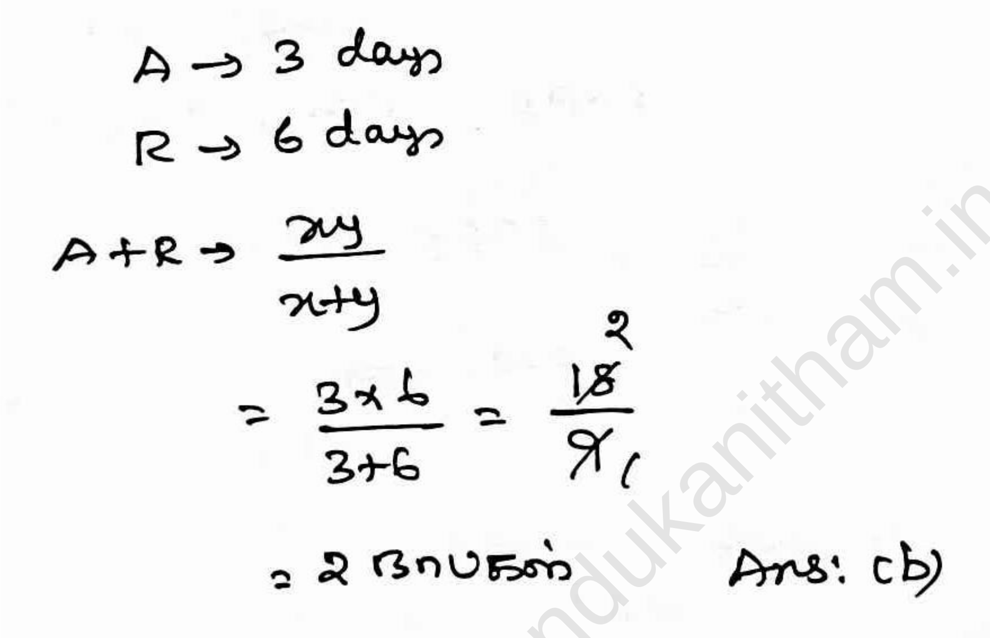
2023 TNPSC EXAMS MATHS QUESTIONS

TIME AND WORK – ANSWER KEY

1) B



A → 3 days

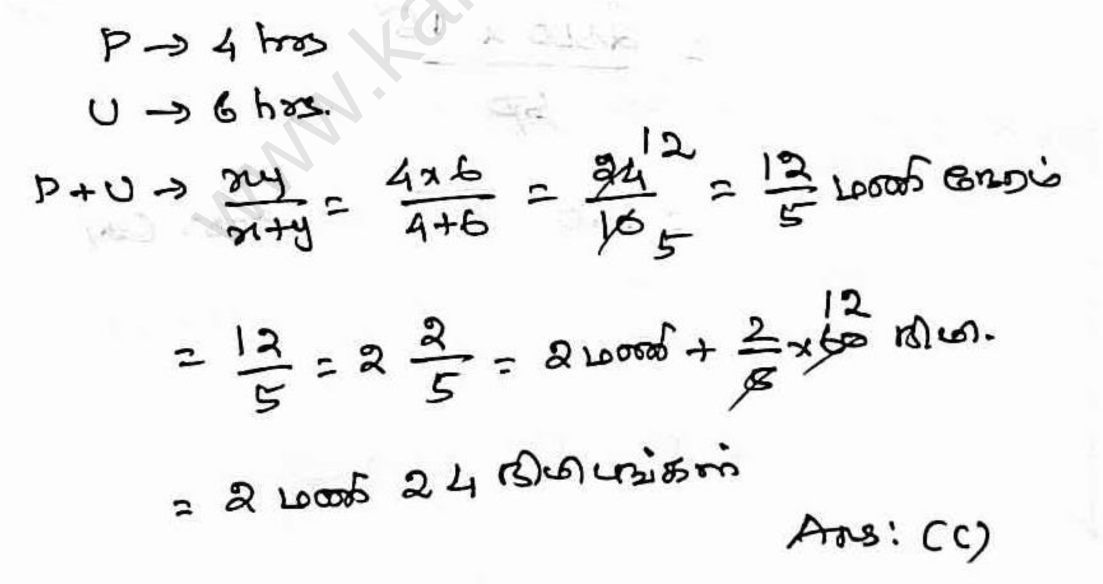
R → 6 days

A+R → $\frac{xy}{x+y}$

$= \frac{3\times6}{3+6} = \frac{\cancel{18}^{2}}{\cancel{9}_{1}}$

= 2 நாட்கள் Ans: (b)

2) C



P → 4 hrs

U → 6 hrs.

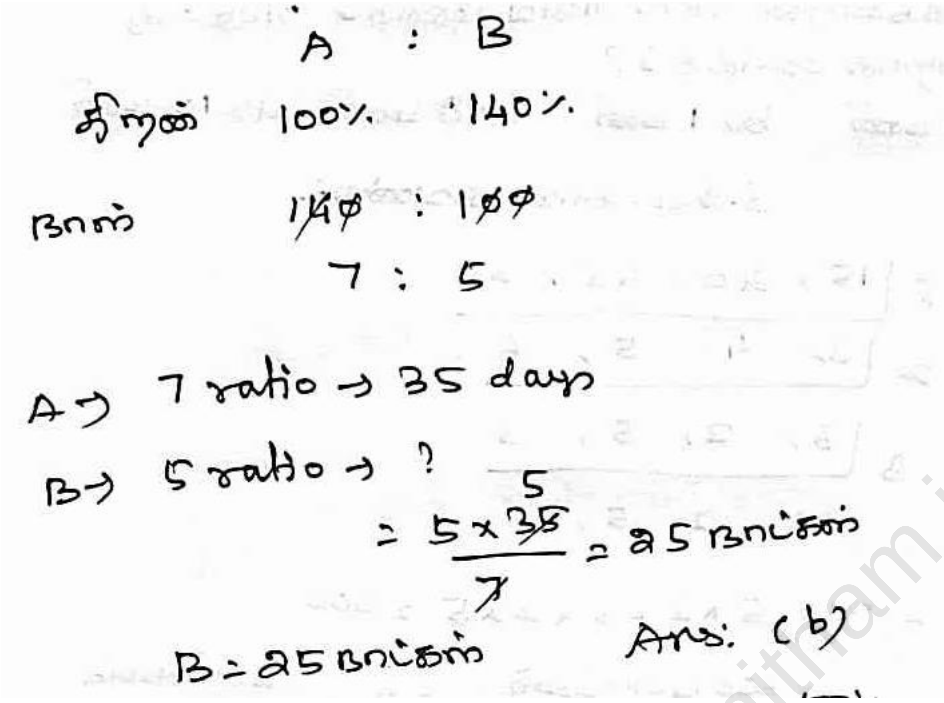
P+U → $\frac{xy}{x+y} = \frac{4\times6}{4+6} = \frac{\cancel{24}^{12}}{\cancel{10}_{5}} = \frac{12}{5}$ மணி நேரம்

$= \frac{12}{5} = 2\frac{2}{5} =$ 2 மணி + $\frac{2}{\cancel{5}} \times \cancel{60}^{12}$ நிமி.

= 2 மணி 24 நிமிடங்கள்

Ans: (C)

3) B



A : B

திறன் 100% : 140%

நாள் $1\cancel{4}\cancel{0} : 1\cancel{0}\cancel{0}$

7 : 5

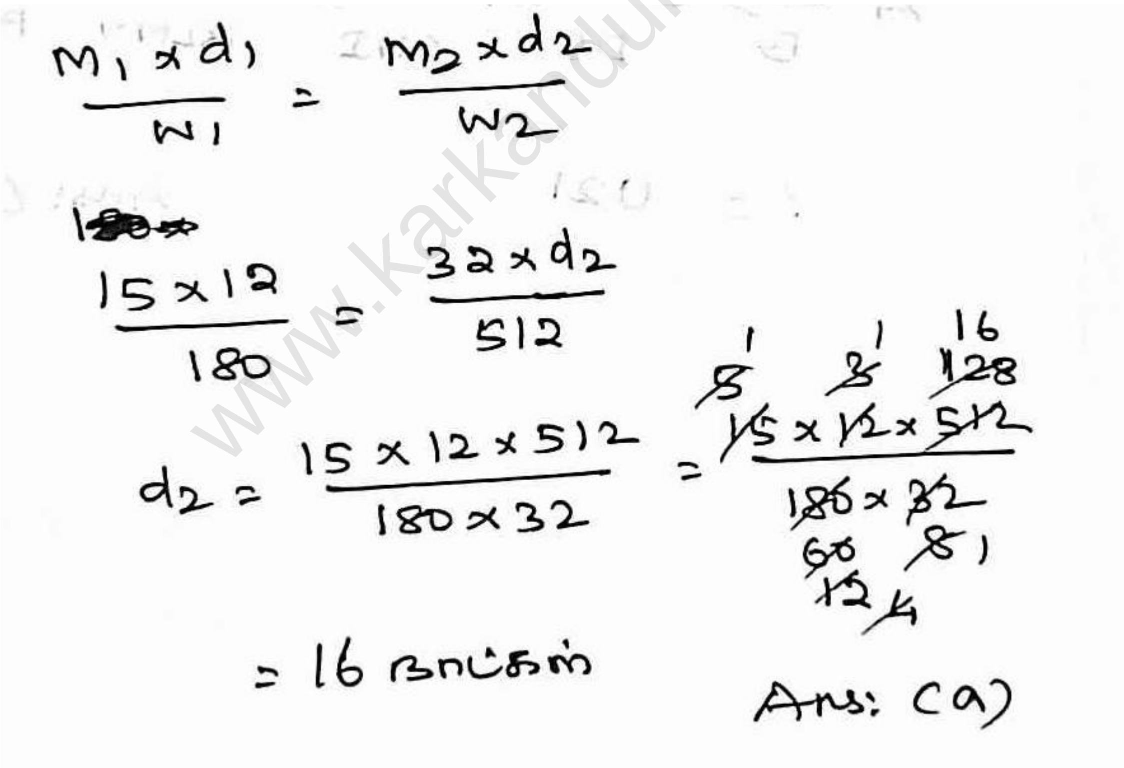
A → 7 ratio → 35 days

B → 5 ratio → ?

$= \frac{5 \times \overset{5}{\cancel{35}}}{\cancel{7}}$ = 25 நாட்கள்

B = 25 நாட்கள்   Ans: (b)

4) A



$$\frac{M_1 \times d_1}{W_1} = \frac{M_2 \times d_2}{W_2}$$

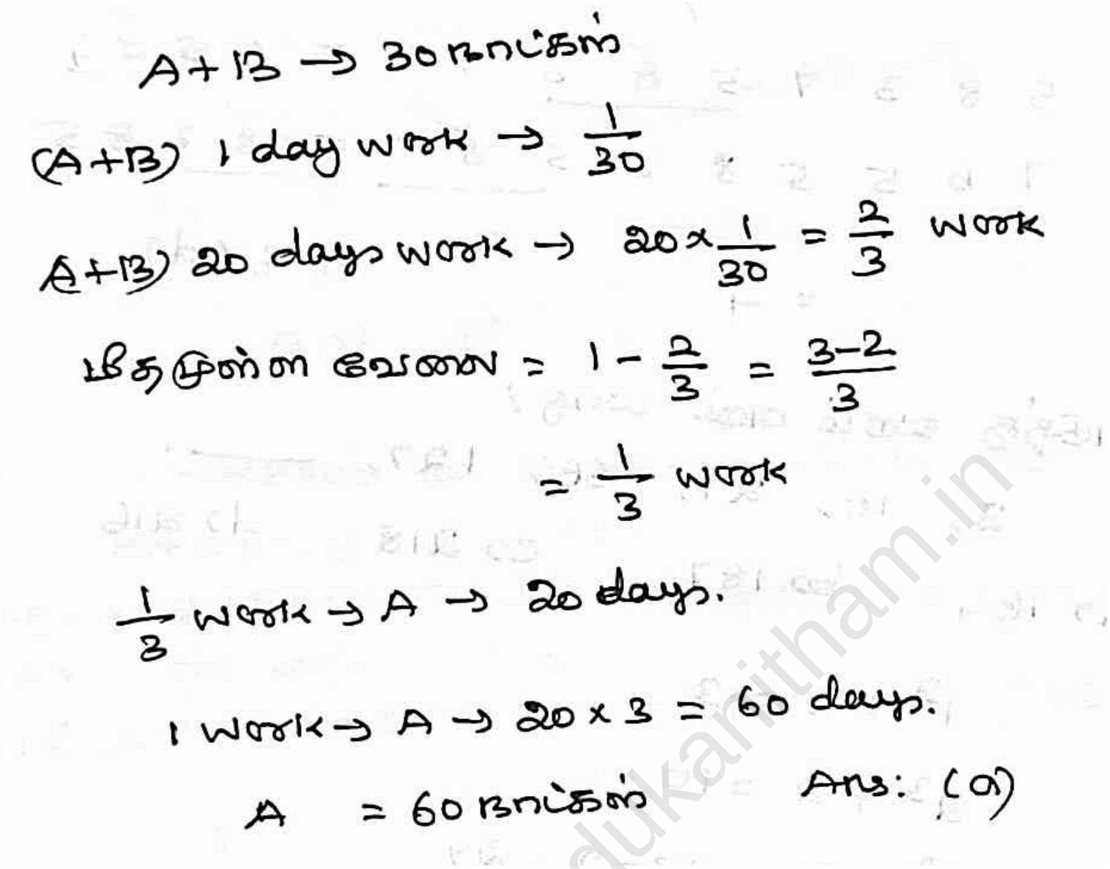
$$\frac{15 \times 12}{180} = \frac{32 \times d_2}{512}$$

$$d_2 = \frac{15 \times 12 \times 512}{180 \times 32} = \frac{\overset{1}{\cancel{15}} \times \overset{1}{\cancel{12}} \times \overset{16}{\cancel{512}}}{\underset{12}{\underset{60}{\cancel{180}}} \times \underset{4}{\underset{8}{\cancel{32}}}}$$

= 16 நாட்கள்

Ans: (a)

5) A



$A+B \rightarrow 30$ நாட்கள்

$(A+B)$ 1 day work $\rightarrow \frac{1}{30}$

$(A+B)$ 20 days work $\rightarrow 20 \times \frac{1}{30} = \frac{2}{3}$ work

மீதமுள்ள வேலை $= 1 - \frac{2}{3} = \frac{3-2}{3}$

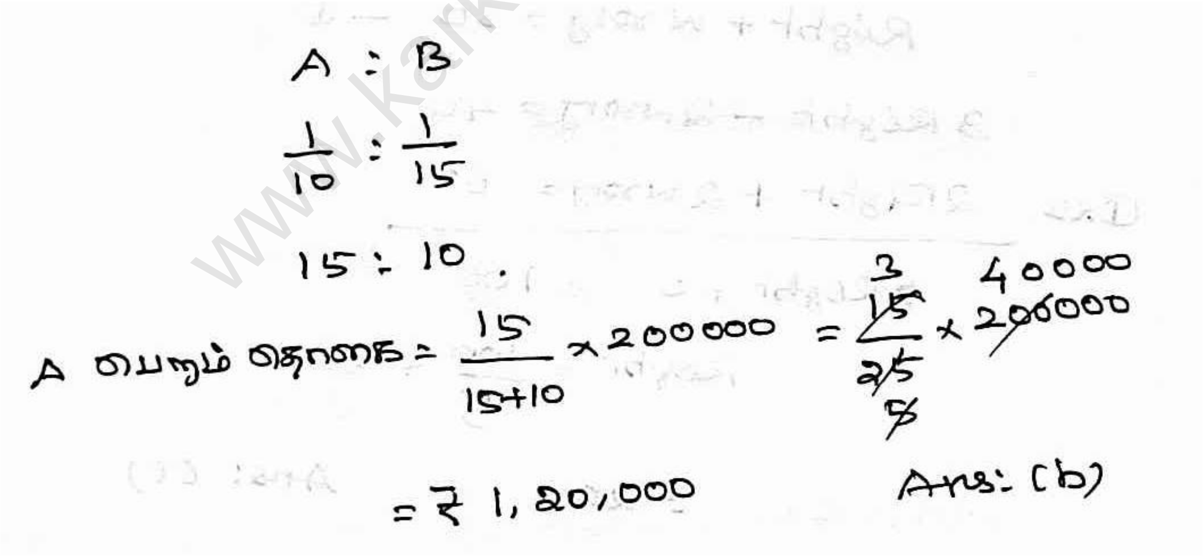
$= \frac{1}{3}$ work

$\frac{1}{3}$ work $\rightarrow A \rightarrow$ 20 days.

1 work $\rightarrow A \rightarrow 20 \times 3 = 60$ days.

$A = 60$ நாட்கள்   Ans: (a)

6) B



$A : B$

$\frac{1}{10} : \frac{1}{15}$

$15 : 10$.

A பெறும் தொகை $= \frac{15}{15+10} \times 200000 = \frac{\overset{3}{\cancel{15}}}{\underset{5}{\cancel{25}}} \times \overset{40000}{\cancel{200000}}$

$= ₹\ 1,20,000$ Ans: (b)

7) B

$P \rightarrow \frac{1}{2}$ work $\rightarrow 6$ days

$P \rightarrow 1$ work $\rightarrow 6 \times 2 = 12$ days.

$Q \rightarrow \frac{2}{3}$ work $\rightarrow 4$ days

$Q \rightarrow 1$ work $\rightarrow 4 \times \frac{3}{2} = 6$ days.

$P+Q \rightarrow \frac{xy}{x+y} = \frac{12 \times 6}{12+6} = \frac{\cancel{12}^{4} \times \cancel{6}}{\cancel{18}_{\cancel{3}\,1}}$

$= 4$ days.

$P+Q \rightarrow 1$ work $\rightarrow 4$ days.

$P+Q \rightarrow \frac{3}{4}$ work $\rightarrow \frac{3}{4} \times 4 = 3$ days.

$= 3$ days. Ans: (b)

8) C

அவ்வொரு வினையாக சுருக்கவும்.

a) $A \rightarrow 20$, $B \rightarrow 30$

$A+B \rightarrow \frac{20 \times 30}{20+30} = \frac{20 \times \cancel{30}^{6}}{\cancel{50}} = 12$ ✓.

$B+C \rightarrow \frac{30 \times 60}{90} = \frac{\cancel{30} \times \cancel{60}^{20}}{\cancel{90}_{\cancel{3}}} = 20$ ✗

c) $A \rightarrow 30$, $B \rightarrow 20$, $C \rightarrow 60$

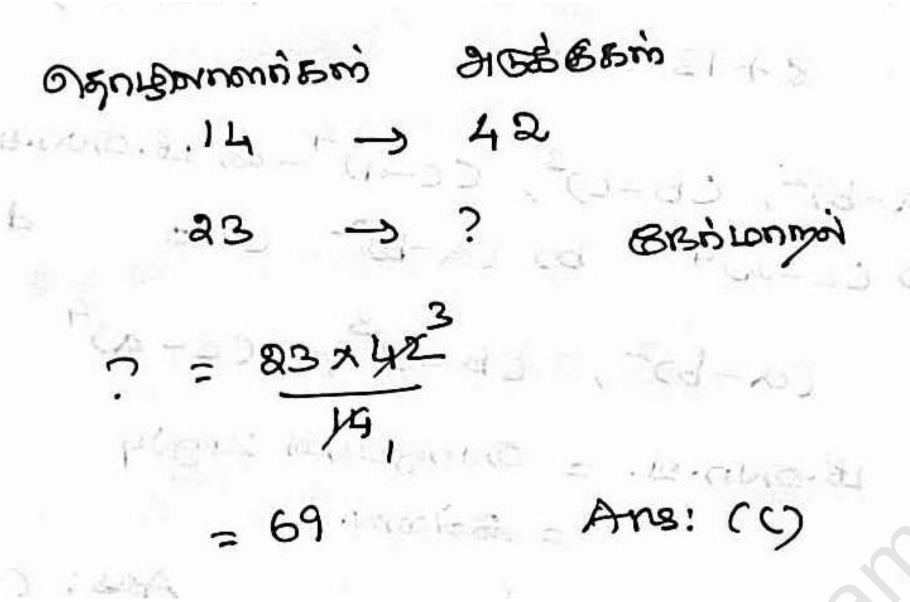
$A+B \rightarrow \frac{\cancel{30}^{6} \times 20}{\cancel{50}} = 12$ ✓ $\quad B+C \rightarrow \frac{\cancel{20}^{1} \times \cancel{60}^{15}}{\cancel{80}_{\cancel{4}}} = 15$ ✓

$C+A \rightarrow \frac{\cancel{30}^{1} \times \cancel{60}^{20}}{\cancel{90}_{\cancel{3}}} = 20$ ✓

$\therefore A \rightarrow 30$, $B \rightarrow 20$, $C \rightarrow 60$ days.

Ans: (c).

9) C



தொழிலாளர்கள் அடுக்குகள்

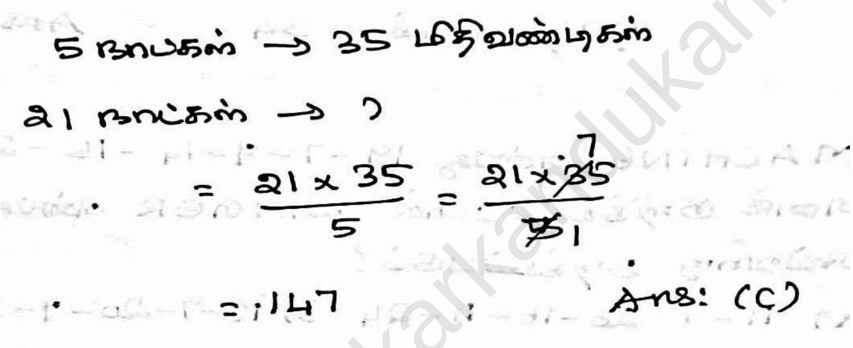
14 → 42

23 → ? நேர்மாறல்

$$? = \frac{23 \times \cancel{42}^{3}}{\cancel{14}_{1}}$$

$= 69$ Ans: (C)

10) C



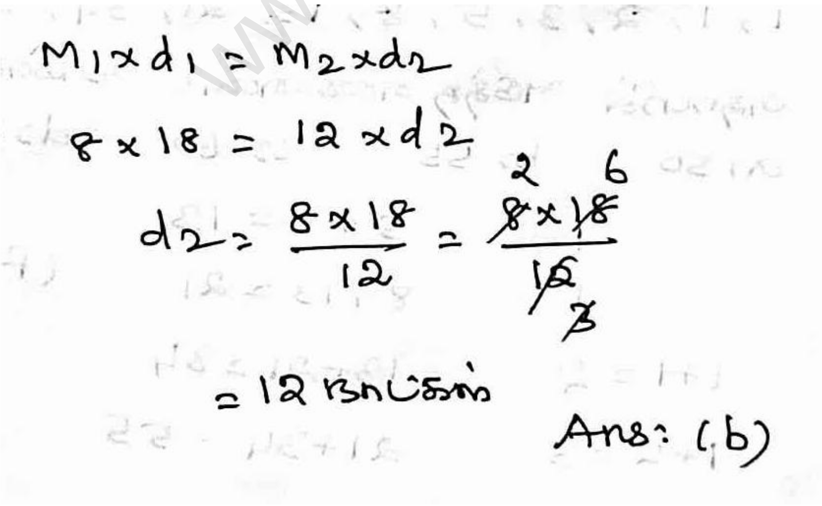
5 நாட்கள் → 35 மிதிவண்டிகள்

21 நாட்கள் → ?

$$= \frac{21 \times 35}{5} = \frac{21 \times \cancel{35}^{7}}{\cancel{5}_{1}}$$

$= 147$ Ans: (C)

11) B



$M_1 \times d_1 = M_2 \times d_2$

$8 \times 18 = 12 \times d_2$

$$d_2 = \frac{8 \times 18}{12} = \frac{\cancel{8}^{2} \times \cancel{18}^{6}}{\cancel{12}_{\cancel{3}}}$$

$= 12$ நாட்கள்

Ans: (b)

12) A

$2M + 3B \rightarrow \frac{1}{10}$ — (1)

$3M + 2B \rightarrow \frac{1}{8}$ — (2)

(1) × 3 $\quad 6M + 9B \rightarrow \frac{3}{10}$

(2) × 2 $\quad 6M + 4B \rightarrow \frac{2}{8} = \frac{1}{4}$

(−)

$5B \rightarrow \frac{3}{10} - \frac{1}{4} = \frac{12-10}{40} = \frac{\cancel{2}^{1}}{\cancel{40}_{20}} = \frac{1}{20}$

$1B \rightarrow \frac{1}{20 \times 5} = \frac{1}{100}$

$2B \rightarrow \frac{2}{100} = \frac{1}{50}$.

(1) ⇒ $\quad 2M + 3B \rightarrow \frac{1}{10}$

$2B \rightarrow \frac{1}{50}$

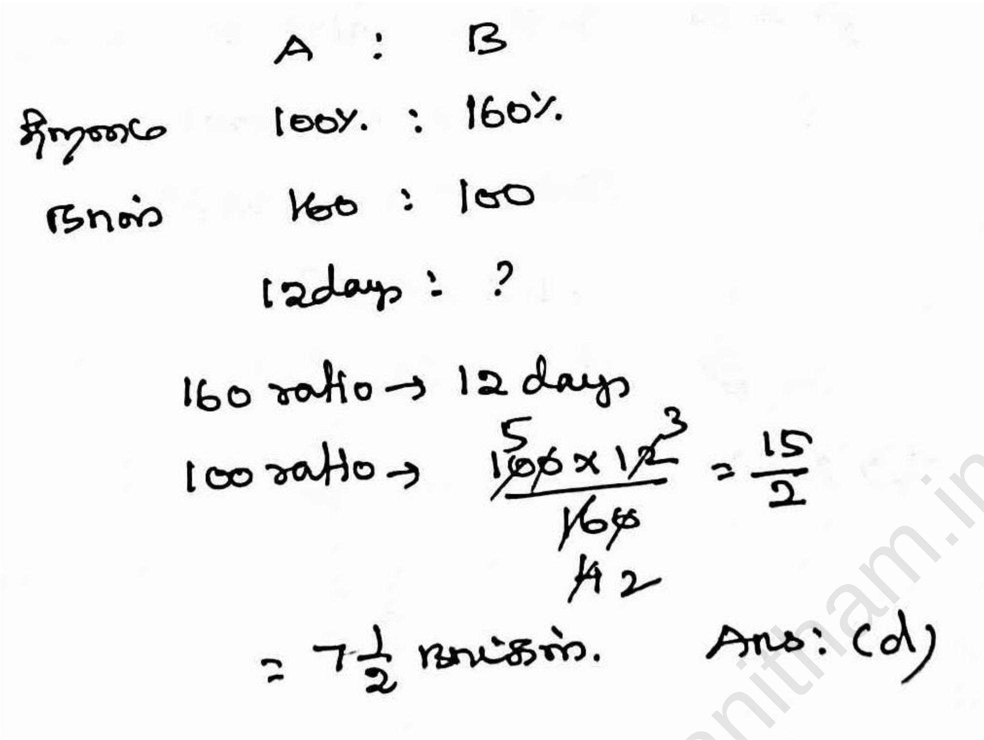
(−)

$2M + 1B \rightarrow \frac{1}{10} - \frac{1}{50} = \frac{50-10}{500} = \frac{\cancel{40}^{2}}{\cancel{500}_{25}}$

2 Men + 1 Boy → $\frac{25}{2}$ days

$= 12\frac{1}{2}$ days. $\quad$ Ans: (a).

13) D



A : B

ക്ഷമത 100% : 160%

ദിനം 160 : 100

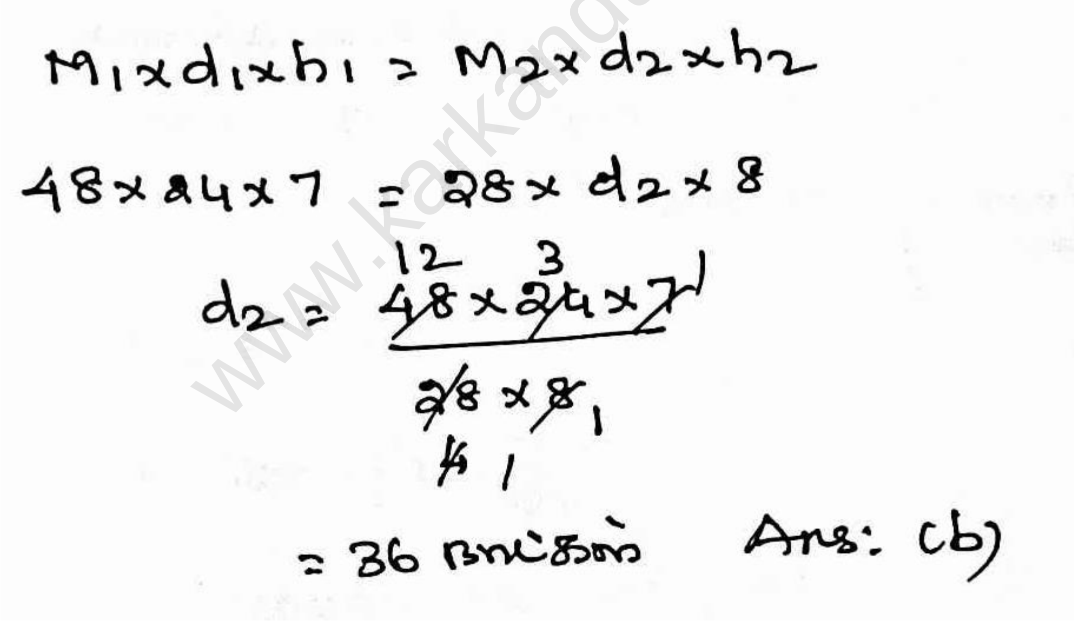
12days : ?

160 ratio → 12 days

100 ratio → $\frac{\overset{5}{\cancel{100}} \times \overset{3}{\cancel{12}}}{\underset{\underset{2}{\cancel{4}}}{\cancel{160}}} = \frac{15}{2}$

$= 7\frac{1}{2}$ ദിവസം. Ans: (d)

14) B



$M_1 \times d_1 \times h_1 = M_2 \times d_2 \times h_2$

$48 \times 24 \times 7 = 28 \times d_2 \times 8$

$d_2 = \frac{\overset{12}{\cancel{48}} \times \overset{3}{\cancel{24}} \times \overset{1}{\cancel{7}}}{\underset{\underset{1}{\cancel{4}}}{\cancel{28}} \times \cancel{8}_1}$

$= 36$ ദിവസം Ans: (b)

15) C

A → 45 days , B → x days.

A B

15 days 24 days

$$\cancel{15}^{1} \times \frac{1}{\cancel{45}_{3}} + 24 \times \frac{1}{x} = 1.$$

$$\frac{24}{x} = 1 - \frac{1}{3} = \frac{3-1}{3} = \frac{2}{3}$$

$$\frac{24}{x} = \frac{2}{3} \Rightarrow \frac{x}{24} = \frac{3}{2}$$

$$x = \frac{3}{\cancel{2}} \times \cancel{24}^{12} = 36$$

A → 45 days , B → 36 days.

$$A+B \rightarrow \frac{xy}{x+y} = \frac{45 \times 36}{45+36} = \frac{\cancel{45}^{5} \times \cancel{36}^{4}}{\cancel{81}_{\cancel{9}}}$$

(A+B) → 100% = 20 days.

100% → 20 days

80% → ?

$$= \frac{80 \times 20}{100} = 16$$

= 16 Bnchm. Ans: (c)

16) C

10M → 15 days

15W → 12 days

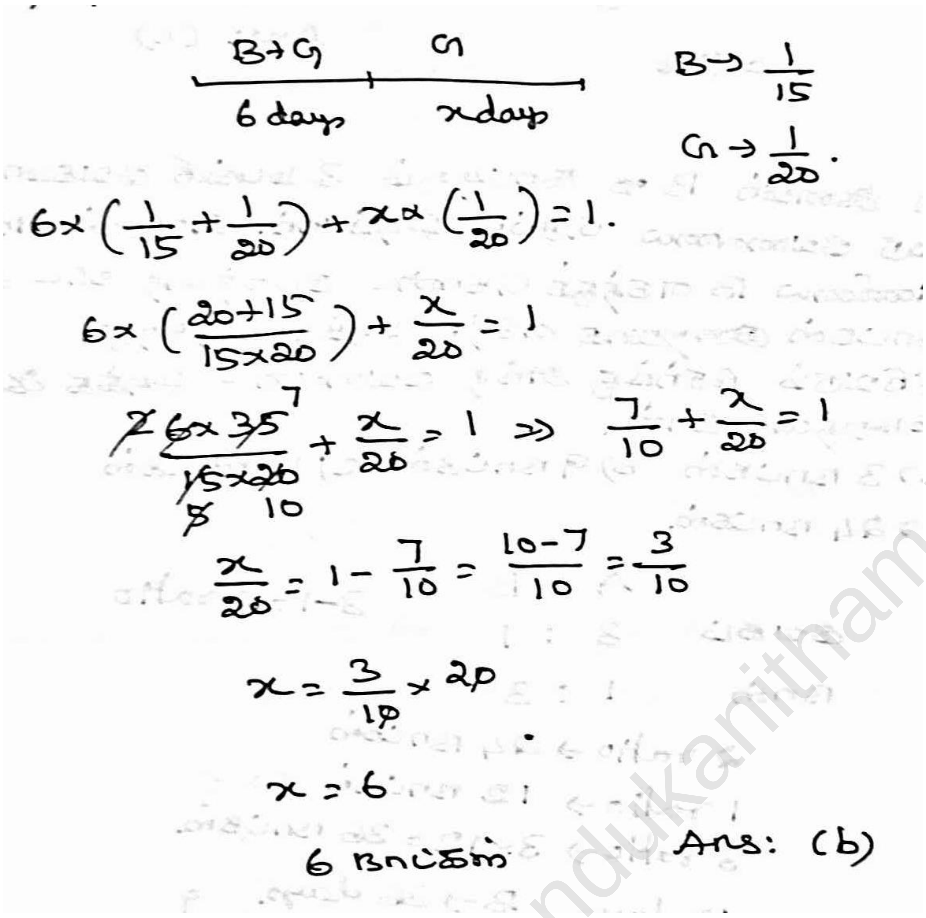
$$10M + 15W \rightarrow \frac{xy}{x+y} = \frac{15 \times 12}{15+12} = \frac{\cancel{15}^{5} \times \cancel{12}^{4}}{\cancel{27}_{\cancel{9}\,3}}$$

$$= \frac{20}{3}$$

$$= 6\frac{2}{3} \text{ days.}$$

Ans: (c)

17) B



$$\underbrace{B+G}_{6\text{ days}}\ \underbrace{G}_{x\text{ days}}$$

$B \rightarrow \frac{1}{15}$

$G \rightarrow \frac{1}{20}$.

$$6\times\left(\frac{1}{15}+\frac{1}{20}\right)+x\times\left(\frac{1}{20}\right)=1.$$

$$6\times\left(\frac{20+15}{15\times20}\right)+\frac{x}{20}=1$$

$$\frac{\cancel{2}\,\cancel{6}\times\overset{7}{\cancel{35}}}{\underset{\cancel{5}}{\cancel{15}}\times\underset{10}{\cancel{20}}}+\frac{x}{20}=1 \Rightarrow \frac{7}{10}+\frac{x}{20}=1$$

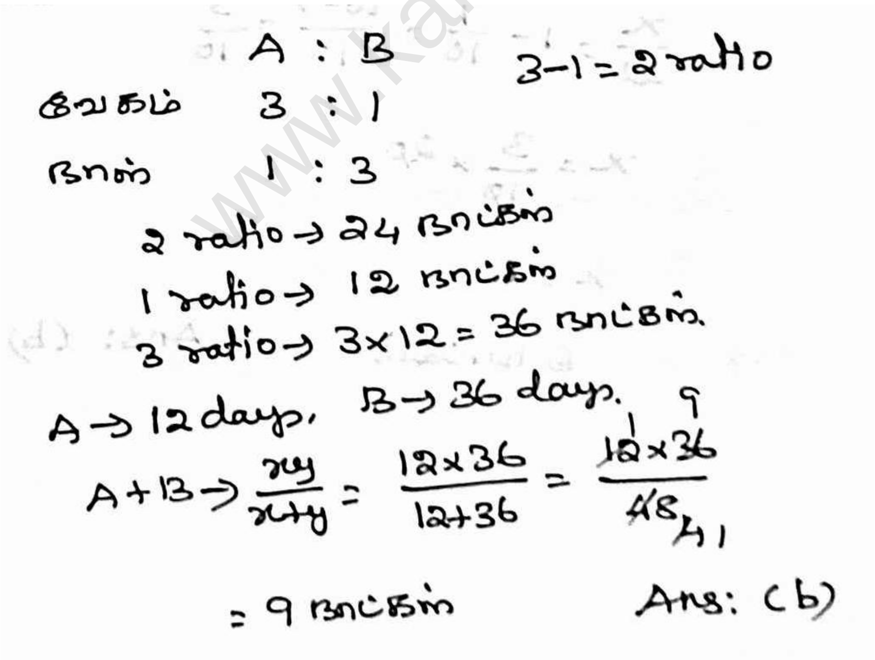
$$\frac{x}{20}=1-\frac{7}{10}=\frac{10-7}{10}=\frac{3}{10}$$

$$x=\frac{3}{1\cancel{0}}\times 2\cancel{0}$$

$$x=6$$

6 நாட்கள் Ans: (b)

18) B



A : B $3-1=2$ ratio

வேகம் 3 : 1

நாள் 1 : 3

2 ratio → 24 நாட்கள்

1 ratio → 12 நாட்கள்

3 ratio → $3\times12=36$ நாட்கள்.

A → 12 days, B → 36 days.

$$A+B \rightarrow \frac{xy}{x+y}=\frac{12\times36}{12+36}=\frac{\overset{1}{\cancel{12}}\times\overset{9}{\cancel{36}}}{\underset{4}{\cancel{48}}}$$

$= 9$ நாட்கள் Ans: (b)

19) A

$$\frac{M_1 \times d_1 \times h_1}{W_1} = \frac{M_2 \times d_2 \times h_2}{W_2}$$

$h_2 = 15+3 = 18$ hrs.

$$\frac{1 \times 6 \times 15}{9600} = \frac{1 \times d_2 \times 18}{14400}$$

$$d_2 = \frac{\cancel{6}^{1} \times 15 \times \cancel{14400}^{\cancel{9}\,1}}{\cancel{9600}_{\cancel{16}\,1} \times \cancel{18}_{2}} = \frac{15}{2}$$

$d_2 = 7\frac{1}{2}$ inches Ans: (a)

20) C

$$\frac{M_1 \times d_1}{W_1} = \frac{M_2 \times d_2}{W_2}$$

$$\frac{6 \times 15}{80} = \frac{16 \times d_2}{256}$$

$$d_2 = \frac{\cancel{6}^{3} \times \cancel{15}^{3} \times \cancel{256}^{\cancel{16}\,2}}{\cancel{80}_{\cancel{16}\,1} \times \cancel{16}_{\cancel{8}\,1}} = 3 \times 3 \times 2$$

$= 18$ Ans: (c)

21) D

P+Q+R ⇒ 3 days.

$$\frac{1}{6}+\frac{1}{8}+\frac{1}{R}=\frac{1}{3} \Rightarrow \frac{8+6}{6\times 8}+\frac{1}{R}=\frac{1}{3}$$

$$\frac{14}{48}+\frac{1}{R}=\frac{1}{3} \Rightarrow \frac{1}{R}=\frac{1}{3}-\frac{14}{48}$$

$$\frac{1}{R}=\frac{48-14\times 3}{3\times 48}=\frac{48-42}{3\times 48}=\frac{\cancel{6}\,\cancel{2}\,1}{\cancel{3}\times \cancel{48}\,24}$$

$$\frac{1}{R}=\frac{1}{24}.$$

$$\frac{1}{P}:\frac{1}{Q}:\frac{1}{R}=\frac{1}{6}:\frac{1}{8}:\frac{1}{24}$$

$\times 24$

$$=4:3:1$$

R ன் பங்கு $=\frac{1}{4+3+1}\times 4800=\frac{1}{\cancel{8}\,1}\times \cancel{4800}\,600$

$=$ ₹. 600.

Ans: (d)

22) A

$6W = 8M$

$1W = \frac{8}{6}M$

$7W = 7 \times \frac{8}{6} = \frac{56}{6}M.$

W - பெண்கள்
M - ஆண்கள்

8 ஆண்கள் → 86 நாட்கள்

$7W + 5M = \frac{56}{6}M + 5M = \frac{56+30}{6}M$

$= \frac{86}{6}M.$

$\frac{86}{6}$ ஆண்கள் → ?

$M_1 \times d_1 = M_2 \times d_2$

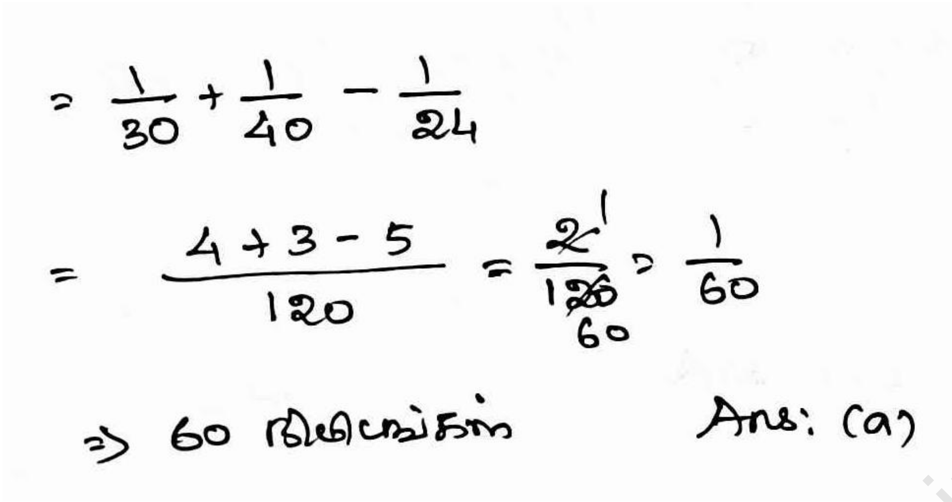
$8 \times 86 = \frac{86}{6} \times d_2$

$d_2 = \frac{8 \times \cancel{86} \times 6}{\cancel{86}}$

= 48 நாட்கள்

Ans: (a)

23) A

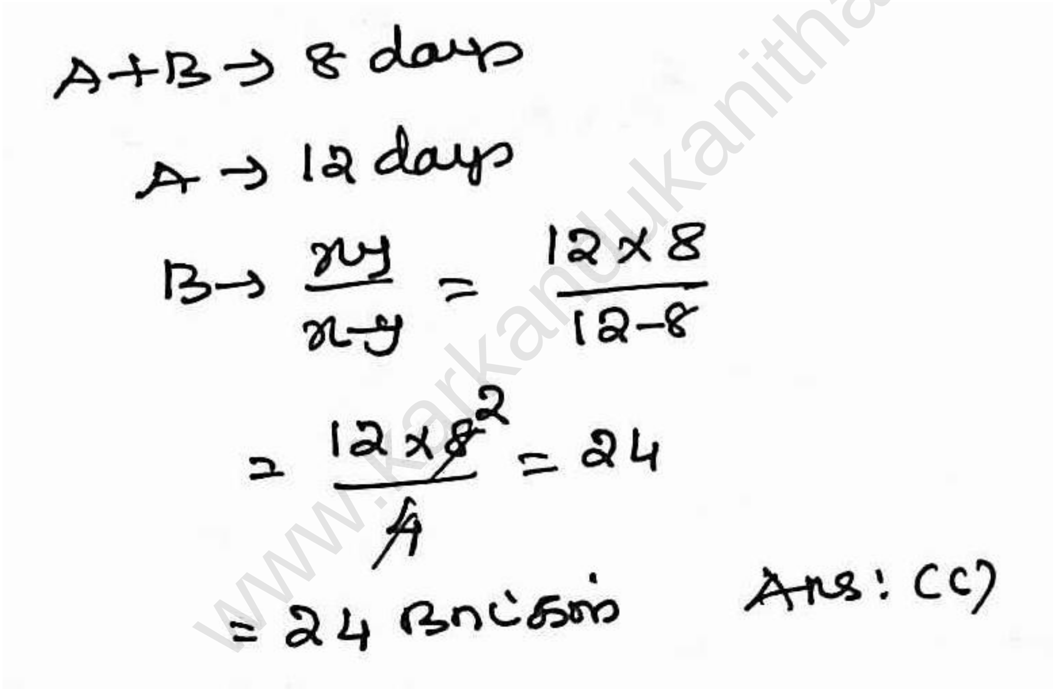


$$= \frac{1}{30} + \frac{1}{40} - \frac{1}{24}$$

$$= \frac{4+3-5}{120} = \frac{\cancel{2}^{1}}{\cancel{120}_{60}} = \frac{1}{60}$$

$\Rightarrow$ 60 நிமிடங்கள் Ans: (a)

24) C



$A+B \rightarrow$ 8 days

$A \rightarrow$ 12 days

$$B \rightarrow \frac{xy}{x-y} = \frac{12 \times 8}{12-8}$$

$$= \frac{12 \times \cancel{8}^{2}}{\cancel{4}} = 24$$

= 24 நாட்கள் Ans: (c)

25) A

$A \rightarrow \frac{1}{8}, \quad B \rightarrow \frac{1}{6} \quad C \rightarrow \frac{1}{C}$

$$\frac{1}{8} + \frac{1}{6} + \frac{1}{C} = \frac{1}{3}$$

$$\frac{1}{C} = \frac{1}{3} - \frac{1}{8} - \frac{1}{6} = \frac{8-3-4}{24}$$

$$\frac{1}{C} = \frac{1}{24}$$

$$\frac{1}{8} : \frac{1}{6} : \frac{1}{24}$$

$\times 24$

$3 : 4 : 1$ ரூ. 1200

C பெறும் கூலித் தொகை

$$= \frac{1}{3+4+1} \times 1200 = \frac{1}{\cancel{8}_{1}} \times \overset{150}{\cancel{1200}}$$

$C =$ ரூ. 150 Ans: (a)

26) A

6 Men = 8 women

÷2 $3M = 4W$

×3 $9M = 12W$.

$9M + 12W = 12W + 12W$

$= 24$ women

8 பெண்கள் → 12 நாட்கள்

24 பெண்கள் → ?

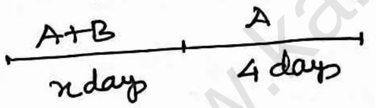
$M_1 \times d_1 = M_2 \times d_2$

$8 \times 12 = 24 \times d_2$

$d_2 = \frac{\cancel{8}^{1} \times \cancel{12}^{4}}{\cancel{24}_{\cancel{3}}}$

= 4 நாட்கள் Ans: (a)

27) D



$x\left(\frac{1}{12} + \frac{1}{20}\right) + 4 \times \frac{1}{12} = 1.$

$x\left(\frac{20+12}{12 \times 20}\right) + \frac{1}{3} = 1$

$\frac{x \times 32}{12 \times 20} = 1 - \frac{1}{3} = \frac{2}{3}$

$x = \frac{\cancel{2}^{1}}{\cancel{3}} \times \frac{\cancel{12}^{4} \times \cancel{20}^{5}}{\cancel{32}_{\cancel{16}\,\cancel{4}\,1}}$

x = 5 நாட்கள்

Ans: (d)