together

in one day = $\dfrac{1}{20}$ part

So,

A + B = $\dfrac{1}{10}$ ....(I)

B + C = $\dfrac{1}{15}$ ...(II)

C + A = $\dfrac{1}{20}$ ....(III)

Adding I, II, III, we get

2 (A + B + C) = $\dfrac{1}{10} + \dfrac{1}{15} + \dfrac{1}{20}$

2 (A + B + C) = $\dfrac{6+4+3}{60} = \dfrac{13}{60}$

A + B + C = $\dfrac{13}{120}$ ....(IV)

Putting the value of eqn. (I) in eqn. (IV)

$\dfrac{1}{10} + C = \dfrac{13}{120}$

C = $\dfrac{13}{120} - \dfrac{1}{10} = \dfrac{13-12}{120} = \dfrac{1}{120}$

∴ Work done in 1 day by C is

$\dfrac{1}{120}$ part

Hence, C will finish the whole work in 120 days

Aliter : Using Rule 19,

C alone can do the work in

= $\dfrac{2xyz}{xy - yz + zx}$

= $\dfrac{2 \times 10 \times 15 \times 20}{10 \times 15 - 15 \times 20 + 20 \times 10}$

= $\dfrac{6000}{150 - 300 + 200}$

= $\dfrac{6000}{50}$ = 120 days

4. (1) Using Rule 1,

12 men + 18 boys = 21 men

Work	Hours/day	Days	Men
1 ↓	$\frac{15}{2}$ ↑	60 ↑	21 ↓
2	9	50	x ↓

$\left.\begin{array}{l} 1 : 2 \\ \\ 9 : \dfrac{15}{2} \\ \\ 50 : 60 \end{array}\right\} : : 21 : x$

$\Rightarrow 9 \times 50 \times x = \dfrac{15}{2} \times 60 \times 21 \times 2$

$\Rightarrow x = \dfrac{15 \times 60 \times 21 \times 2}{2 \times 9 \times 50} = 42$

∴ Number of boys
   = 2 × 21 = 42

5. (2) Using Rule 1,
Amount received by Meeta

$= \dfrac{6}{23} \times 625$ = Rs. 163.04

6. (1)

Work	hours/days	Days	Men
$\frac{2}{5}$ ↓	8 ↑	25	105 ↓
$\frac{3}{5}$	9 ↑	25	x ↓

$\therefore \left.\begin{array}{l} \dfrac{2}{5} : \dfrac{3}{5} \\ \\ 9 : 8 \end{array}\right\} : : 105 : x$

$\Rightarrow \dfrac{2}{5} \times 9 \times x = \dfrac{3}{5} \times 8 \times 105$

$\Rightarrow x = \dfrac{3 \times 8 \times 105}{2 \times 9} = 140$

Number of additional men
= 140 – 105 = 35

7. (1) A's one day's work $= \dfrac{1}{12}$

B's one day's work $= \dfrac{1}{8}$

$(A + B)$'s one day's work

$= \dfrac{1}{12} + \dfrac{1}{8} = \dfrac{2+3}{24} = \dfrac{5}{24}$

Now, $\dfrac{5}{24}$ work is done in 1 day

∴ 1 work is done in $= \dfrac{24}{5}$ days

$= 4\dfrac{4}{5}$ days

Aliter : Using Rule 2,
Here, x = 12, y = 8
Required time taken

$= \dfrac{xy}{x+y}$

$= \dfrac{12 \times 8}{12+8} = \dfrac{24}{5}$

$= 4\dfrac{4}{5}$ days

8. (2) A's 9 days' work $= \dfrac{1}{2}$

∴ A's 1 day's work

$= \dfrac{1}{2 \times 9} = \dfrac{1}{18}$

B's 6 days' work $= \dfrac{1}{3}$

∴ B's 1 day's work

$= \dfrac{1}{3 \times 6} = \dfrac{1}{18}$

∴ $(A + B)$'s 1 day's work

$= \dfrac{1}{18} + \dfrac{1}{18} = \dfrac{2}{18} = \dfrac{1}{9}$

∴ A and B both together will complete the work in 9 days.
Aliter : Using Rule 2,
A's 1 day work

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

$\Rightarrow x = 18$
B's 1 day work

$= \dfrac{1}{3 \times 6} = \dfrac{1}{18}$ days

Required time taken = $\dfrac{x \times y}{x+y}$

$= \dfrac{18 \times 18}{18+18}$

$= \dfrac{18 \times 18}{36}$ = 9 days

9. (3) $(A + B)$'s 1 day's work $= \dfrac{1}{8}$

B's 1 day's work $= \dfrac{1}{24}$

∴ A's one day's work
= $(A + B)$'s one day's work – B's one day's work

$= \dfrac{1}{8} - \dfrac{1}{24} = \dfrac{3-1}{24} = \dfrac{2}{24} = \dfrac{1}{12}$

∴ A will complete the work in 12 days.
Aliter : Using Rule 4,
Here, x = 24, y = 8

Required time = $\dfrac{xy}{x-y}$ days

$= \dfrac{24 \times 8}{24-8}$ = 12 days

10. (4) $(A + B)$'s 1 day's work $= \dfrac{1}{12}$

$(B + C)$'s 1 day's work $= \dfrac{1}{15}$

$(C + A)$'s 1 day's work $= \dfrac{1}{20}$

Adding all,
2 $(A + B + C)$'s 1 day's work

$= \dfrac{1}{12} + \dfrac{1}{15} + \dfrac{1}{20}$

$= \dfrac{5+4+3}{60} = \dfrac{12}{60} = \dfrac{1}{5}$

∴ $(A + B + C)$'s 1 day's work

$= \dfrac{1}{5 \times 2} = \dfrac{1}{10}$

∴ $(A + B + C)$ together can complete the work in 10 days.

Now, A's 1 day's work

= $(A + B + C)$'s 1 day's work –
$(B + C)$'s 1 day's work

$= \dfrac{1}{10} - \dfrac{1}{15} = \dfrac{3-2}{30} = \dfrac{1}{30}$

$\therefore$ A alone can finish the work in 30 days.

Aliter : Using Rule 19,

Here, x = 12, y = 15, z = 20
A alone can do in

$= \dfrac{2xyz}{xy + yz - zx}$

$= \dfrac{2 \times 12 \times 15 \times 20}{12 \times 15 + 15 \times 20 - 20 \times 12}$

$= \dfrac{24 \times 300}{180 + 300 - 240}$

$= \dfrac{24 \times 300}{240}$ = 30 days

11. (1) $(A + B + C)$'s 1 day's work

$= \dfrac{1}{8}$

B's 1 day's work $= \dfrac{1}{18}$

C's 1 day's work $= \dfrac{1}{24}$

$\therefore$ A's 1 day's work

= $(A + B + C)$'s 1 day's work – B's
1 day's work – C's 1 day's work

$= \dfrac{1}{8} - \dfrac{1}{18} - \dfrac{1}{24}$

$= \dfrac{9 - 4 - 3}{72} = \dfrac{2}{72} = \dfrac{1}{36}$

$\Rightarrow$ A's 1 day's work $= \dfrac{1}{36}$

$\therefore$ A alone can do the same work in 36 days.

Aliter : Using Rule 18,

Here, x = 8, y = 18, z = 24

Required time = $\dfrac{xyz}{zy - x(y + z)}$

$= \dfrac{8 \times 18 \times 24}{24 \times 18 - 8(18 + 24)}$

$= \dfrac{8 \times 18 \times 24}{432 - 336}$

$= \dfrac{8 \times 18 \times 24}{96}$ = 36 days

12. (2) Using Rule 2,

A's 1 day's work $= \dfrac{1}{40}$

$\therefore$ A's 5 days' work $= \dfrac{5}{40} = \dfrac{1}{8}$

Remaining work $= 1 - \dfrac{1}{8} = \dfrac{7}{8}$

This part of work is done by B in 21 days.

$\therefore$ B's 1 day's work

$= \dfrac{7}{8 \times 21} = \dfrac{1}{24}$

$\therefore$ $(A + B)$'s 1 day's work

$= \dfrac{1}{40} + \dfrac{1}{24} = \dfrac{3 + 5}{120}$

$= \dfrac{8}{120} = \dfrac{1}{15}$

Hence, A and B together will complete the work in 15 days.

13. (3) Ram's 1 day's work $= \dfrac{1}{20}$

Shyam's 1 day's work $= \dfrac{1}{30}$

$\therefore$ (Ram + Shyam)'s 1 day's work

$= \dfrac{1}{20} + \dfrac{1}{30} = \dfrac{3 + 2}{60}$

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

$\therefore$ (Ram + Shyam)'s 10 days'

work $= 10 \times \dfrac{1}{12} = \dfrac{5}{6}$

Þ Remaining work $= 1 - \dfrac{5}{6} = \dfrac{1}{6}$

Now, $\dfrac{1}{6}$ work is completed by

Ram alone.

To finish this part Ram will take

$= \dfrac{\text{Remaining work}}{\text{Ram's 1 day's work}} = \dfrac{\dfrac{1}{6}}{\dfrac{1}{20}}$

$= \dfrac{1}{6} \times 20 = \dfrac{10}{3} = 3\dfrac{1}{3}$ days

14. (4) Using Rule 2,

Let A worked for x days.

A's 1 day's work $= \dfrac{1}{45}$

$\therefore$ A's x day's work $= \dfrac{x}{45}$

B's 1 day's work $= \dfrac{1}{40}$

$\therefore$ B's x day's work

$= \dfrac{1}{40} \times x = \dfrac{x}{40}$

$(A + B)$ together worked for x days.

$\therefore$ $(A + B)$'s x day's work

$= \dfrac{x}{45} + \dfrac{x}{40}$

$= \dfrac{8x + 9x}{360} = \dfrac{17x}{360}$

$\therefore$ Remaining work

$= 1 - \dfrac{17x}{360} = \dfrac{360 - 17x}{360}$

This part of work, i.e., $\dfrac{360 - 17x}{360}$

is completed by B alone in 23 days.

$\therefore$ $\dfrac{360 - 17x}{360} = 23 \times B$'s 1 day's

work

$\dfrac{360 - 17x}{360} = 23 \times \dfrac{1}{40} = \dfrac{23}{40}$

$\Rightarrow$ 360 – 17x

$= \dfrac{23}{40} \times 360 = 207$

$\Rightarrow 17x = 360 - 207 = 153$

$\Rightarrow x = \dfrac{153}{17} = 9$ days

Hence, A worked for 9 days.

15. (1) $(A + B)$'s 1 day's work $= \dfrac{1}{15}$

$(A + B + C)$'s 1 day's work $= \dfrac{1}{8}$

$\therefore$ C's 1 day's work

$= \dfrac{1}{8} - \dfrac{1}{15} = \dfrac{15 - 8}{120} = \dfrac{7}{120}$

Let $(B + C)$ can complete the work in x days.

$\therefore$ $(A + C)$ can complete the work in $(x + 2)$ days.

$\therefore$ $(B + C)$'s 1 day's work $= \dfrac{1}{x}$

$(A + C)$'s 1 day's work $= \dfrac{1}{x+2}$

$\therefore$ B's 1 day's work

$= \dfrac{1}{x} - \dfrac{7}{120} = \dfrac{120 - 7x}{120x}$

and, A's 1 day's work

$= \dfrac{1}{x+2} - \dfrac{7}{120}$

$= \dfrac{120 - 7(x+2)}{120(x+2)}$

$= \dfrac{106 - 7x}{120(x+2)}$

Now, A's 1 day's work + B's 1 day's work = $(A + B)$'s 1 day's work

$\Rightarrow \dfrac{106 - 7x}{120(x+2)} + \dfrac{120 - 7x}{120x} = \dfrac{1}{15}$

$\Rightarrow \dfrac{106x - 7x^2 + 120x + 240 - 7x^2 - 14x}{120x(x+2)}$

$= \dfrac{1}{15}$

$\Rightarrow -14x^2 + 212x + 240$

$= 8x^2 + 16x$

$\Rightarrow 22x^2 - 196x - 240 = 0$

$\Rightarrow 11x^2 - 98x - 120 = 0$

$\Rightarrow 11x^2 - 110x + 12x - 120 = 0$

$\Rightarrow 11x(x - 10) + 12(x - 10) = 0$

$\Rightarrow (x - 10)(11x + 12) = 0$

$\Rightarrow x = 10$, and $-\dfrac{12}{11}$

But no. of days cannot be negative

$\therefore x = 10$

$\therefore$ A's 1 day's work

$= \dfrac{1}{10 + 2} - \dfrac{7}{120}$

$= \dfrac{1}{12} - \dfrac{7}{120}$

$= \dfrac{10 - 7}{120} = \dfrac{3}{120} = \dfrac{1}{40}$

$\therefore$ A alone can complete the work in 40 days.

16. (2) Let us denote A's 1 day's work by A, B's 1 day's work by B and C's work by C.

So, $A + B = \dfrac{1}{30}$

and $B + C = \dfrac{1}{20}$

Also, $5A + 15B + 18C = 1$ work. This can be written as,
$5(A + B) + 10(B + C) + 8C = 1$
Substituting the values of $(A + B)$ and $(B + C)$ we get,

$\left(5 \times \dfrac{1}{30}\right) + \left(10 \times \dfrac{1}{20}\right) + 8C = 1$

or $\dfrac{1}{6} + \dfrac{1}{2} + 8C = 1$

or $8C = 1 - \dfrac{1}{6} - \dfrac{1}{2}$

or $8C = \dfrac{6 - 1 - 3}{6}$

or $8C = \dfrac{2}{6}$

or $C = \dfrac{2}{6 \times 8} = \dfrac{1}{24}$

Hence, C will complete the work in 24 days.

17. (3) Using Rule 3,

$(A + B)$'s 1 day's work $= \dfrac{1}{30}$

$(B + C)$'s 1 day's work $= \dfrac{1}{24}$

$(C + A)$'s 1 day's work $= \dfrac{1}{20}$

Adding all the above, we have
$2(A + B + C)$'s 1 day's work

$= \dfrac{1}{30} + \dfrac{1}{24} + \dfrac{1}{20}$

$= \dfrac{4 + 5 + 6}{120} = \dfrac{15}{120} = \dfrac{1}{8}$

$\therefore$ $(A + B + C)$'s 1 day's work

$= \dfrac{1}{8 \times 2} = \dfrac{1}{16}$

Now, all three worked together for 10 days.

$\therefore$ $(A + B + C)$'s 10 days' work

$= \dfrac{1}{16} \times 10 = \dfrac{5}{8}$

$\therefore$ Remaining part of work

$= 1 - \dfrac{5}{8} = \dfrac{8 - 5}{8} = \dfrac{3}{8}$

Now, A's 1 day's work

$= \dfrac{1}{16} - \dfrac{1}{24} = \dfrac{3 - 2}{48} = \dfrac{1}{48}$

Since, A finishes $\dfrac{1}{48}$ part of work

in 1 day

$\therefore$ A will finish $\dfrac{3}{8}$ part of work

in $1 \times 48 \times \dfrac{3}{8} = 18$ days.

18. (4) Let the work be completed in x days. Therefore, A worked for $x - 3$ days, B for x days and C for 4 days.

A's 1 day's work $= \dfrac{1}{24}$

B's 1 day's work $= \dfrac{1}{36}$

and, C's 1 day's work $= \dfrac{1}{48}$

$\therefore (x-3) \times \dfrac{1}{24} + x \times \dfrac{1}{36} + 4 \times \dfrac{1}{48} = 1$

$\Rightarrow \dfrac{x-3}{24} + \dfrac{x}{36} + \dfrac{1}{12} = 1$

$\Rightarrow \dfrac{3x - 9 + 2x + 6}{72} = 1$

$\Rightarrow 5x - 3 = 72$

$\Rightarrow 5x = 75$

$\Rightarrow x = \dfrac{75}{5} = 15$

Hence, the work was completed in 15 days.

19. (1) Let the work was completed in x days. Hence, A worked for 6 days, B worked for $(x-6)$ days and C worked for x days.

Now, A's 1 day's work $= \dfrac{1}{24}$

$\therefore$ A's 6 days' work

$= \dfrac{1}{24} \times 6 = \dfrac{1}{4}$

B's 1 day's work $= \dfrac{1}{32}$

$\therefore$ B's $(x-6)$ days' work

$= \dfrac{1}{32} \times (x-6) = \dfrac{x-6}{32}$

C's 1 day's work $= \dfrac{1}{64}$

$\therefore$ C's x days' work

$= \dfrac{1}{64} \times x = \dfrac{x}{64}$

$\therefore \dfrac{1}{4} + \dfrac{x-6}{32} + \dfrac{x}{64} = 1$

$\Rightarrow \dfrac{x-6}{32} + \dfrac{x}{64} = 1 - \dfrac{1}{4} = \dfrac{3}{4}$

$\Rightarrow \dfrac{2x - 12 + x}{64} = \dfrac{3}{4}$

$\Rightarrow 3x - 12 = 48$

$\Rightarrow 3x = 48 + 12 = 60$

$\Rightarrow x = \dfrac{60}{3} = 20$

Hence, the work was completed in 20 days.

20. (2) A's work for the first day

$= \dfrac{1}{10}$

B's work for the second day

$= \dfrac{1}{20}$

C's work for the third day $= \dfrac{1}{40}$

Work done in 3 days by them

together $= \dfrac{1}{10} + \dfrac{1}{20} + \dfrac{1}{40}$

$= \dfrac{4+2+1}{40} = \dfrac{7}{40}$

Hence, $\dfrac{7}{40}$ part of work will be completed in 3 days.

$\dfrac{7 \times 5}{40}$ i.e $\dfrac{35}{40}$ part of work will be completed in 3 × 5 or 15 days.

Remaining work

$= 1 - \dfrac{35}{40} = \dfrac{5}{40} = \dfrac{1}{8}$

Now, A will work on 16th day. The remaining work after 16 days

$= \dfrac{1}{8} - \dfrac{1}{10} = \dfrac{5-4}{40} = \dfrac{1}{40}$

Again, B will work on 17th day.
$\because$ B completes the work in 20 days.

$\therefore$ B will complete $\dfrac{1}{40}$ part of

work in $20 \times \dfrac{1}{40} = \dfrac{1}{2}$ day

Hence, Total time taken in completion of work

$= 15 + 1 + \dfrac{1}{2} = 16\dfrac{1}{2}$ days

21. (3) A's 1 day's work $= \dfrac{1}{120}$

B's 1 day's work $= \dfrac{1}{150}$

$(A + B)$'s 1 day's work

$= \dfrac{1}{120} + \dfrac{1}{150}$

$= \dfrac{5+4}{600} = \dfrac{9}{600} = \dfrac{3}{200}$

$(A + B)$ work together for 20 days
Hence, $(A + B)$'s 20 days' work

$= 20 \times \dfrac{3}{200} = \dfrac{3}{10}$

After 20 days B leaves, and A alone works for 12 days
$\therefore$ A's 12 days' work

$= \dfrac{1}{120} \times 12 = \dfrac{1}{10}$

Now, after 12 days, C joins A and the work is finished in 48 days. It means A works for 48 days more.
$\therefore$ A's 48 days' work

$= \dfrac{1}{120} \times 48 = \dfrac{2}{5}$

$\therefore$ Total work done by A and B together

$= \dfrac{3}{10} + \dfrac{1}{10} + \dfrac{2}{5}$

$= \dfrac{3+1+4}{10} = \dfrac{8}{10} = \dfrac{4}{5}$

$\therefore$ Remaining work

$= 1 - \dfrac{4}{5} = \dfrac{1}{5}$

This part of work, i.e., $\dfrac{1}{5}$ is done

by C in 48 days

$\therefore$ C's 48 days' work $= \dfrac{1}{5}$

$\therefore$ C's 1 day's work

$= \dfrac{1}{5 \times 48} = \dfrac{1}{240}$

Hence, C alone can finish the work in 240 days.

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