TIME & WORK

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CONCEPT

$$S = \frac{D}{T} \qquad T = \frac{D}{S} \qquad D = S \times T$$

$$E = \frac{W}{T} \qquad T = \frac{W}{E} \qquad W = E \times T$$

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

$$T_A = 10d \qquad T_B = 20d$$

$$E_A = \frac{1}{10} \qquad E_B = \frac{1}{20}$$

$$\frac{1}{10} + \frac{1}{20} = \frac{3}{20}$$

$$T = \frac{20}{3} = 6.66 \, days$$

$$T = \frac{1}{3/20} = \frac{20}{3} = 6.66$$

Q1. A can do a piece of work in 20 days and B can do it in 15 days. How long will they take if both work together?

A) 62/7 days   ✓ B) 60/7 days

C) 66/7 days   D) 67/7 days

$$E_A = \frac{1}{20} \qquad E_B = \frac{1}{15}$$

$$\frac{1}{20} + \frac{1}{15} = \frac{3+4}{60} = \frac{7}{60}$$

Q2. Jai can do a piece of work in 10 days and Veeru can do the same work in 20 days. With the help of Basanti, they finish the work in 5 days. How long will it take for Basanti alone to finish the work?

✓ A) 20 days   B) 10 days

C) 35 days   D) 15 days

$$E_J = \frac{1}{10} \qquad E_v = \frac{1}{20}$$

$$\frac{1}{10} + \frac{1}{20} + E_B = \frac{1}{5}$$

$$E_B = \frac{1}{5} - \frac{1}{10} - \frac{1}{20}$$

$$= \frac{4-2-1}{20} = \frac{1}{20}$$

Q3. Frodo can do 1/2 of the work in 8 days while Bilbo can do 1/3 of the work in 6 days. How long will it take for both of them to finish the work?

A) 88/17 days   B) 144/17 days

C) 72/17 days   D) 8 days

$$E_F = \frac{1/2}{8} = \frac{1}{16} \qquad E_B = \frac{1/3}{6} = \frac{1}{18}$$

$$\frac{1}{16} + \frac{1}{18} = \frac{9+8}{144} = \frac{17}{144}$$

Q4. Gangadhar can do 25% of a piece of work in 5 days. How many days will he take to complete the work 10 times?

A) 150 days   B) 250 days

C) 200 days   D) 180 days

$$25\% \longrightarrow 5d$$

$$100\% \longrightarrow 20d$$

$$10x \longrightarrow 200d$$

Q5. 6 men can do a piece of work in 12 days. How many men are needed to do the work in 18 days?

A) 3 men   B) 6 men

C) 4 men ✓   D) 2 men

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

$$\frac{6 \times 12^4}{1} = \frac{x \times 18^3}{1}$$

$$x = 4$$

Q6. 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

A) 10   B) 11

C) 12 ✓   D) 15

$$\frac{x \times 30}{1} = \frac{(x+6) 20}{1}$$

$$30x = 20x + 6 \times 20$$

$$10x = 6 \times 20$$

$$x = 12$$

Q7. Chandler can do a piece of work in 10 days. Joey can do it in 15 days. If the total wages for the work is Rs.50. How much should Chandler be paid if they work together for the entire duration of the work?

A) Rs.30   B) Rs.20   C) Rs.50   D) Rs.40

$$E_C = \frac{1}{10} \qquad E_J = \frac{1}{15}$$

$$\frac{1}{10} + \frac{1}{15} = \frac{3+2}{30} = \frac{5}{30} = \frac{1}{6}$$

$$W_C = \frac{1}{10} \times 6 = \frac{3}{5}$$

$$M_C = \frac{3}{5} \times 50 = 30$$

$$
\begin{array}{ccc}
\underline{C} & & \underline{J} \\
\frac{1}{10} & : & \frac{1}{15} \\
15 & : & 10 \\
3 & : & 2
\end{array}
$$

$$\frac{3}{5} \times 50 = 30$$

Q8. A and B undertake a piece of work for Rs.100. A can do it in 5 days and B can do it in 10 days. With the help of C, they finish it in 2 days. How much should C be paid for his contribution?

A) Rs.40   B) Rs.20   C) Rs.60   D) Rs.30

$$E_A = \frac{1}{5} \qquad E_B = \frac{1}{10}$$

$$W_A = \frac{1}{5} \times 2 \qquad W_B = \frac{1}{10} \times 2$$

$$= \frac{2}{5} \qquad\qquad = \frac{1}{5}$$

$$M_A = \frac{2}{5} \times 100 \qquad M_B = \frac{1}{5} \times 100$$

$$= 40 \qquad\qquad = 20$$

$$M_C = 100 - 40 - 20$$

$$= 40$$

Q9. 4 men and 3 women finish a job in 6 days, and 5 men and 7 women can do the same job in 4 days. How long will one man and one woman take to do the work?

A) 156/7 days   B) 51/2 days   C) 58/7 days   D) 271/22 days

$$\frac{M_1 \, T_1}{W_1} = \frac{M_2 \, T_2}{W_2} = \frac{M_3 \, T_3}{W_3}$$

$$\frac{(4M+3W)\,6}{1} = \frac{(5M+7W)\times 4}{1} = \frac{(1M+1W)\,x}{1}$$

$$24M + 18W = 20M + 28W$$

$$4M = 10W$$

$$\boxed{M = \frac{10}{4}W = \frac{5}{2}W}$$

$$(5M+7W)\,4 = (1M+1W)\,x$$

$$\left(5\times\frac{5}{2}W + 7W\right)4 = \left(\frac{5}{2}W + W\right)x$$

$$\frac{25W+14W}{2}\times 4 = \frac{7}{2}W\,x$$

$$\frac{39}{2}W\times 4 = \frac{7}{2}W\,x$$

$$x = \frac{39\times 4}{7} = \frac{156}{7}$$

Q10. **5 men and 3 boys can together cultivate a 23-acre field in 4 days and 3 men and 2 boys together can cultivate a 7-acre field in 2 days. How many boys will be needed together with 7 men, if they have to cultivate a 45-acre field in 6 days?**

A) 2   B) 3   C) 4   D) 6

$$\frac{(5M+3B)\,4^{2}}{23} = \frac{(3M+2B)\,2^{1}}{7} = \frac{(7M+xB)\,6^{3}}{45_{\,15}}$$

$$\frac{(5M+3B)\,2}{23} = \frac{(3M+2B)\,1}{7} \qquad \frac{3M+2B}{7} = \frac{7M+xB}{15}$$

$$70M + 42B = 69M + 46B \qquad (3\times4B + 2B)\,15 = (7\times4B + xB)\,7$$

$$\boxed{M = 4B} \qquad \overset{2}{14}B \times 15 = (28+x)B \times 7$$

$$30 = 28 + x$$

$$x = \underline{\underline{2}}$$

Q11. A building is under construction and the task of paving the blocks is given to a group of men. 40 men can finish the given task in 96 days, working 9 hours/day. If 48 men take up the assignment and commit to finish it in 45 days, how many hours will they need to work per day?

A) 24　　　　　　B) 27　　　　　　C) 16　　　　　　D) 18

$$\frac{40 \times 96 \times 9}{1} = \frac{48 \times 45 \times x}{1}$$

$$x = 16$$

Q12. If A & B can do a job in 8 days and B & C can do the same job in 12 days. If A, B & C work together they can finish the job in 6 days. In how many days can A & C finish the job?

A) 8 days   B) 10 days   C) 12 days   D) 14 days

$$E_A + E_B = \frac{1}{8} \quad -(1)$$

$$E_B + E_C = \frac{1}{12} \quad -(2)$$

$$E_A + E_B + E_C = \frac{1}{6} \quad -(3)$$

$(3) - (1)$

$$E_C = \frac{1}{6} - \frac{1}{8} = \frac{1}{24}$$

$(3) - (2)$

$$E_A = \frac{1}{6} - \frac{1}{12} = \frac{1}{12}$$

$$E_A + E_C = \frac{1}{12} + \frac{1}{24} = \frac{2+1}{24} = \frac{3}{24}$$

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

Q13. A can do a piece of work in 20 days. He works at it for 5 days and then B finishes it in 10 more days. In how many days will A and B together finish the work?

A) 8 days   B) 10 days   C) 12 days   D) 6 days

$$E_A = \frac{1}{20}$$

$$W_A = \frac{1}{20} \times 5 = \frac{1}{4}$$

$$W_{Rem} = 1 - \frac{1}{4} = \frac{3}{4}$$

$$E_B = \frac{3/4}{10} = \frac{3}{40}$$

$$E_A + E_B = \frac{1}{20} + \frac{3}{40}$$

$$= \frac{2+3}{40} = \frac{5}{40} = \frac{1}{8}$$

Q14. Louis can do a piece of work in 25 days and Clark can do it in 20 days. They work for 5 days and then Louis goes away. In how many more days will Clark finish the work?

A) 10 days   B) 12 days   C) 14 days   ✓D) 11 days

$$E_L = \frac{1}{25} \qquad E_C = \frac{1}{20}$$

$$W_5 = \frac{1}{25} \times 5 + \frac{1}{20} \times 5 = \frac{1}{5} + \frac{1}{4} = \frac{9}{20}$$

$$W_{Rem} = 1 - \frac{9}{20} = \frac{11}{20}$$

$$T_C = \frac{11/20}{1/20} = 11 \text{ days}$$

Q15. Twenty workers can finish a piece of work in 30 days. After how many days should 5 workers leave the job so that the work is completed in 35 days?
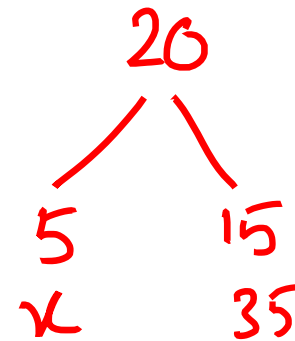
A) 5 days   B) 10 days   ✓ C) 15 days   D) 20 days

$$\frac{20 \times \overset{6}{30}}{1} = \frac{\overset{}{5} \times x + 15 \times \overset{7}{35}}{1}$$

$$120 = x + 105$$

$$x = 120 - 105 = \underline{\underline{15}}$$

20
/ \
5   15
x   35

Q16. Gabbar and Mogambo together can do a piece of work in 7 days. If Gabbar does twice as much work as Mogambo in a given time, how long will Gabbar alone take to do the work?

A) 6.33 days   B) 10.5 days   C) 11 days   D) 72 days

$$E_G + E_M = \frac{1}{7}$$

$$E_G = 2E_M \Rightarrow E_M = \frac{E_G}{2}$$

$$E_G + \frac{E_G}{2} = \frac{1}{7} \qquad \Bigg| \qquad E_G = \frac{1}{7} \times \frac{2}{3} = \frac{2}{21}$$

$$\frac{3}{2} E_G = \frac{1}{7} \qquad \Bigg| \qquad T_G = \frac{21}{2} = 10.5 \text{ //}$$

Q17. The ratio of efficiencies of P, Q and R is 2 : 3 : 4. While P and R work on alternate days, Q works on all days. The work is completed in 10 days and the total amount they get is Rs. 1200. Find the amount earned by each person (respectively).

A) 200, 600, 400   B) 400, 600, 200   C) 600, 200, 400   D) 400, 200, 600

	P	Q	R
E	2	3	4
T	5	10	5
	1 : 2 : 1
			2
W	2×1 : 3×2 : 4×1
	1 : 3 : 2

Q18. Bruce can copy 50 pages in 10 hours. Bruce and Robin together can copy 300 pages in 40 hours. In how much time can Robin copy 30 pages?

A) 13 hours B) 12 hours C) 11 hours D) 9 hours

$$E_B = \frac{50}{10} = 5$$

$$E_B + E_R = \frac{300}{40} = \frac{15}{2}$$

$$f_R = \frac{15}{2} - 5 = \frac{5}{2}$$

$$T_R = \frac{30^6}{5/2} = 12$$

B	50p	10h
B+R	300p	40h
B	200p	40h
R	100p	40h
R	30p	x

12

Q19. There are 720 boxes. A & B can paint them in 20 days, B & C can paint them in 24 days, A & C in 15 days. If A paints for 4 days, B for 8 days and C for 8 days, how many boxes will be painted?

A) 252   B) 516   ✓ C) 348   D) 492

$$E_A + E_B = \frac{720}{20} = 36 \quad - \text{①}$$

$$E_B + E_C = \frac{720}{24} = 30 \quad - \text{②}$$

$$E_A + E_C = \frac{720}{15} = 48 \quad - \text{③}$$

$$W_B + W_C = 30 \times 8 = 240$$

$$\text{①} + \text{③} - \text{②}$$

$$2E_A = 36 + 48 - 30$$

$$E_A = \frac{54}{2} = 27$$

$$W_A = 27 \times 4 = 108$$

$$\text{Tot} = 240 + 108 = 348$$

Q20. Sansa can do a piece of work in 10 days, Arya in 12 days and Bran in 15 days. They all start the work together, but Sansa leaves after 2 days and Arya leaves 3 days before the work is completed. In how many days is the work completed?

A) 2 days   B) 6 days   ✓ C) 7 days   D) 8 days

$$E_S = \frac{1}{10} \qquad E_A = \frac{1}{12} \qquad E_B = \frac{1}{15}$$

$$W_S + W_A + W_B = 1$$

$$\frac{1}{10} \times 2 + \frac{1}{12}(x-3) + \frac{1}{15} \times x = 1$$

$$\frac{12 + 5x - 15 + 4x}{60} = 1$$

$$9x - 3 = 60$$

$$9x = 63$$

$$x = 7$$

Q21. Two pipes can fill the cistern in 10 hours and 12 hours respectively, while the third empties it in 20 hours. If all the pipes are opened simultaneously, then the cistern will be filled in

A) 9 hours   B) 8.5 hours   C) 8 hours   ✓ D) 7.5 hours

$$E_1 = \frac{1}{10} \qquad E_2 = \frac{1}{12} \qquad E_3 = -\frac{1}{20}$$

$$\frac{1}{10} + \frac{1}{12} - \frac{1}{20} = \frac{6 + 5 - 3}{60} = \frac{8}{60}$$

$$T = \frac{60}{8} = 7.5$$

Q22. A cistern is normally filled in 5 hours. However, it takes 6 hours when there is a leak in its bottom. If the cistern is full, in what time can the leak empty half of it?

A) 6h   B) 5h   C) 30h   ✓ D) 15h

$$E_p = \frac{1}{5}$$

$$E_p + E_L = \frac{1}{6}$$

$$E_L = \frac{1}{6} - \frac{1}{5} = -\frac{1}{30}$$

15

Q23. Two taps are running continuously to fill a tank. The first tap could have filled it in 5 hours by itself and the second one by itself could have filled it in 20 hours. But the operator failed to realize that there was a leak in the tank from the beginning which caused a delay of one hour in the filling of the tank. Find the time in which the leak would empty a filled tank?

A) 15 hours ✓ B) 20 hours C) 25 hours D) 40 hours

$$E_1 = \frac{1}{5} \qquad E_2 = \frac{1}{20}$$

$$\frac{1}{5} + \frac{1}{20} = \frac{1}{4}$$

$$E_1 + E_2 + E_L = \frac{1}{4+1}$$

$$\frac{1}{5} + \frac{1}{20} + E_L = \frac{1}{4+1}$$

$$E_L = -\frac{1}{20}$$

Q24. Two pipes can fill a tank in 20 and 24 minutes respectively and a waste pipe can empty 3 gallons per minute. All the three pipes working together can fill the tank in 15 minutes. The capacity of the tank in gallons is

A) 100   B) 110   ✓ C) 120   D) 140

$$E_1 = \frac{1}{20} \qquad E_2 = \frac{1}{24}$$

$$E_1 + E_2 + E_w = \frac{1}{15}$$

$$Cap = 3 \times 40$$
$$= 120$$

$$E_w = \frac{1}{15} - \frac{1}{20} - \frac{1}{24}$$

$$= \frac{8 - 6 - 5}{120} = \frac{-3}{120} = \frac{-1}{40}$$

Q25. Three taps P, Q and R can fill a tank in 12 hours, 15 hours and 20 hours respectively. If P is open all the time and Q and R are open for one hour each alternately, starting with Q, then the tank will be full in how many hours?

A) 9 hours   B) 7 hours   C) 13 hours   D) 11 hours

$$E_P = \frac{1}{12} \qquad E_Q = \frac{1}{15} \qquad E_R = \frac{1}{20}$$

$$W_{1st} = \frac{1}{12} + \frac{1}{15} = \frac{5+4}{60} = \frac{9}{60}$$

$$W_{2nd} = \frac{1}{12} + \frac{1}{20} = \frac{5+3}{60} = \frac{8}{60}$$

$$W_2 = \frac{9}{60} + \frac{8}{60} = \frac{17}{60}$$

$$W_6 = \frac{17}{60} \times 3 = \frac{51}{60} < 1$$

$$W_4 = \frac{17}{60} \times 2 = \frac{34}{60}$$

$$W_8 = \frac{17}{60} \times 4 = \frac{68}{60} > 1$$

Q26. Anand is twice as good a workman as Balu and is therefore able to finish a piece of work in 30 days less than Balu. In how many days they can complete the whole work; working together?

A) 15 days   B) 20 days ✓   C) 35 days   D) 30 days

$$E_A = 2E_B$$

$$T_B = 2T_A$$

$$T_A = T_B - 30$$

$$T_A = 30d$$

$$T_B = 60d$$

$$\frac{1}{30} + \frac{1}{60} = \frac{3}{60} = \frac{1}{20}$$

Q27. A, B and C can do a piece of work in 24 days, 30 days and 40 days respectively. They began the work together, but C left 4 days before the completion of the work. In how many days was the work completed?

A) 11 days   B) 12 days   C) 13 days   D) 14 days

$$E_A = \frac{1}{24} \quad E_B = \frac{1}{30} \quad E_C = \frac{1}{40}$$

Total Time $= x$

$$W_A + W_B + W_C = 1$$

$$\frac{x}{24} + \frac{x}{30} + \frac{x-4}{40} = 1$$

$$\frac{5x + 4x + 3x - 12}{120} = 1 \qquad x = 11$$

$$12x - 12 = 120$$

$$x - 1 = 10$$

Q28. Four pipes P, Q, R and S can fill a cistern in 20, 25, 40 and 50 hours respectively. The first pipe P was opened at 6:00 am, Q at 8:00 am, R at 9:00 am and S at 10:00 am. When will the cistern be full?

A) 4:18 pm   ✓ B) 3:09 pm   C) 12:15 pm   D) 11:09 pm

$$E_p = \frac{1}{20} \quad E_Q = \frac{1}{25} \quad E_R = \frac{1}{40} \quad E_S = \frac{1}{50}$$

$$WD \ till \ 10 \ am = \frac{1}{20} \times 4 + \frac{1}{25} \times 2 + \frac{1}{40} \times 1$$

$$= \frac{40 + 16 + 5}{200} = \frac{61}{200}$$

$$W_{Rem} = 1 - \frac{61}{200} = \frac{139}{200}$$

$$Eff = \frac{1}{20} + \frac{1}{25} + \frac{1}{40} + \frac{1}{50} = \frac{10 + 8 + 5 + 4}{200} = \frac{27}{200}$$

$$T = \frac{139/200}{27/200} = \frac{139}{27} \approx 5$$

$$Ans = 10 \ am + 5 \ hrs$$

$$= 3 \ pm$$

Q29. Two friends A and B take a job for Rs. 10000. Had they worked alone, A would have taken 20 days while B would have taken 30 days. They started working together but after 10 days, A left and B completed the remaining work alone. Find the difference between their share?

A) 0   B) 1000   C) 2000   D) 5000

$$E_A = \frac{1}{20} \qquad E_B = \frac{1}{30}$$

$$W_A = \frac{1}{20} \times 10 = \frac{1}{2}$$

Q30. In a regular week, there are 5 working days and for each day, the working hours are 8. A man gets Rs.2.40 per hour for regular work and Rs.3.20 per hour for overtime. If he earns Rs.432 in 4 weeks, then how many hours does he work for?

A) 145　　　　　　B) 165　　　　　✓ C) 175　　　　　　D) 185

Reg Hours = $4 \times 5 \times 8 = 160$

Wage Reg = $2.4 \times 4 \times 5 \times 8 = 384$

Extra = $432 - 384 = 48$

Extra Hours = $\dfrac{48}{3.2} = \dfrac{48 \times 10}{32} = 15$

$160 + 15$
$= 175$

EXTRA QUESTIONS:

31. A software programmer provider has been training its workforce in such a way that 36 programmers could write 36 software programs of similar nature in 36 hours. The company has received an order for getting 84 software programs of similar nature in 24 hours. How many additional programmers should the company employ for this project?

A) 90   B) 126   C) 66   D) 44

32. A and B can do a piece of work in 45 days and 40 days respectively. They began to do the work together but A leaves after some days and then B completed the remaining work in 23 days. The number of days after which A left the work was

A. 12   B. 11   C. 10   D. 9

33. A work is done by three person A, B and C. A alone takes 10 hours to complete a single product but B and C working together takes 4 hours, for the completion of the same product. If all of them worked together and completed 14 products, then how many hours have they worked for?

A. 20   B. 28   C. 40   D. 54

34. A large tanker can be filled by two pipes A and B in 60 minutes and 40 minutes respectively. How many minutes will it take to fill the tanker from empty state if B is used for half the time and A and B fill it together for the other half?

A. 15 min   B. 20 min   C. 25 min   D. 30 min

35. 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?

A. 12   B. 15   C. 16   D. 18

ANSWER KEY – TIME & WORK

QUESTION	ANSWER	QUESTION	ANSWER	QUESTION	ANSWER	QUESTION	ANSWER
1	B	11	C	21	D	31	A
2	A	12	A	22	D	32	D
3	B	13	A	23	B	33	C
4	C	14	D	24	C	34	D
5	C	15	C	25	B	35	B
6	C	16	B	26	B		
7	A	17	A	27	A		
8	A	18	B	28	B		
9	A	19	C	29	A		
10	A	20	C	30	C		