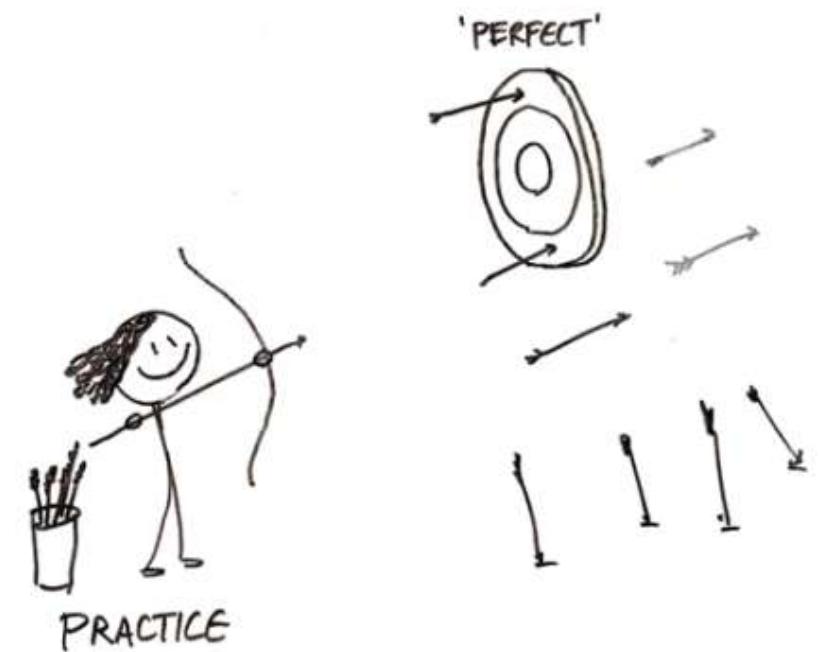


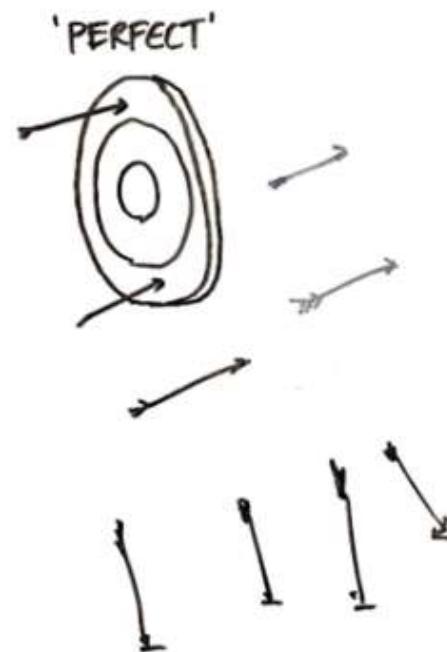
• Practice:

1. A person travels from Chennai to Pondicherry in cycle at 7.5 Kmph. Another person travels the same distance in train at a speed of 30 Kmph and reached 30 mins earlier. Find the distance.
2. It takes eight hours for a 600 km journey, if 120 km is done by train and the rest by car. It takes 20 minutes more, if 200 km is done by train and the rest by car. The ratio of the speed of the train to that of the car is?
3. Jake and Paul each walk 10 km. The speed of jack is 1.5 faster than Paul's speed. What is the Jake's speed ?
4. Raj travels a part of journey by taxi paying 15 per km and rest by train paying 21per km. If he travels a total of 450 Km and pay Rs.8130 then the distance travelled by raj in train?
5. A person walks at 4km/hr for a particular duration T1 and 3km/hr for another duration T2 and covers a total distance of 36km. If he walks at 4km/hr for the duration T2 and at 3Km/hr for the duration T1, then he covers only 34km. What is $T_1 + T_2$?



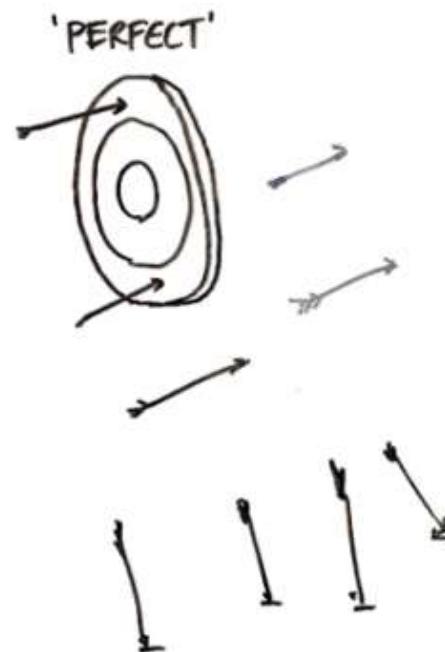
- **Practice:**

6. Raj drives slowly along the perimeter of a rectangular park at 24kmph and completes one full round in 4mins. The ratio of length is to breadth is 3:2. What are its dimensions?
7. Megha drives along the perimeter of square field of side 10kms. She drives along the first side at 10kmph, along second side 20 kmph, along 3rd side 30kmph and along the forth side at 40 kmph. Her average speed is ?
8. When a train travels at a speed of 60kmph, it reaches the destination on time. When the same train travels at a speed of 50kmph, it reaches its destination 15min late. What is the length of journey?
9. A car travelling with $\frac{5}{7}$ of its actual speed covers 42 km in 1 hour 40 min 48 sec. Find the actual speed of the car.
10. By travelling at 40 kmph, a person reaches his destination on time. He covered two-third the total distance in one-third of the total time. What speed should he maintain for the remaining distance to reach his destination on time?



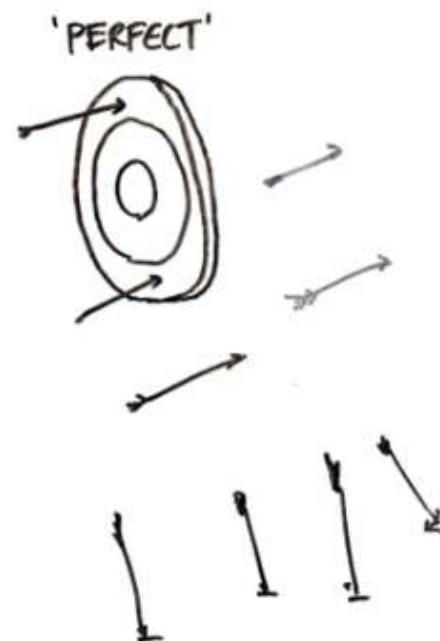
• Practice:

1. The distance between two cities A and B is 495 km. A train starts from A at 7 : 30 a.m. and travels towards B at 60 km/hr. Another train starts from B at 9 a.m. and travels towards A at 75 km/hr. At what time do they meet?
2. A train of length 300 metres crosses a tree in 20 seconds and crosses another train of the same length travelling in opposite direction in 25 seconds. What is the speed of the second train?
3. Two trains of length 120 meters and 140 meters are moving in the same direction on parallel tracks at speed of 82 km/hr and 64 km/hr. In what time the first train will cross the second train?
4. A train of length 200 meters takes 12 seconds to cross a man who is running at a speed of 10 km/hr in opposite direction of the train. What is the speed of the train?
5. A train crosses two men who are running in the direction of train at 4 km/hr and 8 km/hr in 18 and 20 seconds respectively. Find the length of train.



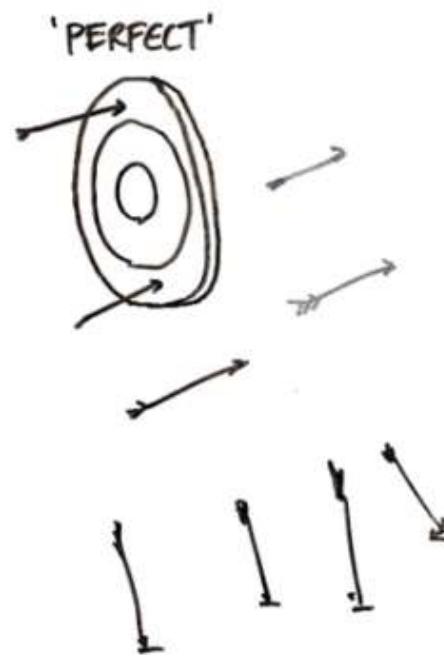
- Practice:

6. Two stations P and Q are 160 km apart on a straight track. A train starts running from station P at 8 a.m. at a speed of 30 km/hr towards station Q. Another train starts from station Q at 9 a.m. at a speed of 35 km/hr towards station P. At what time they will meet?
7. Two trains are moving towards each other with speeds 40 km/hr and 45 km/hr from different stations P and Q. When they meet the second train from station Q has covered 20 km more distance than the first train which starts from station P. What is the distance between the two stations?
8. A train of length 200 meters is moving at a speed of 80 km/hr. In what time it will cross a man who is running at 10 km/hr in opposite direction of the train?
9. A man sitting in a train which is running at a speed of 100 km/hr saw a goods train which is running in opposite direction towards him. The goods train crosses the man in 8 seconds. If the length of goods train is 300 meters, find its speed.
10. A train crosses a pole and a bridge of length 280 meters in 6 seconds and 20 seconds respectively. At what speed the train is running?



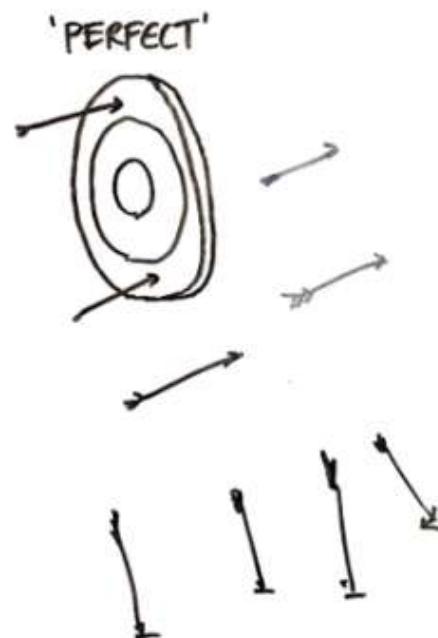
- Practice:

1. The speed of a boat in still water is 15 km/hr and the rate of current is 3 km/hr. The distance travelled downstream in 12 minutes is?
2. A boat takes 90 minutes less to travel 36 miles downstream than to travel the same distance upstream. If the speed of the boat in still water is 10 mph, the speed of the stream is?
3. A boat covers a certain distance downstream in 1 hour, while it comes back in 1.5 hours. If the speed of the stream be 3 kmph, what is the speed of the boat in still water?
4. A boatman goes 2 km against the current of the stream in 1 hour and goes 1 km along the current in 10 minutes. How long will it take to go 5 km in stationary water?
5. Speed of a boat in standing water is 9 kmph and the speed of the stream is 1.5 kmph. A man rows to a place at a distance of 105 km and comes back to the starting point. The total time taken by him is?



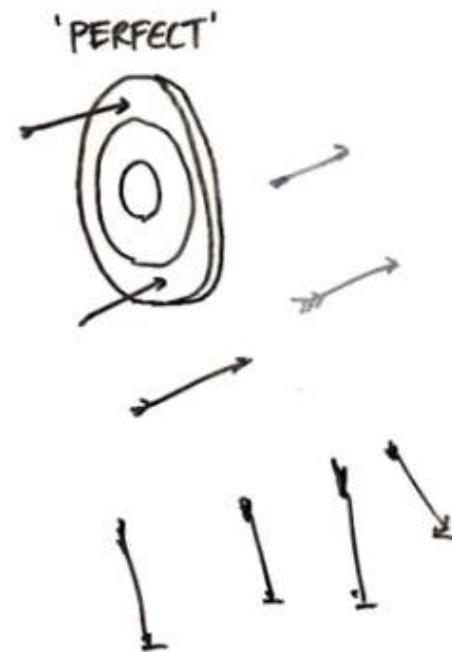
- Practice:

6. A man rows to a place 48 km distant and come back in 14 hours. He finds that he can row 4 km with the stream in the same time as 3 km against the stream. The rate of the stream is?
7. A man can row a boat at a speed of 20 km/hr in still water. If the speed of the stream is 5 km/hr, in what time he can row a distance of 75 km downstream?
8. A boat covers 800 meters in 600 seconds against the stream and returns downstream in 5 minutes. What is the speed of the boat in still water?
9. A man rows downstream at 20 km/hr and rows upstream at 15 km/hr. At what speed he can row in still water?
10. A man swims 12 km downstream and 10 km upstream. If he takes 2 hours each time, what is the speed of the stream?



- Practice:

1. How many times in a day, the hands of a clock forms 30° ?
2. At what angle the hands of a clock are inclined at 15 minutes past 6?
3. The angle between the minute hand and the hour hand of a clock when the time is 4.20, is?
4. How many times in a day, the hands of a clock are straight?
5. At 3:20, the hour hand and the minute hand of a clock form an angle of?

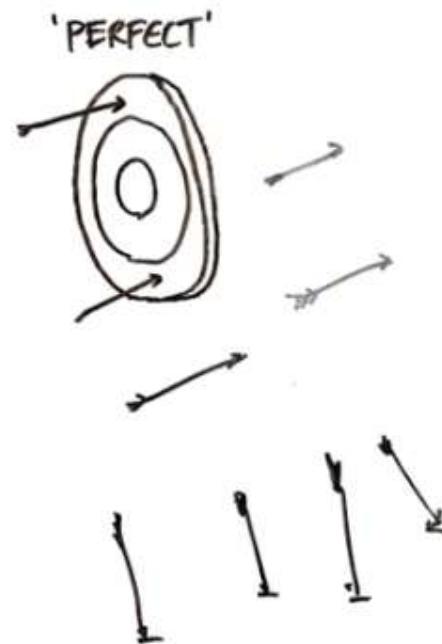


- Practice:

6. What is the angle between hour hand and minute hand of a clock at 3.30?
7. At what time between 4 o'clock and 5 o'clock will the hands of a clock coincide?
8. A clock is set at 4am. It loses 16 minutes in 24 hours. What will be the correct time when the clock indicates 9pm on the 4th day?
9. At what time between 4:30 and 5:00 will the hands of a clock be at right angle?
10. A watch which gains uniformly is 5 minutes slow at 6am on Monday and is 5 minutes 48 seconds fast at 6pm on the following Monday. When was it correct?



PRACTICE



Distemel

DOMS

Page No.

Date

/ /

$$\textcircled{1} \text{ cyclist speed} = 7.5$$

Train Speed = 30 kmph, Train = 30 minutes

Time by cycle = D

7.5

Time by train = D

30

Difference = D

$$\frac{D}{7.5} - \frac{D}{30} = 0.5$$

$$(D = 15 \text{ km})$$

\textcircled{2}

$$\frac{120}{T} + \frac{480}{C} = 8$$

$$\frac{200}{T} + \frac{400}{C} = 8.33$$

$$\frac{T}{C} = \frac{2}{3}$$

$$\textcircled{3} \text{ Jack speed} = 1.5 \times \text{Paul's speed}$$

Paul speed V,

$$\text{Time} : \frac{10}{V} = \frac{10}{1.5V} + \frac{5}{1.5V} \Rightarrow T = 1.5V = 10 \text{ km/h}$$

\textcircled{4}

$$\text{Total} = 450 \text{ km}$$

$$\text{Cost} = 8130$$

$$\text{train} = x, \text{ taxi} = 450 - x$$

$$\text{Cost} = 21x + 15(450 - x) = 8130$$

$$x = 280 \text{ km}$$

\textcircled{5}

$$4T_1 + 3T_2 = 36$$

$$4T_2 + 3T_1 = 34$$

$$T_1 = 6 \text{ hours}, T_2 = 4 \text{ hours}$$

$$T_1 + T_2 = 10 \text{ hours}$$

\textcircled{6}

Perimeter speed = 240 Time = 60 min

$$P = 240 \times \frac{1}{15} = 1.6 \text{ km} = 1600 \text{ m}$$

$$L:B = 3:2, L = 3x, B = 2x$$

$$2(3x + 2x) = 1600 \Rightarrow x = 160$$

$$L = 480, B = 320$$

(2)

Time = 10 km speed = 10, 20, 30, 40
 Distance = 40 km

$$\text{Time} = \frac{10}{10} + \frac{10}{20} + \frac{10}{30} + \frac{10}{40} = 1 + 0.5 + 0.33 + 0.25 = 2.08 \text{ hours}$$

$$\text{Avg} = \frac{40}{2.08} = 19.2 \text{ kmph}$$

(3) Speed = 60 late speed = 50 kmph, Delay = 15 min
 Distance = D

$$\frac{D}{60} - \frac{D}{50} = 0.25 \Rightarrow D = 75 \text{ km}$$

(4) Radial speed = $\frac{5}{7}$, Distance = 42 km, Time = 1 hr 40 min

$$\text{Reduced Speed} = \frac{42}{1.66} = 25 \text{ kmph}$$

$$\text{Actual Speed} = 25 \times \frac{7}{5} = 35 \text{ kmph}$$

(5) On-time speed = 60 kmph

Distance = D Total time = T

$$\frac{2D}{3} \text{ in } \frac{T}{3} \Rightarrow \text{Speed} = \frac{2D}{\frac{T}{3}} = \frac{60 \times 2}{\frac{T}{3}} = \frac{120}{T} = 20$$

$$\text{Speed} = \frac{D/3}{2T/3} = \frac{D}{2T} = 10 \text{ kmph}$$

$$\textcircled{1} \quad 7:30 - 9:00 = 1.5 \text{ hours}$$

$$D = S \times T = 60 \text{ km/hour} \times 1.5 \text{ hours} = 90$$

$$\text{Distance b/w } = 60 \text{ km/hour} \times 90 = 405 \text{ km}$$

$$60 \text{ km/hour} + 75 = 135 \text{ km/hour}$$

$$\text{Time} = D/S = 405 / 135 = 3 \text{ hours}$$

$$\text{Meeting time} = 12:00 \text{ pm}$$

$$\textcircled{2} \quad D = 300$$

$$T = 20$$

$$S = D/T = \frac{300}{20} = 15 \text{ m/s}$$

$$\text{Length of } T_2 = 300 \text{ m} + 300 \text{ m} = 600 \text{ m}$$

$$T = 25 \text{ s}$$

$$R_S = D/T = 600 \text{ m} / 25 = 24 \text{ m/s}$$

$$\text{Relative speed} = 24 \text{ m/s} = 15 \text{ m/s} + T_2$$

$$\text{Speed of } T_2 = 24 \text{ m/s} - 15 \text{ m/s} = 9 \text{ m/s}$$

$$\text{Cover } 20 \text{ km/hour} = 72 \text{ m/s} \times \left(\frac{1.8}{5}\right) = 32.4 \text{ km/hour}$$

$$\textcircled{3} \quad R_S = 82 \text{ km} = 60 \text{ km/hour} = 18 \text{ m/s}$$

$$D = 82 + 14 = 96 \text{ km}$$

$$T = D/S = 96 / 18 = 52 \text{ sec}$$

$$\textcircled{4} \quad V \times \left(\frac{5}{18}\right) = 10 \left(\frac{5}{18}\right) = 25/9 \text{ m/s}$$

$$(V \times \frac{5}{18}) + (\frac{25}{9})$$

$$D = 200 \quad T = 12$$

$$2000 = R_S \times 12$$

$$R_S = 2000 / 12 = 166.67$$

$$(5V/18) + (25/9) = 50/9$$

$$5V + 50 = 300$$

$$5V = 250$$

$$V = 50 \text{ km/hour}$$

$$\textcircled{5} \quad 3 \text{ of } 1 : 4 \text{ km/hour} = 10/9 \text{ m/s}$$

$$3 \text{ of } 2 : 8 \text{ km/hour} = 20/9 \text{ m/s}$$

$$\text{Speed of train} = V \times \left(\frac{5}{18}\right) \text{ m/s}$$

$$f_{\text{train}} = (5V/18) - (10/9) \quad S_m = (5V/18) - (20/9)$$

$$f_{\text{train}} = R_S \times 18 \quad L = \left(\frac{5V}{18} - \frac{10}{9}\right) \times 18 \quad L = \left(\frac{5V}{18} - \frac{20}{9}\right) \times 20$$

$$\text{Guns} = L \times 20$$

$$L = 5V - 20 \Rightarrow L = \frac{50V}{9} - \frac{400}{9}$$

$$5V - 20 = \frac{50V}{9} - \frac{400}{9} \Rightarrow 5V - 180 = 50V - 400$$

$$5V - 20 = 220 - 20$$

$$5V = 240 \quad V = 48 \text{ km/hour}$$

$$Q = P = 1 \text{ hr} = 30 \text{ km/hour} \times 1 \text{ hour} = 30 \text{ km}$$

$$D = 160 \text{ km} - 30 \text{ km} = 130 \text{ km}$$

$$P_{BS} = 20 + 85 + 65 \text{ km/hour}$$

$$T = D/V = 130 / 65 \approx 2 \text{ hr}$$

$$MT = 6 \text{ hours} + 2 \text{ hours} = 11:00 \text{ am} + 2 \text{ hours} = 1:00 \text{ pm}$$

$$ST = 2L + 20 \text{ km}$$

$$T_{\text{of } 1} = x/40$$

$$T_{\text{of } 2} = (x+20)/45$$

$$x/40 = (x+20)/45$$

$$45x = 40x + 800$$

$$5x = 800$$

$$x = 160 \text{ km}$$

$$2 + (x+20) = 160 + 180 \Rightarrow 840$$

$$T_B = 80 \times (5/18) \approx 22.2 \text{ min}$$

$$M_B = 10 \times (5/18) \approx 2.8 \text{ min}$$

$$\Rightarrow (200/\text{min}) + (25/\text{min}) = 225 \text{ min}^{-1}$$

$$D = T \cdot L = 200 \text{ m} \Rightarrow T = D/L = 200 / 25 \approx 8 \text{ min}$$

$$M_H = 100 \times (5/18) \approx 27.8 \text{ min}$$

$$(250/\text{min}) + V = 27.8 \Rightarrow V = 27.8 - 250 = 2.2 \text{ min}$$

$$T = 98 \text{ min}$$

$$300 = (250 + V) \times 8$$

$$\frac{250}{\text{min}} + V \approx \frac{300}{8} = 37.5$$

$$250 = 2.2 \times 8 \Rightarrow 250 = 17.6 \Rightarrow V = 250 - 17.6 = 232.4 \text{ min}$$

$$\text{Kin/Net: } \frac{232.4}{8} = 29.05 \text{ min}$$

$$L = V \times B = 20 \times 20 = 400 \text{ m}$$

$$TD = L + 280 = 400 + 280 = 680 \text{ m}$$

$$T = 208 \text{ min}$$

$$L + 280 = V \times 20$$

$$L = 6V$$

$$6V + 280 = 20V \Rightarrow 6V = 20V - 280 \Rightarrow 14V = 280 \Rightarrow V = 20 \text{ m/s}$$

$$6V + 280 = 20V \Rightarrow 6V = 20V - 280 \Rightarrow 14V = 280 \Rightarrow V = 20 \text{ m/s}$$

$$\text{Kin/Net: } 20 \times \frac{2.8}{5} = 22 \text{ min}$$

Q) $D_8 = 15 + 3 = 18 \text{ km/hg}$
 $+ 2 \text{ hours} = 12/60 = 0.2 \text{ hr}$
 $D = S \times T = 18 \times 0.2 = 3.6 \text{ km}$

Q) $D_8 = V + 3$

$V_8 = V - 3$

$\frac{36}{V_8} - \frac{36}{V} = 1.5$

$360 + 36x - 360 + 36x = 150 - 1.5x^2$
 $72x^2 + 150 = 150 - 1.5x^2$

$1.5x^2 + 72x^2 = 150 - 150$
 $73.5x^2 = 0$

$3x^2 + 144x - 800 = 0$

Divide by 3

$x^2 + 48x - 1000 = 0$

$x = \frac{-48 \pm \sqrt{48^2 + 4000}}{2} = \frac{-48 \pm 52}{2} = 2$

Q) $D_8 = V + 3$

$V_8 = V - 3$

$(V+3) \times 1 = (V-3) \times 1.5$

$V+3 = 1.5V - 4.5$

$-0.5V = -27.5$

$V = 55 \text{ km/h}$

$2 \text{ hours} = 2 \times 60 = 120 \text{ minutes}$

Q) ~~$D_8 = V + 3$~~ $D_8 = V + 3$ $\text{and } 2.5 \text{ hours} = 150 \text{ minutes}$

$150 = V + 3 \times 120 + 822$

$150 = V + 360 + 822$

$D_8 = 1 \text{ km/hour} = \frac{1}{6} \text{ hr}$

speed = 6 km/h

$V + 8 = 6 + 25$

$2V = 8 \Rightarrow V = 4 \text{ km/h}$

$8 - 6 - 4 = 2 \text{ km/hr}$

$\gamma = D_8 = 5/4 = 1.25 \text{ kg}$

$\approx 1 \text{ kg} + 5 \text{ minutes}$

$$5) DS = q + l \cdot s = 10 \cdot 5 \text{ km/hour}$$

$$VS = q - l \cdot s = 5 \text{ km/hour}$$

$$T_{DS} = 105 / 10 \cdot 5 = 10 \text{ hours}$$

$$T_{UP} = 105 / 2 \cdot 5 = 14 \text{ hours}$$

$$T_t = 10 + 14 = 24 \text{ hours}$$

$$6) DS = v \cdot t$$

$$VS = v \cdot s$$

$$\frac{4}{v+s} = \frac{3}{v-s}$$

$$\frac{48}{v+s} + \frac{48}{v-s} = 14$$

$$4(v-s) = 3(v+s)$$

$$4v - 4s = 3v + 3s$$

$$\frac{4s}{6s} + \frac{48}{6s} = 14$$

$$\frac{6}{6} + \frac{8}{6} = 14$$

$$14 = 14$$

$$v = 7s$$

$$s = 1 \text{ km/hour}$$

$$7) DS = 20 + 5 = 25 \text{ km/hour}$$

$$T = DS = 25 / 25 = 1 \text{ hour}$$

$$8) D = 800 \quad T = 600 \quad T = 5 \text{ minutes} = 300$$

$$SP = 800 / 600 = 1.33 \quad S = 800 / 300 = 2.67$$

$$DS = v$$

$$SS = S$$

$$v - s = 4.33$$

$$v + s = 8.33$$

$$2v = 4.33 + 8.33 = 12.67 = 4 \quad v = 2 \text{ m/s}$$

$$2 \times (1.33) = 2.67 \text{ km/hour}$$

$$DS = v + s = 20$$

$$UP = v - s = 15$$

$$2v = 15 + 20 = 35 \Rightarrow v = 17.5 \text{ km/hour}$$

$$v = 12.5 \text{ km/hour}$$

$$9) DS = 12 / 2 = 6 \text{ km/hour}$$

$$UP = 10 / 2 = 5 \text{ km/hour}$$

$$v + s = 6 \text{ km/hour}$$

$$v - s = 5 \text{ km/hour}$$

$$2v = 11$$

$$v = 5.5 \text{ km/hour}$$

Clock

① 30° Angle = 44 times in 12 hrs \Rightarrow 88 times in a day

$$\text{② } 30H - 5.5M = 180 - 82.5 \Rightarrow 97.5^\circ$$

$$\text{③ } 11:30 : 110 - 110 = 10^\circ$$

④ 22 times in 12 hrs \Rightarrow 44 times

$$\text{⑤ } 190 - 110 = 80^\circ$$

$$\text{⑥ } 1105 - 180 = 75^\circ$$

$$\text{⑦ } 21 \frac{9}{11} \text{ min}$$

⑧ Total time = 89 hrs

$$\text{Actual time} = 89 \text{ hrs} + \frac{16 \times 89}{1440} = 89 + 1 = 90 \text{ hrs}$$

Correct time: 6:00 am on the 5th day

$$\text{⑨ } 4:30 \text{ and } 5:00 : 4:32 \frac{8}{11} \text{ and } 4:54 \frac{6}{11}$$

⑩ 5 mins \Rightarrow 8 sec in 180 hrs

3 hours and 18 mins after 6:00 am

\Rightarrow 12:00 pm Friday