# Time and Distance

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<td>(1) Aman and Kapil starts from Delhi and Gwalior respectively towards each other at same time. They meet at Mathura and then take 196 minutes and 225 minutes respectively to reach Gwalior and Delhi. If speed of Aman is 30 km/hr, then what is the speed (in km/hr) of Kapil?</td>
<td>(a) 28 (b) 30 (c) 225/7 (d) 392/15</td>
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<td>(2) A train travels 20% faster than a car. Both start from point A at the same time and reach point B, 180 km away at the same time. On the way the train takes 30 minutes for stopping at the stations. What is the speed (in km/hr) of the train?</td>
<td>(a) 28 (b) 30 (c) 225/7 (d) 392/15</td>
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<td>(3) A man starts running from point P at 11:00 a.m. with a speed of 10 km/hr. He runs for 2 hours and then takes a 1 hour rest. He continues this till he is caught by another man who starts at 2:00 p.m. from point P and runs non-stop at a speed of 15 km/hr towards the first man. At what time (in p.m.) will the first man be caught?</td>
<td>(a) 25 (b) 24.5 (c) 24 (d) 25.5</td>
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<td>(4) After excluding stoppages, the speed of a bus is 60 kmph and after including stoppages, it is 45 kmph. For how many minutes does the bus stop per hour?</td>
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<td>(5) If a boat goes a certain distance at 30 km/h and comes back the same distance at 20 km/hr, what is the average speed (in km/hr) for the total journey?</td>
<td>(a) 28 (b) 30 (c) 225/7 (d) 392/15</td>
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<td>(6) A train of length 100 m crosses another train of length 150 m, running on a parallel track in the opposite direction in 9 seconds. If the speed of train having length 150 m is 40 km/hr, then what is the speed (in km/hr) of the other train?</td>
<td>(a) 28 (b) 30 (c) 225/7 (d) 392/15</td>
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(7) If I walk at 7/6 of my usual speed, then I reach my office 15 minutes early. What is the usual time taken (in minutes) by me to reach the office?

(a) 30
(b) 48
(c) 50
(d) 60

(11) A bus travels 2/5 of a total journey at its usual speed. The remaining distance was covered by bus at 6/7 of its usual speed. Due to slow speed it reaches its destination 50 minutes late. If the total distance is 200 kms, then what is the usual speed (in km/hr) of bus?

(10) Two people A and B are at a distance of 260 km each from other at 9:00 a.m. A immediately starts moving towards B at a speed of 25 km/h and at 11:00 a.m. B starts moving towards A at a speed of 10 km/hr. At what time (in p.m.) will they meet each other?

(a) 5:00 p.m.
(b) 6:00 p.m.
(c) 6:30 p.m.
(d) 7:00 p.m.

(13) After repairing a scooter runs at a speed of 54 km/h and before repairing runs at a speed of 48 km/h. It covers a certain distance in 6 hours after repairing. How much time will it take to cover the same distance before repairing?

(a) 6 hours 15 minutes / 6 घंटे 15 मिनट
(b) 6 hours 45 minutes / 6 घंटे 45 मिनट
(c) 7 hours / 7 घंटे
(14) A bus starts running with the initial speed of 21 km/hr and its speed increases every hour by 3 km/hr. How many hours will it take to cover a distance of 252 km?

(15) Diameter of wheel of a cycle is 21 cm. The cyclist makes 45 minutes to reach a destination at a speed of 16.5 km/hr. How many revolutions will the wheel make during the journey?

(16) 37 trees are planted in a straight line such that distance between any two consecutive trees is same. A car takes 20 seconds to reach the 13th tree. How much more time (in seconds) will it take to reach the last tree?

(17) A spaceship travels at 810 km/hr. How many metres does it travel in 1/5th of a second?

(18) Two trains are moving in the opposite directions at speed of 43 km/h and 51 km/h respectively. The time taken by the slower train to cross a man sitting in the faster train is 9 seconds. What is the length (in metres) of the slower train?

(19) A man makes four trips of equal distances. His speed on first trip was 60 km/hr and in each subsequent trip his speed was half of the previous trip. What is the average speed (in km/hr) of the man in these four trips?

(20) To cover a distance of 144 km in 3.2 hours what should be the average speed of the car in meters/second?

(21) A taxi going at 90 km/hr takes 35 minutes to travel a certain distance. By how much should it increase its speed (in km/hr) to travel the same distance in 21 minutes?
bicycle @ 18 km/hr. What is distance (in kms) travelled on foot?

(23) Excluding stoppages, the speed of a bus is 72 kmph and including stoppages, it is 60 kmph. For how many minutes does the bus stop per hour?

(24) If a person walks at 15 km/hr instead of 9 km/hr, he would have walked 3 km more in the same time. What is the actual distance (in kms) travelled by him?

(25) A runner starts running from a point at 6.00 am with a speed of 8 km/hr. Another racer starts from the same point at 8.30 am in the same direction with a speed of 10 km/hr. At what time of the day (in p.m.) will the second racer overtake the other runner?

(26) Two trains are moving in the opposite direction at speed of 30 km/hr and 45 km/hr respectively, whose lengths are 450 m and 550 m respectively. What is the time taken (in seconds) by slower train to cross the faster train?
(31) Two cyclists P and Q cycle at 20 km/hr and 25 km/hr towards each other. What was the distance (in kms) between them when they started if they met after 56 minutes?

(32) A boat goes a certain distance at 40 km/hr and comes back the same distance at 24 km/hr. What is the average speed (in km/hr) for the total journey?

(33) A man travelled a distance of 60 km in 7 hours. He travelled partly on foot @ 6 km/hr and partly on bicycle @ 12 km/hr. What is the distance (in kms) travelled on foot?

(34) Excluding stoppages, the speed of a train is 120 kmph and including stoppages, it is 50 kmph. For how many minutes does the train stop per hour?

(35) A train travels 40% faster than a car. Both start from point A at the same time and reach point B, 140 km away at the same time. On the way the train takes 25 minutes for stopping at the stations. What is the speed (in km/hr) of the train?

(36) A train goes a certain distance at 40 km/hr and comes back the same distance at 24 km/hr. What is the speed of the boat in still water?

(37) Two cars A and B travel from one city to another, at speeds of 35 km/hr and 45 km/hr respectively. If car B takes 2 hours lesser time than car A for the journey, then the distance (in kms) between the two cities is?

(38) If a person walks at 12 km/hr instead of 10 km/hr, he would have walked 1 km more in the same time. What is the actual distance (in kms) travelled by him at 10 km/hr in the same time?

(39) To travel 720 km, a Express train takes 6 hours more than Duronto. If however, the speed of the Express train is doubled, it takes 2 hours less than Duronto. The speed of Duronto (in km/hr) is?
720 किलोग्राम की यात्रा करने के लिए, एक एक्सप्रेस ट्रेन को डयुरोंटो से 6 घंटे अधिक समय लगता है। अगर एक्सप्रेस ट्रेन की गति दोगुनी कर दी गई है, तो यह डयुरोंटो से 2 घंटे कम समय लेती है। डयुरोंटो की गति (किलोमीटर /घंटा में) कितनी है?

SSCCGL23AUG-S1 : 59
(a) 60 (b) 72 (c) 66 (d) 78

(40) If a taxi going at 40 km/hr takes 25 minutes to travel a certain distance, by how much should it increase its speed (in km/hr) to travel the same distance in 20 minutes?
यदि 40 किमी /घंटा की गति से जाने वाली एक टैक्सी को एक निश्चित दूरी की यात्रा करने के लिए 25 मिनट लगती हैं, तो 20 मिनट में उसी दूरी की यात्रा करने के लिए इसे अपनी गति (किलोमीटर /घंटा में) कितनी वृद्धि करनी चाहिए?

SSCCGL22AUG-S1 : 59
(a) 50 (b) 5 (c) 25 (d) 10

(41) A man travelled a distance of 50 km in 8 hours. He travelled partly on foot at 5 km/hr and partly on bicycle at 7 km/hr. What is the distance (in kms) travelled on foot?
एक आदमी ने 8 घंटे में 50 कि.मी. की दूरी की। वह अपने रूप से 5 कि.मी. /घंटा पैदल चला और आशिक रूप से 7 कि.मी. /घंटा की गति से साइकल पर 7 कि.मी. /घंटा की गति से सफर किया। पैदल तय की गई दूरी (कि.मी. में) कितनी है?

SSCCGL23AUG-S2 : 59
(a) 20 (b) 25 (c) 15 (d) 30

(42) A spaceship travels at 1,260 km/h. How many metres does it travel in 1/10 th of a second?
एक अंतरराष्ट्रीय यान 1,260 किमी/घंटे की गति से यात्रा करता है। सेकंड के 1/10 वें भाग में वह कितने मीटर यात्रा करेगा?

SSCCGL20AUG-S3 : 59
(a) 126 (b) 35 (c) 36 (d) 125

Answer Key

Solution
(1)

Aman takes 196 min to travel y distance and his speed is 30 km/hr.

Distance = speed \times time
Y = 30 \times \frac{196}{60} = 98 \text{ km} 

Now, we know that time taken by aman to cover x distance is equal to the time taken by kapil to travel y(98 km).

Therefore, \( \frac{x}{30} = \frac{98}{\text{speed}} \).

Distance traveled by kapil from point A to delhi
\((\frac{98 \times 30}{x})(\frac{225}{60}) = x \).

By solving these eq. we get \( x = 105 \text{ km} \).

Hence to travel 105 km kapil take 225 min therefore his speed must be 28 km/hr.

(2) 
Let, Speed of Car = x

\text{Speed of train} = \frac{6x}{5} 

From question;
\( \frac{180}{x} - \frac{180 \times 5}{6x} = \frac{1}{2} \)

\( \Rightarrow \frac{180}{6x} = \frac{1}{2} \)

\( \therefore x = 60 \text{ km/h} \)

\text{Speed of train} = 60 \times \frac{5}{5} = 72 \text{ km/h} 

(4) 
In 1 hour the bus can travel 60 km without including stoppages. To travel 1 km it took 1 min.
In 1 hour the bus can travel 45 km including stoppages difference = 15 km
So, it stopped for 15 min in hour.

(5) 
avg. speed = \frac{\text{total distance}}{\text{total time}}

= \frac{d + d}{\frac{d}{20} + \frac{d}{20}}

After solving = 24 \text{ km/h}.

(6)
Let slow speed = 6x
And normal speed = 7x
Time difference will occur only in remaining 3/5 of distance.
Let total distance = D
\[
\frac{3D}{6x} - \frac{2D}{7x} = \frac{50}{60}
\]
\[
\frac{120}{6x} \cdot \frac{120}{7x} = \frac{5}{6}
\]
\[
\frac{120(7-6)}{42x} = \frac{5}{6}
\]
\[
X = \frac{25}{7}
\]
Usual speed = \(\frac{25}{7} \times 7 \text{ km} = 24 \text{ km/hr}\)

Distance covered by A in 3 seconds = 30 × 3 = 90 metre.
This 90 m distance is covered by B in \(\frac{90}{50-30} = 4.5\) second.
∴ A travelled = 90 + (4.5 × 30)
= 90 + 135 = 225 m
& B travelled = 4.5 × 50 = 225 m
∴ Required total distance = 225 + 225 = 450 m

Distance covered in 6 hours after repairing = 54 × 6 = 324 km
Required time = \(\frac{324}{48}\) = 6 hours 45 min.

In first hour bus will cover 21 km
In second hour it will cover 24 km
In third hour it will cover 27 km
By formula Sum of AP
\[
252 = n/2 [2 \times 21 + (n - 1)3]
\]
\[
504 = 42n + 3n^2 - 3n
\]
\[
3n^2 + 39n - 504 = 0
\]
\[
n^2 + 13n - 168 = 0
\]
\[
n^2 + 21n - 8n - 168 = 0
\]
\[
n(n + 21) - 8(n + 21) = 0
\]
\[
n = 8, - 21
\]
So, n = 8 hours

Distance Covered=3/4 × 16.5=12.375 km
=1237500 cm
Distance covered in one revolution=Diameter × π
=21 × 22/7
=66 cm

Revolution=1237500/66=18750

Let distance between two planted trees be x unit.
∴ 12x distance is covered in 20 seconds
∴ 36x distance is covered in 60 seconds.
∴ Required time = 60 sec – 20 sec = 40 seconds.

1 hour = 3600 sec
1 Km = 1000m
810 Km = 810000m
3600 sec = 810000m
1 sec = 810000/3600 = 225m
1/5 sec = 225 × 1/5 = 45m

Let distance =x
1\text{ time speed}=60\text{kmph time}=x/60
2\text{ time Speed}=30\text{kmph time}=x/30
3\text{ time speed}=15\text{kmph time}=x/15
4\text{ time speed}=7.5\text{kmph time}=2x/15
Total time =x/60+x/30+x/15+2x/15
=15x/60=x/4
Total Distance = 4x
Time = x/4
Speed= 4x / (x/4) =16kmph

Avg. speed = 144/3.2 × 5/18
= 12.5 m/s

Distance = 90 × \(\frac{5}{18} \times 35 \times 60\) meters
= 52500 m
Speed required to cover this distance in 21 minutes
= 52500/21×60 × 18/5 km/hr
= 150 km/hr
∴ Increase in speed = 150 – 90 = 60 km/hr

Let his distance travelled by foot be x km.
x/9 + (99 - x)/18 = 9
⇒ 2x + 99 - x = 9 × 18
⇒ x = 63

Speed without stoppage (s_)= 72 km/hr
Speed with stoppage (s)= 60 km/hr
The bus stop per hour = S_ - S_ / S_ = 72-60/72 × 60 minutes
= 10 minutes
Let the time taken by him be ‘t’.
∴ ATQ
$15 \times t - 9 \times t = 3$
$\Rightarrow t = \frac{1}{2} \text{ hr}$
∴ Actual distance travelled = $9 \times \frac{1}{2} = 4.5 \text{ kms}$

(25)
Up to 8:30 AM first runner would have run for $2.5 \times 8 = 20 \text{ km}$
Time taken by second runner to overtake first runner
= $20/10 - 8$
= 10 hours
So, second runner will overtake first runner after 8 : 30 AM + 10 hour
= 6 : 30 PM

(26)
Relative speed of both trains
= $(30 + 45) \text{ km/h}$
= $(75 \times 5/18) \text{ m/s}$
∴ Time taken to cross each other
= $\left(\frac{1000}{75 \times 5} \right) \text{ sec} = 48 \text{ sec}$

(28)
Average speed for total journey $= \frac{2xy}{x+y}$
= $2 \times 30 \times 60/90 = 40 \text{ km/h}$

(29)
$\text{Speed} = \frac{2 \times 1000}{2.5 \times 60 \times 60} = 10 \text{ m/sec}$

(30)
Speed = $81/1.5 \times 5/18 = 15 \text{ m/sec}$

(31)
Distance covered by (P + Q) in 1 hour = $20 + 25 = 45 \text{ km}$.
Distance covered by them in 56 minutes is the distance between them.
So, Distance between P and Q $= 45/60 \times 56 = 42 \text{ km}$.

(38)
Let the time taken at both speed be t.
ATQ
$12t - 10t = 1$
$t = 0.5 \text{ hour}$
Required distance = $10 \times 0.5$
= 5 km

(40)

Distance = $40 \times 25/60 = 16.67 \text{ km}$
Required speed = $16.67/20 \times 60 \text{ km/hr} = 50 \text{ km/hr}$.
∴ Required increase in speed = $50 - 40 = 10 \text{ km/hr}$. 