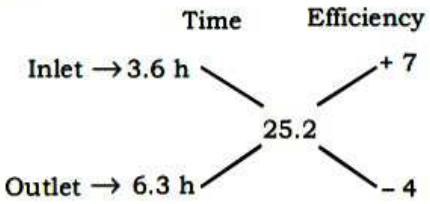
SOLUTIONS

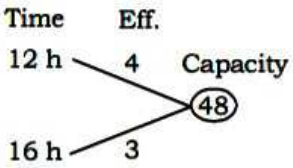
1. (d)



Then, required time

$= \frac{25.2}{7-4} = \frac{25.2}{3} = 8.4$ hrs

2. (d)



Let the leakage pipe is c

A/Q

$$\Rightarrow \frac{48}{A+B+C} - \frac{48}{A+B} = \frac{90}{60}$$

$$\Rightarrow \frac{48}{7-C} - \frac{48}{7} = \frac{3}{2}$$

$$\Rightarrow 48\left(\frac{(7-7+C)}{7(7-C)}\right) = \frac{3}{2}$$

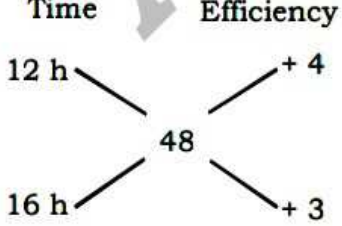
$$\Rightarrow \frac{C}{48-7C} = \frac{1}{32}$$

$\Rightarrow 32C = 48 - 7C$

$\Rightarrow C = \frac{49}{39} \rightarrow$ eff.

Now time taken by C to empty the tank $= \frac{48}{\frac{49}{39}} = \frac{48\times 39}{49} = 38\frac{10}{49}$ hr.

Alternate Method:



ATQ,

A and B has to work for extra 90 minutes.

$$\Rightarrow (A+B)\times\frac{90}{60} = C\left[\frac{48}{7}+\frac{90}{60}\right]$$

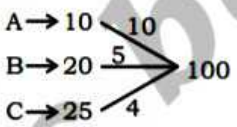
$$\Rightarrow 7\times\frac{3}{2} = C\times\frac{96+21}{14}$$

$$\Rightarrow \frac{7\times 3}{2} = C\times\frac{117}{14}$$

$$\Rightarrow C = \frac{49}{39}$$

Hence, time taken by C to empty the tank $= \frac{48\times 39}{49} = 38\frac{10}{49}$ hrs.

3. (c)

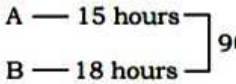


Time	2 Hr.	2 Hr.	
Tap	A + B + C	A + B	A
Work Done	38	30	Remain = 32

Total work done by A in percentage $= \frac{10\times 4+32}{100}\times 100$

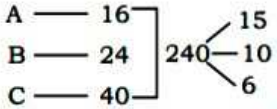
$= 72\%$

4. (d)



Total time when tank will be filled by A and B $= \frac{90}{11} = 8\frac{2}{11}$ hours

5. (b)



Total work done by (A + B + C) in 10 days = (15 + 10 – 6) × 10

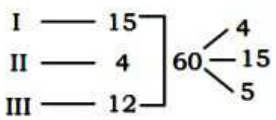
= 190

Remaining work = 240 – 190 = 50

Remaining work done by (B + C)

$= \frac{50}{10-6} = \frac{50}{4} = 12\frac{1}{2}$ hours

6. (d)



Total time taken by three pipes to fill empty tank $= \frac{60}{4+15-5}$

$= \frac{60}{14} = \frac{30}{7}$ hours

7. (b)

Let, B be can fill the tank in x hour.

A → $(x - 5)$ hours

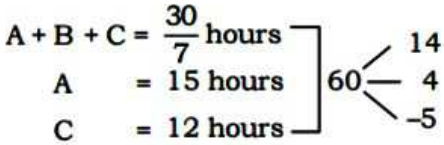
A & B → 6 hours

So, $\frac{1}{(x-5)} + \frac{1}{x} = \frac{1}{6}$

x = 15(satisfies the equation)

Hence, B can fill the cistern in 15 hours.

8. (a)



B's efficiency = [14 – (4 –5)] = 15

B fill the tank $= \frac{60}{15} = 4$ hours

9. (a) Let, B be can fill the tank in x hour.

A → $(x - 5)$ hours

A & B → 6 hours

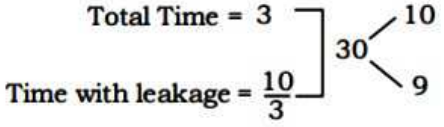
So, $\frac{1}{(x-5)} + \frac{1}{x} = \frac{1}{6}$

x = 15(satisfies the equation)

A can fill the tank in = $x - 5$

= 15 – 5 = 10 hours

10. (c)



Drain the whole water by leak

$= \frac{30}{10-9} = 30$ hours

11. (a)

A — 15
B — 30
C — 40
120 : 8 : 4 : 3

A does work 6 am to 10 am
$= 4 \times 8 = 32$
B does work 8 am to 10 am
$= 2 \times 4 = 8$
Total work done = 32 + 8 = 40
Remaining work = 120 – 40 = 80
(A + B + C) complete 80 work

$= \frac{80}{8+4+3} = \frac{80}{15} = \frac{16}{3}$

= 5 hours 20 minutes
Thus, Tank will be filled at = 3 : 20 pm

12. (d)

A — 12
B — 18
36 : 3 : 2

Total time taken $= \frac{36}{3+2} = \frac{36}{5}$

= 7 hours 12 minutes

13. (a)

A — 16
B — 24
C — 40
240 : 15 : 10 : 6

(A + B + C)'s 10 hours work done
$= (15 + 10 - 6) \times 10$
= 190
Remaining work = 240 – 190 = 50
Remaining work (A + B) completed

in $= \frac{50}{15+10} = 2$ hours

14. (d)

A — $12\frac{1}{2}$
B — 25
25 : 2 : 1

(A + B) $= \frac{25}{3}$ hours

With Leakage $= \frac{25}{3} + 1\frac{2}{3}$

$= \frac{25}{3} + \frac{5}{3} = 10$ hours

(A + B) — $\frac{25}{3}$
With Leakage — 10
100 : 12 : 10

Time taken by the leak to empty the cistern -

$= \frac{100}{12-10} = 50$ hours

15. (c)

A — 1 hour
With Leakage A — $\frac{4}{3}$ hour
4 : 4 : 3

Leakage pipe can empty the tank

in $= \frac{4}{4-3} = 4$ hours

16. (c)

A → 6
B → 8
C → 10
30 : 40 : –24 : 240

All pipes are opened together, then the tank will get filled in

$= \frac{240}{(40+30-24)} = \frac{240}{46} = 5\frac{5}{23}$ hours

17. (c)

A → 2
B → 3
C → 6
3 : 2 : 1 : 6

Pipe A & C can fill the tank in

$= 1 + \frac{1}{4} = \frac{5}{4}$ hrs.

Pipe A & C filled the tank $= \frac{5}{4} \times 4$

= 5 unit
Pipe B should be closed after

$= \frac{1}{2} \times 60 = 30$ minutes

18. (a)
(A, B and C) together can fill a cistern in 12 hours
Let, the total work = 60

efficiency of (A, B and C) $= \frac{60}{12} = 5$

Work done by all three pipes in 4 hours = 4 × 5 = 20
Remaining work = (60 – 20) = 40
A and B together take 10 hours to fill the tank.

efficiency of (A and B) $= \frac{40}{10} = 4$

efficiency of C = (5 – 4) = 1
'C' alone fill two-thirds of the

cistern $= \frac{60 \times \frac{2}{3}}{1} = 40$ hours

19. (b)

A → 10
B → 15
C → 30
3 : 2 : 1 : 30

(A, B, C) opened together for 3 hours = (3 + 2 + 1) × 3 = 18

tank in $= \frac{30}{18} \times 30 = 50$ hours

20. (a)

A → 12
B → 18
C → 24
6 : 4 : 3 : 72

All the pipes opened together for 7 minutes = (6 + 4 + 3) × 7 = 91
So, the water that overflow
= (91 – 72) = 19

% change $= \frac{19}{72} \times 100\% = 26\frac{7}{18}\%$

21. (a)

P → 18
Q → 27
3 : 2 : 54

'R' can empty the full tank in 54 minutes

So, efficiency of 'R' $= \frac{54}{54} = 1$

P and Q opened together for 6 minutes = (3 + 2) × 6 = 30
R can empty the tank

$= \frac{30}{1} = 30$ min.

22. (b) Let, B can fill the tank in x
A → $(x + 3)$

So, $\frac{1}{x+3} + \frac{1}{x} = \frac{3}{20}$

On solving, $x = 12$
B → 12
A → 15

So, pipe A can fill $\frac{1}{3}$ of the tank

in $= 15 \times \frac{1}{3} = 5$ minutes

23. (c) A → 36
B → 48
4 : 3 : 144

Both pipe opened together for 9 hours = (4 + 3) × 9 = 63
Remaining = (144 – 63) = 81
'B' alone fill the remaining part

$= \frac{81}{3} = 27$ hours

24. (d)

$A + B \to 16 \xrightarrow{3} 48$

$C \to 24 \xrightarrow{-2}$

(A + B) opened together for 10 hours and then closed

Tank filled = 3 × 10 = 30

'C' will emptied the tank filled in

$= \frac{30}{2} = 15$ hours.

25. (c)

$A \to 6 \xrightarrow{8} 48$

$B \to 16 \xrightarrow{3}$

Let the efficiency of pipe 'C' be x.

Then, $(8 + 3 - x) \times \frac{80}{60} = 48 \times \frac{5}{18}$

$\Rightarrow (11 - x) \times \frac{4}{3} = \frac{40}{3}$

$\Rightarrow x = 1$

Hence, pipe 'C' alone can fill the tank in $= \frac{48}{1} = 48$ hours

26. (c)

$A \to 18 \xrightarrow{4} 72$

$B \to 24 \xrightarrow{3}$

Work done by pipe A in 12 min

$= 4 \times 12 = 48$

Remaining work = 72 – 48 = 24

Time taken by pipe B = $\frac{24}{3}$ = 8 min

Thus, pipe B should be closed after 8 min.

27. (b)

A	B	C
1	3	6

Tank capacity = (1 + 3 + 6) × 4 = 40

'A' alone take to fill the tank = $\frac{40}{1}$

= 40 hours

28. (c)

$A \to 15 \xrightarrow{8}$

$B \to 10 \xrightarrow{12} 120$

$A + B - C \to 8 \xrightarrow{15}$

Let tap 'C' will empty the tank in 'x' minutes.

ATQ,

$8 + 12 - x = 15$

$20 - x = 15$

$x = 15$

Total Work = 120

'C' alone will empty $\frac{3}{8}$ part of the tank = $\frac{\frac{120 \times 3}{8}}{5}$ = 9 minutes

29. (d)

$A \to 18 \xrightarrow{-4}$

$B \to 24 \xrightarrow{-3} 72$

$C \to 36 \xrightarrow{+2}$

Total capacity of tank = 72

$\frac{5}{6}$ of the tank = $72 \times \frac{5}{6} = 60$

all three pipes are opened together then,

Required time to emptied the tank

$= \frac{60}{-4 - 3 + 2} = \frac{60}{-5}$ = 12 hours

★★★★★

30. (a)

$A \to 18 \xrightarrow{10}$

$B \to \frac{45}{2} \xrightarrow{8} 180$

$C \to 12 \xrightarrow{-15}$

T.W = 180

Work done by pipe A and pipe B in 6 min = (10 + 8) × 6 = 108

Pipe 'C' alone empty the tank

$= \frac{108}{15} = 7\frac{1}{5}$ min

31. (b)

Pipe A can fill a tank in $3\frac{1}{2}$ min

= 350 litres

Pipe A can fill a tank in 1 min

$= 350 \times \frac{2}{7}$

= 100 litres

Pipe B can fill a tank in $8\frac{2}{3}$ min

= 780 litres

Pipe B can fill a tank in 1 min

$= 780 \times \frac{3}{26}$ = 90 litres

Pipe A and pipe B together fill the tank in 1 min = 100 + 90 = 190 litres

pipe A & pipe B can fill the tank of 1615 Litre in

$= \frac{1615}{190} = 8\frac{1}{2}$ min