Quantitative Aptitude

Problem on Train

Level-1

Q1 A train speeds before a pole in 10 seconds and a platform 150 m long in 20 seconds. Find the length of the train in meters.
(A) 100 (B) 111
(C) 101 (D) 110
(E) 150

Q2 Two trains are running in the same direction for 25 sec and 15 sec respectively but their speed is the same. Find the ratio of the distance covered by them.
(A) $\frac{4}{3}$
(B) $\frac{3}{4}$
(C) $\frac{3}{5}$
(D) $\frac{5}{3}$
(E) None of these

Q3 A train 175 m long passes a person, running at 4 km/hr in the same direction in which the train is going in 20 seconds. Calculate the speed of the train.
(A) 21.5 km/hr (B) 35.5 km/hr
(C) 27.5 km/hr (D) 28.5 km/hr
(E) None of these

Q4 A train running at the speed of 12 m/s, and passes a platform in 1 minute. It takes 90 seconds to pass a bridge of twice the length of the platform. Find the length of the train.
(A) 200 (B) 280
(C) 300 (D) 360
(E) 400

Q5 A platform of length 250 m can be crossed by a train of length 150 m in 20 sec. Find the speed of the train in kmph.
(A) 65 kmph (B) 70 kmph
(C) 72 kmph (D) 80 kmph
(E) None of these

Q6 A platform of length 450m is crossed by a train of length 350 m. If the speed of the train is 360 kmph, then find the total time taken by the train to cross the platform.
(A) 5 sec (B) 8 sec
(C) 12 sec (D) 9 sec
(E) 7 sec

Q7 **A train of a certain length can cross a platform of length 350 m in 30 sec with the speed of 72 kmph. Find the length of the train.**
(A) 200 m (B) 250 m
(C) 300 m (D) 350 m
(E) 400 m

Q8 **A train running at a speed of 144 km/hr crosses a platform double its length in 40 seconds. What is the length of the platform in metres?**
(A) 700 m (B) 800 m
(C) 1000 m (D) 1200 m
(E) 750 m

Q9 A platform of length 250m is crossed by a train of length 150 m. If the speed of the train is 72 kmph, then find the total time taken by the train to cross the platform.
(A) 20 sec (B) 25 sec
(C) 30 sec (D) 28 sec
(E) None of these

Q10 **A train running at a speed of 54 km/hr crosses a platform double its length in 24 seconds. What is the length of the platform in meters?**
(A) 200 m (B) 240 m
(C) 300 m (D) 350 m
(E) 400 m

Q11 A 640 metre long train takes 160 seconds more to cross a platform twice its length than it takes to cross a pole at the same speed. What is the speed of the train in metre/second?
(A) 16
(B) 8
(C) 10
(D) Cannot be determined
(E) none of these

Q12 Train A crosses Train B running in the opposite direction at the speed of 60 kmph in 6 seconds and crosses a pole in 8 seconds. If the length of train B is 100 m longer than train A, find the length of train A.
(A) 200 m
(B) 400m
(C) 300m
(D) 500 m
(E) Can not be determined.

Q13 Two trains of equal length are running on parallel lines in the same direction at 70 km/hr and 46 km/hr. The faster train crossed the slower train in 54 seconds. The length of each train is:
(A) 180 m (B) 120 m
(C) 150 m (D) 200 m
(E) 240 m

Q14 Two trains coming from the opposite sides cross each other in 20 seconds if the Lengths of first train and second train are 225 m and 375 m respectively, also the speed of first train is 36 km/hr. The speed of second train is:
(A) 65 km/hr (B) 70 km/hr
(C) 72 km/hr (D) 80 km/hr
(E) None of these

Q15 A man traveled a certain distance by train at the rate of 40 kmph. and walked back at the rate of 5 kmph. If the whole journey took 9 hours, find the distance traveled by the person.
(A) 40 km (B) 60 km
(C) 80 km (D) 90 km
(E) None of these

Q16 A man travelled a certain distance by train at the rate of 50 kmph and walked back at the rate of 10 kmph. If the whole journey took 6 hours, find the distance.
(A) 50 km (B) 40 km
(C) 30 km (D) 20 km
(E) None of these

Q17 A platform of length 200m is crossed by a train of length 300 m. If the speed of the train is 25 m/sec, then find the total time taken by the train to cross the platform.
(A) 15 sec (B) 20 sec
(C) 25 sec (D) 18 sec
(E) None of these

Q18 **A train 350 meters long is running at a speed of 108 kmph. If a man is running at 18 kmph in the direction opposite to that in which the train is going, then find the time it will take to pass the man.**
(A) 15 sec (B) 20 sec
(C) 10 sec (D) 12 sec
(E) 25 sec

Q19 **A train travelling with uniform speed crosses a platform of length 750 meters in 15 sec and crosses a bridge of length 1.8 km in 30 sec . What is the length of the train?**
(A) 1 km (B) 1.3 km
(C) 0.3 km (D) 0.03 km
(E) None of these

Q20 **A train, 400 m long takes 50 seconds to cross a bridge 800 m long. How much time will the train take to cross a platform 320 m long?**
(A) 40 sec (B) 30 sec
(C) 45 sec (D) 35 sec
(E) 55 sec

Q21 Direction: If two trains of length 200 m and 250m are having the speed of 18 km/hr and 36 km/hr, respectively, find the time taken to cross each other, is they move in opposite direction.

(A) 180 sec (B) 120 sec
(C) 90 sec (D) 30 sec
(E) 60 sec

Q22 In 15 seconds, a train X traveling at 15 m/s crosses a train Y at 72 kmph in the opposite direction. What is the length of train X that is twice as long as train Y?
(A) 300m
(B) 350m
(C) 380m
(D) 450m
(E) None of the above

Q23 **How many seconds will a 750 metre long train take to cross a man walking with a speed of 8 km/hr in the direction of the moving train if the speed of the train is 98 km/hr?**
(A) 20 sec (B) 25 sec
(C) 30 sec (D) 35 sec
(E) 50 sec

Q24 **How many seconds will a train 400 m in length, travelling at the rate of 108 km/h, take to pass another train 100 m long, proceeding in the same direction at the rate of 18 km/h?**
(A) 15 sec (B) 20 sec
(C) 25 sec (D) 30 sec
(E) 10 sec

Q25 **If a platform of length 300 m can be crossed by a train in 30 sec and the speed of the train is 20 m/sec, then find the length of the train.**
(A) 200 m (B) 250 m
(C) 300 m (D) 350 m
(E) 400 m

Q26 **If a train of length 250 m can cross a platform of certain length in 20 sec and the speed of the train is 90 kmph, then find the length of the platform.**
(A) 250 m (B) 200 m
(C) 300 m (D) 320 m
(E) 350 m

Q27 **If a train of length 300 m can cross a platform of certain length in 20 sec and the speed of the train is 144 kmph, then find the length of the platform.**
(A) 450 m (B) 480 m
(C) 500 m (D) 550 m
(E) None of these

Level-2

Q1 **The ratio of the length of train A to B is 5:4 and the speed of the train A to B is 5:6. If train A also crosses a pole in 10 seconds, Find the speed of train B. Note: The difference in length of the train is 200m.**

(A) 20 (B) 25
(C) 24 (D) 35
(E) 45

Q2 Two trains 180 meters and 170 meters in length respectively are running in opposite directions, one at the rate of 26 km and the other at the rate of 100 km an hour. Find in what second they will be completely clear of each other from the moment they meet?

(A) 15 sec (B) 12 sec
(C) 10 sec (D) 8 sec
(E) 20 sec

Q3 A fast moving Roorkee express crosses another train in 30 seconds. The speed of the faster train is 47 km/hr and the speed of the slower train is 27 km/hr. The length of faster train is 120 m, then the length of the passenger train if they are moving in the same direction:

(A) 41 m (B) 45 m
(C) 47 m (D) 49 m
(E) None of these

Q4 After traveling 80 km, a train meets with an accident and then proceeds at ¾ of its former speed and arrives at its destination $35\ min$ late. Had the accident occurred $24\ km$ further , it would have reached the destination only $25\ min$ late. Find the speed of the train.

(A) $45\ km/h$ (B) $55\ km/h$
(C) $48\ km/h$ (D) $30\ km/h$
(E) $50\ km/h$

Q5 The of length of train A and train B is 4k and 5k and the speed of train A is 20 m/sec and speed of train B is 40 m/sec and time taken by train A and Train B to cross each other in opposite directions is 45 sec, then find the value of k.

(A) 200 (B) 400
(C) 300 (D) 100
(E) 250

Q6 A _a___ m long train crosses a platform __b___ length in 40 sec. Time taken by train to cross the 220 m long platform in 22 sec.

i. a = 220, b = 580.
ii. a = 200, b = 540.
iii. a = 210, b = 520.

Find which one satisfies the above condition.

(A) Only i (B) Only ii
(C) Both i and iii (D) Only iii
(E) Both i and ii

Q7 A train covers a certain distance in 360 minutes at the speed of 80 km/h. The speed of the train is increased by (x – 10)%, then the train reduces the time to cover the distance by 60 minutes. Find the value of x% of 2800.

(A) 360 (B) 840
(C) 480 (D) 720
(E) None of these

Q8 A child moving at 6 kmph in the opposite direction of a train crosses it in 50 seconds. Another train that is 25% quicker and half as long takes 30 seconds to cross the stationary pole. Calculate the second train's length approximately.

(A) 135 m (B) 145 m
(C) 125 m (D) 155 m
(E) None of these

Q9 The speed of two railway engines is in the ratio $5 : 4$. If they move on parallel tracks in the same direction and if the slower engine is ahead of the faster engine by $8\ km$, when the latter starts, how far will the faster engine travel before it overtakes the slower one?

(A) $42\ km$ (B) $40\ km$
(C) $32\ km$ (D) $36\ km$
(E) $48\ km$

Q10 Train A can cross a bridge in 32 seconds. The speeds of train A & train B is 90 km/h and 19 meters/sec, respectively. The length of Train B is 110 meters less than that of Train A. If train A and train B cross each other while running in opposite directions in 22.5 seconds, then find the time train B takes to cross the bridge.
(A) $\frac{780}{19}$ sec
(B) $\frac{680}{19}$ sec
(C) $\frac{690}{19}$ sec
(D) $\frac{590}{19}$ sec
(E) None of these

Q11 Train A can cross a pole and bridge of 375-meter-long in 12 seconds and 27 seconds, respectively. Train A cross train B which is moving in opposite direction to train A in 13 seconds. Find the speed of train B if its length is 5% less than the length of train A.
(A) 63 km/h (B) 81 km/h
(C) 90 km/h (D) 72 km/h
(E) None of these

Q12 The length of two trains (A and B) is 270 m and 720 m, respectively. If they are going in the same direction, train B takes 55 seconds to pass train A completely and if they are going in opposite directions, they pass each other completely in 9 seconds. Find the speed of train A?
(A) 48 m/s (B) 51 m/s
(C) 55 m/s (D) 60 m/s
(E) None of these

Q13 Train A having length 450 m crosses a platform thrice of its length in 36 sec. Train B running at the speed of 54 kmph crosses a standing man in 50 sec. Find the time taken by both trains to cross each other when running in the same direction.
(A) $30\frac{2}{7}$ seconds (B) $36\frac{2}{7}$ seconds
(C) $33\frac{2}{7}$ seconds (D) $34\frac{2}{7}$ seconds
(E) 40 seconds

Q14 Train P crosses a pole in 4 seconds. Train Q coming from the opposite direction crosses a bogie of train P of length $\frac{1}{4}$ of train P in 2 seconds. The length of Train P and Train Q are in the ratio 7:3. Find the speed of Train P, if the speed of Train Q is 20 m/s.
(A) 60 m/s (B) 56 m/s
(C) 54 m/s (D) 48 m/s
(E) 45 m/s

Q15 **A train can go 150 km in 5 hours but there was an accident midway. After the accident, the speed of the train reduces by 33.33%. If the accident occurs after covering 90 km, then find the total time taken by the train.**
(A) 5 hr (B) 6 hr
(C) 8 hr (D) 3 hr
(E) 9 hr

Q16 The ratio of lengths of two trains Alfa express and Beeta express is 6:9 and the ratio of the time taken by both trains to cross a man standing on a platform is 3:1. If the speed of Alfa is 30 km/hr, find the speed of Beeta.
(A) 125 km/hr (B) 130 km/hr
(C) 135 km/hr (D) 140 km/hr
(E) None of these

Q17 A goods train and a passenger train are running on the parallel tracks in the same direction. The driver of the goods train observes that the passenger train coming from behind overtakes and crosses his train completely in $1\ min$ whereas a passenger on the passenger train marks
that he crosses the goods train in $⅔\ min$. If the speeds of the trains are in the ratio of $1:2$, then find the ratio of their lengths.
(A) $1:2$ (B) $2:1$
(C) $1:4$ (D) $3:1$
(E) $4:1$

Q18 Train X of length 300 meter crosses another train Y of length 1/3rd of the length of train X running in opposite direction of train X in p second. Speed of train X is $\frac{5}{3}$ times of the speed of train Y. Train X can cross a platform of length 200 meter in 20 second. Find the value of p.

(A) 8 sec (B) 15 sec
(C) 14 sec (D) 10 sec
(E) 12 sec

Q19 A passenger train and a goods train are running in the same direction on parallel railway tracks. If the passenger train now takes three times as long to pass the goods train as when they are running in opposite directions, then what is the ratio of the speed of the passenger train to that of the good train ?

(A) $1:2$ (B) $1:1$
(C) $4:3$ (D) $3:2$
(E) $2:1$

Q20 **A train 200 metres long overtook a person, who was walking in the same direction at the rate of 18 km/hr and passed him in 10 seconds. Subsequently, it overtook a second person who was also walking in the same direction, and passed him 20 seconds. If the second person was walking at x m/sec, then find the value of x.**

(A) 15 m/s (B) 10 m/s
(C) 12 m/s (D) 18 m/s
(E) 24 m/s

Q21 **A train 300 metres long overtook a person, who was walking in the same direction at the rate of 36 km/hr and passed him in 20 seconds. Subsequently, it overtook a second person who was also walking in the same direction, and passed him 20 seconds. If the second person was walking at x m/sec, then find the value of x.**

(A) 10 m/sec (B) 12 m/sec
(C) 15 m/sec (D) 18 m/sec
(E) 24 m/sec

Level-3

Q1 Two trains 'A' and 'B' are moving in opposite directions (from Q and P respectively) towards their destinations 'P' and 'Q', respectively. Train 'A' takes 25 hours and train 'B' takes 36 hours, to reach their respective destinations after crossing each other. If the speed of train 'B' is 150 km/hr, then find the speed of train 'A'.

(A) 200 km/hr (B) 120 km/hr
(C) 180 km/hr (D) 140 km/hr
(E) 150 km/hr

Q2 The distance between the two trains is 150 km and moving in the opposite direction on the same track. The speed of one train is 65 km/hr and the speed of another train is 55 km/hr. A bird starts flying at a speed of 60 km/hr at the location of the faster train. When it reaches the slower train, it turns around and flies in the opposite direction at the same speed. When it reaches the faster train again it turns around and so on. When the train collide, how far has the bird flown (in km)?

(A) 60 (B) 65
(C) 85 (D) 50
(E) 75

Q3 The speed of trains A and B is $93\ km/h$ and $51\ km/h$ respectively. When both the trains are running in the opposite direction, they cross each other in $18s$. The length of Train B is half of the length of Train A. If train A crosses a bridge in $42s$, then find the length of the bridge.

(A) $485\ m$ (B) $240\ m$
(C) $605\ m$ (D) $480\ m$
(E) $610\ m$

Q4 A train running at the speed of 72 km/h can cross a pole and a platform _____ meters long in _____ seconds and 32 seconds respectively.
The values given in which of the following options will fill the blanks in the same order in which is it given to make the above statement true:

A. 460, 9
B. 420, 11
C. 400, 12
D. 320, 15
E. 360, 13

(A) Only A
(B) Only A, B and C
(C) Only B, C and E
(D) Only A, C, D and E
(E) Only B

Q5 A train running at a speed of 72 km/h can cross a pole and a bridge ____ meters long in ____ seconds and 24 seconds respectively.
The values given in which of the following options will fill the blanks in the same order in which is it given to make the above statement true:

A. 320, 8
B. 280, 10
C. 250, 11

(A) Only A (B) Only B and C
(C) Only A and B (D) Only A and C
(E) Only B

Q6 A train has to go to point B, which is 288 km far from point A. After traveling for 2.5 hours, the train met with an accident and its speed was decreased by 'x' km/h and it reached point B late by 50 minutes. If the initial speed of the train was 16 m/s, then find the value of 'x'?

(A) 13.2 km/h (B) 14.4 km/h
(C) 10.8 km/h (D) 12 km/h
(E) 15.2 km/h

Q7 A train of length 'x + 100' meters can cross a platform of length 'x - 50' meters in 13.5 seconds while the train can cross a person running at speed of 15 km/h towards the train in

8 seconds. Find the speed of the train and length of the platform.

(A) 30 m/s and 200 meters

(B) 26 m/s and 150 meters

(C) $\frac{200}{3}$ m/s and 200 meters

(D) $\frac{100}{3}$ m/s and 150 meters

(E) 29 m/s and 120 meters

Q8 Traveling at its usual speed, a train takes 'x' seconds to cross a pole. Traveling at a speed that is 25% more than its usual speed, the train takes (x + 2) seconds to cross a 168-meter-long platform. Traveling at a speed that is 50% more than its usual speed, the train takes '1.5x' seconds to cross a 540-metre-long bridge. Find the usual speed of the train.

(A) 18 m/s (B) 24 m/s

(C) 36 m/s (D) 72 m/s

(E) None of these

Q9 Two trains of equal lengths take 15 seconds and 10 seconds respectively to cross a telegraph post. If the length of each train be 150 metre and in 'a' second they cross each other travelling in opposite directions, then find the value of (0.5 × a + 2a)?

(A) 25 (B) 28

(C) 30 (D) 35

(E) None of these

Q10 Train A, starts from point X and train B starts from point Y running at 70 km/hr and 110 km/hr respectively. The distance between X and Y is 717km. If the length of train A is (z/5 + 960) meters and of train B is(1.333Z + 200) meters, they cross each other in opposite directions in 4 hours. Find the speed of train C whose length is (3Z/2) meters and cross a platform of length 250 meters in 41 seconds.

(A) 220 km/hr (B) 120 km/hr

(C) 200 km/hr (D) 160 km/hr

(E) 180 km/hr

Answer Key

Level-1

Q1	(E)
Q2	(D)
Q3	(B)
Q4	(D)
Q5	(C)
Q6	(B)
Q7	(B)
Q8	(B)
Q9	(A)
Q10	(B)
Q11	(B)
Q12	(E)
Q13	(A)
Q14	(C)
Q15	(A)
Q16	(A)
Q17	(B)
Q18	(C)
Q19	(C)
Q20	(B)
Q21	(D)
Q22	(B)
Q23	(C)
Q24	(B)
Q25	(C)
Q26	(A)
Q27	(C)

Level-2

Q1	(C)
Q2	(C)
Q3	(C)
Q4	(C)
Q5	(C)
Q6	(A)
Q7	(B)
Q8	(C)
Q9	(B)
Q10	(C)
Q11	(D)
Q12	(E)
Q13	(D)
Q14	(B)
Q15	(B)
Q16	(C)
Q17	(B)
Q18	(D)
Q19	(E)
Q20	(A)
Q21	(A)

Level-3

Q1	(C)	Q6	(B)
Q2	(E)	Q7	(D)
Q3	(C)	Q8	(D)
Q4	(B)	Q9	(C)
Q5	(C)	Q10	(E)

Hints & Solutions

Level-1

Q1 Text Solution:

Let the length of the train be x meters and its speed by y m/sec.

And time =10 second

We know that,

Speed = $\frac{\text{distance}}{\text{time}}$

Put the values,

$y = \frac{x}{10}$

With platform,new length =x+150m and time =20 sec

By using speed formula ,Them we get

$\frac{x+150}{20} = \frac{x}{10}$

=> 10(x + 150) = 20x

=> 10x + 1500 = 20x

=>20x-10x=1500

=>10x=1500

=>x=150 meters.

Hence, the correct option is 150 meters.

Q2 Text Solution:

Let the distance of the two trains be x meter and y meter respectively.

Then, Time taken by the first train = 25 seconds and Time taken by the second train = 15 seconds

Now use speed formula,

I.e. speed=distace/time

So, $\frac{x}{25} = \frac{y}{15}$ because, speed of both train are same

$\Rightarrow \frac{x}{y} = \frac{25}{15}$

$\Rightarrow \frac{x}{y} = \frac{5}{3}$

Hence, the correct option is $\frac{5}{3}$.

Q3 Text Solution:

Length of the train = 175 m

Time taken to pass the person = 20 seconds

Speed of the train relative to person = $\frac{175}{20} m/s$

= $\frac{35}{4} \times \frac{18}{5}$ = $\frac{63}{2}$km/hr

(we have to convert m/s in to km/hr, multiplied by $\frac{18}{5}$)

Let the speed of the train be x km/hr then,

relative speed = (x-4) km/hr

So, x - 4 = $\frac{63}{2}$

2x - 8 = 63

2x = 63 +8

2x = 71

x = 35.5km/hr

∴ The answer is 35.5km/hr

Q4 Text Solution:

Let the length of the train be x m and the length of the platform be y m

$x + y = 12 \times 60$

$x + y = 720 \ldots\ldots\ldots I$

Length of bridge = 2y

$x + 2y = 90 \times 12$

$x + 2y = 1080 \ldots\ldots\ldots\ldots\ldots\ldots\ldots II$

Equation II – equation I

$y = 360\ m$

$x = 720 - 360 = 360$

Q5 Text Solution:

Let the speed of the train be x m/s.

Total length of platform and train = $250 + 150 = 400\ m$

Time taken to cross the platform = 20 sec

$=> \frac{400}{x} = 20$

$=> x = 20\ m/s = 20 \times \frac{18}{5} = 72\ kmph$

Q6 Text Solution:

Speed of train = $360\ kmph = 360 \times \frac{5}{18} = 100\ m/s$

Total length of platform and train $= 450 + 350 = 800\ m$

Time taken to cross the platform $= \frac{800}{100} = 8\ sec$

Q7 Text Solution:

Let the length of the train be x m.

Total length of platform and train = $x + 350\ m$

Speed of train = 72 kmph $= 72 \times \frac{5}{18} = 20\ m/s$

Time taken to cross the platform = 30 sec

$\frac{x+350}{20} = 30$

$x + 350 = 600$

$x = 250\ m$

Q8 Text Solution:

Let the length of the platform be 2x m .

Length of train = x m

Total length of train and platform $= x + 2x = 3x\ m$

Speed of train = 144 kmph $= 144 \times \frac{5}{18} = 40\ m/s$

Time taken to cross $= 40\ sec$

$\frac{3x}{40} = 30$

$x = 400\ m$

So, length of platform $= 2x = 800\ m$

Q9 Text Solution:

Total length of platform and train $= 250 + 150 = 400\ m$

Speed of train = 72 kmph $= 72 \times \frac{5}{18} = 20\ m/s$

Time taken to cross the platform $= \frac{400}{20} = 20\ sec$

Q10 Text Solution:

Let the length of the train be x m.

Length of platform = 2x m

Total length of platform and train $= 2x + x = 3x\ m$

Speed of train = 54 kmph $= 54 \times \frac{5}{18} = 15\ m/s$

Time taken to cross the platform = 24 sec

$\frac{3x}{15} = 24$

$x = 120\ m$

So, length of platform $= 2x = 240\ m$

Q11 Text Solution:

⇒ Let the speed of the train be x m /sec

⇒ Length of platform = 2 × 640 = 1280

⇒ Total length = 1280 + 640 = 1920

⇒ (1920 / x) – (640 / x) = 160

⇒ 1280 / x = 160

⇒ x = 1280 / 160

∴ x = 8 m/sec

Q12 Text Solution:

Length of train A = x

Length of train B = x + 100

Speed of train A = y

2x + 100 = (y + 60) × 5/18 × 6

6x + 300 = 5y + 300

6x = 5y

x = y × 5/6

We cannot find the answer.

Q13 Text Solution:

Let the length of each train be x m

Relative speed = 70 - 46 =24 km/hr = $24 \times \frac{5}{18} = \frac{20}{3}\ m/s$

Distance = speed × time

$2x = \frac{20}{3} \times 54$

$2x = 360$

$x = 180\ m$

Q14 Text Solution:

Let the speed of the second train be x m.

Speed of first train = 36 km/hr = 36 x $\frac{5}{18} = 10m/s$

Time taken by the trains to cross each other = 20 seconds

Total lengths of trains = 225 + 375 = 600 m

Sum of their speeds = x + 10

According to the question,

Time = $\frac{Sum\ of\ length\ of\ the\ two\ trains}{Sum\ of\ their\ speeds}$

20 = $\frac{600}{x + 10}$

20 x + 200 = 600

x = $\frac{400}{20} = 20m/s = 20 \times \frac{18}{5}$ = 72 km/hr

Q15 Text Solution:

Let the total distance traveled by the person be k km.

As per question;

$\frac{k}{40} + \frac{k}{5} = 9$

$=> \frac{45k}{200} = 9$

$=> k = 40\ km$

Q16 Text Solution:

Let the total distance x km.

As per question;

x/50+x/10 =6

=>60x/500=6

=>x = 50 km

Q17 Text Solution:

Total length of platform and train $= 200 + 300 = 500\ m$

Speed of train $= 25\ m/s$

Time taken to cross the platform $= \frac{500}{25} = 20\ sec$

Q18 Text Solution:

length of train$= 350\ m.$

Relative speed of man and train = 108 + 18 kmph = 126 kmph = $126 \times \frac{5}{18}$ = 35 m/s

Time taken to cross the faster train $= \frac{350}{35} = 10\ sec$

Q19 Text Solution:

Let the length of train is L ,

$\frac{750+L}{15} = \frac{1800+L}{30}$

$1500 + 2L = 1800 + L$

$L = 300\ m$

$L = 0.3\ km$

Therefore, the length of the train is 0.3 km.

Q20 Text Solution:

Total length of train and bridge $= 800 + 400 = 1200\ m$

Let the speed of the train be x m/s.

Time Taken to cross the bridge = 50 sec

$\frac{1200}{x} = 50$

$x = 24\ m/s$

Therefore, time taken to cross the platform of length 320 = $\frac{(400+320)}{24} = 30\ sec$

Q21 Text Solution:

Ans: 90 sec

speed of first train=$18 \times \frac{5}{18} = 5$m/s

speed of second train=$36 \times \frac{5}{18} = 10$m/s

Distance they have to cross to cross each other is the sum of lengths of tarin =200 + 250 =450m.

If they move in the opposite direction, relative speed = 10 + 5 = 15 m/s.

time taken=$\frac{dis\tan ce}{time}$ = $\frac{450}{15} = 30$sec

Q22 Text Solution:

Let the length of train X be 2a meters.

ATQ

T = $\frac{d}{t}$

15 = $\frac{2a+a}{15+72\times\frac{5}{18}}$

15 = $\frac{3a}{35}$

15 x 35 = 3a

a = 175m

So, the length of train X = 2a = 2 x 175 = 350m

Q23 Text Solution:

Relative speed of man and train $= 98 - 8 = 90\ kmph = 25\ m/s$

Length of train = 750 m

Time taken by train to cross the man $= \frac{750}{25} = 30\ sec$

Q24 Text Solution:

Relative speed of both the trains $= 108 - 18 = 90\ kmph = 25\ m/s$

Total length of both the trains = $400 + 100 = 500\ m$

Time taken to pass the train $= \frac{500}{25} = 20\ sec$

Q25 Text Solution:

Let the length of the train be x m.

Total length of platform and train $= x + 300\ m$

Speed of train $= 20\ m/s$

Time taken to cross the platform = 30 sec

$=> \frac{x+300}{20} = 30$

$=> x + 300 = 600$

$=> x = 300\ m$

Q26 Text Solution:

Let the length of the train be x m.

Total length of platform and train $= x + 250\ m$

Speed of train = 90 kmph $= 90 \times \frac{5}{18} = 25\ m/s$

Time taken to cross the platform = 20 sec

$=> \frac{x+250}{25} = 20$

$=> x + 250 = 500$

$=> x = 250\ m$

Q27 Text Solution:

Let the length of the train be x m.

Total length of platform and train $= x + 300\ m$

Speed of train = 144 kmph $= 144 \times \frac{5}{18} = 40\ m/s$

Time taken to cross the platform = 20 sec

$=> \frac{x+300}{20} = 40$

$=> x + 300 = 800$
$=> x = 500\ m$

Level-2

Q1 Text Solution:

Let the length of train A and B be 5x and 4x m respectively.

As per question;

5x- 4x = 200

x = 200 m

Therefore, the length of trainA = 1000 and trainB = 800 m.

Let the speed of train A and B be 5k and 6k m/s respectively.

As per question;

$\frac{1000}{5x}$=10

x = 20 m/s

Therefore, speed of train B = $20 \times \frac{6}{5}$= 24 m/s

Q2 Text Solution:

Total length of both the trains $= 180 + 170 = 350\ m$

Relative speed of both train $= 100 + 26 = 126\ kmph = 35\ m/s$

So, time taken by faster train to cross slower train = $\frac{350}{35} = 10\ sec$

Q3 Text Solution:

Let the length of another train be x m.

Time taken to cross another train = 30 seconds

Relative speed = 47 - 27 = 20 km/hr = 20 $\times \frac{5}{18} = \frac{50}{9} m/s$

Here,Distance = Sum of length of the two trains

Since Time = $\frac{D}{S}$

30 = $\frac{\text{Sum of length of the two trains}}{\text{Difference in speeds}}$

30 = $\frac{120 + x}{\frac{50}{9}}$

30 = $\frac{(120 + x) \times 9}{50}$

1500 = 1080 + 9x

9 x =420

x = $\frac{420}{9} = 46.66 \approx 47m$

Q4 Text Solution:

The speed after $(80 + 24 = 104\ km$ is the same in both cases.

The difference in time $(35 - 25 = 10\ min$ is only because of the difference in speeds for the $24\ km$ journey.

Now, difference between time when $24\ km$ are traveled with $3/4th$ of speed and with usual speed$= 10\ min$

$\frac{24}{3x} \times 4 - \frac{24}{x} = \frac{10}{60}$

$32/x - 24/x = ⅙$

$8/x = ⅙$

$x = 48\ km/h$

Q5 Text Solution:

Let the length of train A and train B be 4k and 5k m.

Total length of both the trains $= 4k + 5k = 9k\ m$

Relative speed of both the trains $= 20 + 40 = 60\ m/s$

Time taken to cross each other $= 45\ sec$

$\frac{9k}{60} = 45$

$k = 300\ m$

Q6 Text Solution:

Let's check option i, the speed of the train is $\frac{220+580}{40}$ = 20 m/sec.

Time taken to cross 220 m long platform is = $\frac{[220+220]}{20}$ =22 sec

So, it is satisfied.

Similarly,

Let's check option ii, the speed of the train is $\frac{200+540}{40}$ = 18.5m/sec.

Time taken to cross 220 m long platform is = $\frac{[220+200]}{18.5}$ = 22.70 sec

So, it is not satisfied.

Let's check option iii, the speed of the train is $\frac{210+520}{40}$ = 18.25m/sec.

Time taken to cross 220 m long platform is = $\frac{[220+210]}{18.25}$ = 23.56 sec

So, it is not satisfied.

Q7 Text Solution:

Increased speed = $\frac{80 \times 360}{360 - 60} = \frac{80 \times 360}{300}$ = 96 km/h

x – 10 = $\frac{96-80}{80}$ × 100

x – 10 = 20

x = 30

x% of 2800 = 30% of 2800 = 0.3 × 2800 = **840**

Q8 Text Solution:

Correct Option: C

Speed of boy = 6kmph

⇒ 1 kmph = $5/18\ mps$

⇒ 6 kmph = 6 × $5/18$ = 1.66m/s

Let the first train's length and speed be L metres and v m/s, respectively.

We are aware that time + relative speed equals distance.

Considering the length of the boy negligible,

L = (v + 1.66)× 50 ....(1) {both boy and train are in opposite direction hence we take positive sign}

Length of 2nd train = L/2

Speed of 2nd train = 125% of v = 1.25v

⇒ L/2 = 1.25v × 30

⇒ L = 75v **...(2)**

Solving the equation 1 & 2, we get

L = 250 m ⇒ length of 2nd train = L/2 = 125 m

Option (C) is correct.

Q9 Text Solution:

time taken by faster engine to overtake slower engine=$8\ /\ (5x-4x) = 8/x\ h$

Distance covered by faster engine $= 5x \times 8/x = 40\ km$

Hence the answer is 40km.

Q10 Text Solution:

Let length of train A be 'x' meters

Length of train B = 'x-110' meters

And length of bridge be 'y' meters

According to question,

$\frac{x+y}{90\times\frac{5}{18}} = 32$

x+y = 800.....(i)

And

$\frac{x+x-110}{90\times\frac{5}{18}+19}$ = 22.5

x + x – 110 = 990

x + x = 1100

x = 550

x value put in eq(i)

So, y = 250

Length of train B = x – 110 = 440 meters

Required time = $\frac{440+250}{19}$ = $\frac{690}{19}$ sec

Q11 Text Solution:

Let the length of train A be 'x' meter.

So according to question: x/12 = (x + 375)/27

27x = 12x + 4500

15x = 4500

x = 300

So, the speed of train A = 300/12 = 25 m/s

Length of train B = 0.95× 300 = 285 meter

Let the speed of train B be 'S' m/s.

So according to question: 13 × (S + 25) = 300 + 285

S + 25 = 585/13

S + 25 = 45

S = 20

So, the speed of train B = 20 m/s = 20 × 18/5 = 72 km/h

Hence, option d.

Q12 Text Solution:

Let the speed of train B = x m/s

Speed of the train A = y m/s

ATQ,

x – y = $\frac{990}{55}$

x – y = 18

x = 18 + y.....I

And,

x + y = $\frac{990}{9}$

x + y = 110.....II

From eq. I Put the value of x in eq. II

18 + y + y = 110

18 + 2y = 110

2y = 92,

y = 46

Speed of the train A = 46 m/s

Q13 Text Solution:

Speed of train A = $\frac{450+3\times450}{36} = \frac{1800}{36} = 50\ m/s$

Speed of train B = $54 \times \frac{5}{18} = 15\ m/s$

Length of train B = $15 \times 50 = 750\ m$

Relative speed when both trains running in the same direction =50 - 15 = 35 m/s

Required time = $\frac{450+750}{35} = \frac{1200}{35} = \frac{240}{7} = 34\frac{2}{7}$ seconds

Q14 Text Solution:

Speed of train Q =20 m/s

And, the length of trains P and Q is 7k and 3k.

Speed of train P = $\frac{7k}{4}$ m/s.

Length of one bogie of train P = $\frac{7k}{4}$

Relative speed = $\frac{7k}{4} + 20$

$\frac{3k+\frac{7k}{4}}{\frac{7k}{4}+20} = 2$

$\frac{19k}{4} = \frac{14k}{4} + 40$

$\frac{5k}{4} = 40$

$k = 32$

Speed of train P = $\frac{7k}{4} = 56$ m/s

Q15 Text Solution:

Speed of train A = $\frac{150}{5} = 30\ km/hr$

Speed of train A after accident $= \frac{2}{3} \times 30 = 20\ km/hr$

Distance covered by train after accident $= 150 - 90 = 60\ km$

Total Time taken by train = $\frac{90}{30} + \frac{60}{20} = 6\ hr$

Q16 Text Solution:

Let the length of Alfa express and Beeta express be 6x and 9x respectively, and time taken by the both trains to cross the man be 3t and t respectively.

So the speed of first train = $\frac{6x}{3t} = \frac{2x}{t}$

Given that,

Speed of Alfa train = 30 km/hr

Therefore,

30 = $\frac{2x}{t}$

$\frac{x}{t} = 15$.....(i)

Now the speed of train Beeta = $\frac{9x}{t}$.....(ii)

Putting the value of $\frac{x}{t}$ from equation (i) in (ii)

9 x 15 = 135 km/hr

Q17 Text Solution:

let the speeds of the two trains be x and $2x$ and length be A and B respectively.

Given,

$A + B\ /\ 2x - x = 1\ min = 60\ s\ \ldots\ldots(1)$

And $A\ /\ 2x - x = ⅔\ min = 40\ s\ \ldots.(2)$

From equation 1 and 2,

$A + B\ /\ A = 60/40$

$1 + B/A = 3/2$

$B/A = ½$

$A : B = 2 : 1$

Q18 Text Solution:

As we know

Speed = Distance/ Time

Relative speed of two objects when traveling in the same direction = Speed of object A + Speed of object B

Relative speed of two objects when traveling in the opposite direction = Speed of object A - Speed of object B

Distance travelled by train = Length of train + Length of Plateform

Length of train Y = $\frac{1}{3}$ × 300 = 100 meter

Speed of train X = $\frac{200+300}{20}$ = 25 m/sec

Speed of train Y = 25 × $\frac{3}{5}$ = 15 m/sec

p = $\frac{300+100}{25+15} = 10$ sec

Q19 Text Solution:

let the speed of passenger and goods train be x and y respectively.

Given, $x + y = 3(x - y)$

$x + y = 3x - 3y$

$2x = 4y$

$x : y = 2 : 1$

Q20 Text Solution:

Let the speed of the train be a m/s.

Speed of 1st person = $18 \times \frac{5}{18}$ = 5 m/s

Relative speed of train and 1 st person = (a - 5) m/s

Time taken to cross 1st person by the train = 10 sec

$\frac{200}{(a-5)}$=10

a = 25 m/s

Relative speed of train and 2nd person = 25-x m/s

So,Time taken to cross 2nd person = 20

$\frac{200}{(25-x)}$ = 20

x = 15 m/s

Q21 Text Solution:

Let the speed of the train be a m/s.

Speed of 1st person $= 36 \times \frac{5}{18} = 10\ m/s$

Relative speed of train and 1 st person $= a - 10\ m/s$

Time taken to cross 1st person by the train $= 20\ sec$

$\frac{300}{a-10} = 20$

$a = 25\ m/s$

Relative speed of train and 2nd person $= 25 - x\ m/s$

So,Time taken to cross 2nd person = 20

$\frac{300}{25-x} = 20$

$x = 10\ m/s$

Level-3

Q1 Text Solution:

Speed of two trains will be inversely proportional to the square root of time taken by them to reach their respective destinations after crossing each other.

Therefore,

Speed of train 'A'=S_A

Speed of train 'B' = S_B

time taken by train 'B'=T_B

time taken by train 'A'=T_A

$\frac{S_A}{S_B} = \sqrt{\frac{T_B}{T_A}}$

Or, Speed of train $\frac{S_A}{150} = \sqrt{\frac{36}{25}}$

Or, speed of train 'A' = $\frac{6}{5}$ × 150 = 180 km/hr

Hence, option c.

Q2 Text Solution:

Given:

Distance between two trains = 150 km

Speed of the first train = 65 km/hr

Speed of the second train = 55 km/hr

Speed of the bird = 60 km/hr

Formula Used:

Time = Distance/Relative Speed

Calculation:

The train are 150 km apart.

Since, trains are moving in opposite direction.

Relative speed = (65+ 55) km/hr =120 km/hr

Therefore, time taken to collide the train = Distance/Relative Speed = (150/120) hr =1.25 hours

The distance covered by the bird in 1.25 hours = 60 × 1.25 = 75 km

Q3 Text Solution:

let the length of train A and B be x and $x/2$ respectively.

Relative speed for opposite direction

Now, $(x + x/2) \ / \ 18 \ = \ 40$

$x = 480 \ m$

Again, $93 \times \frac{5}{18} = \frac{480+y}{42}$

$480 + y = 1085$

$y = \ 605 \ m$

Q4 Text Solution:

Speed of the train = 72 km/h = 72 × $\frac{5}{18}$ = 20 m/s

Length of train + Length of platform = 32 × 20 = 640 m

For option A:

Length of train = 20 × 9 = 640 – 460

180 = 180

So option A can be the answer.

For option B:

Length of train = 20 × 11 = 640 – 420

220 = 220

So option B can be the answer.

For option C:

Length of train = 20 × 12 = 640 – 400

240 = 240

So option C can be the answer.

For option D:

Length of train = 20 × 15 = 640 – 320

300 ≠ 320

So option D can't be the answer.

For option E:

Length of train = 20 × 13 = 640 – 360

260 ≠ 280

So option E can't be the answer.

Hence, option b.

Q5 Text Solution:

Speed of the train = 72 × $\frac{5}{18}$ = 20 m/s

For option A:

Length of the train = 20 × 8 = 160 m

So, the length of the bridge = 20 × 24 – 160 = 320

480 – 160 = 320

320 = 320

So, option A can be the answer.

For option B:

Length of the train = 20 × 10 = 200 m

So, the length of the bridge = 20 × 24 – 200 = 280

480 – 200 = 280

280 = 280

So, option B can be the answer.

For option C:

Length of the train = 20 × 11 = 220 m

So, the length of the bridge = 20 × 24 – 220 = 250

480 – 220 = 250

260 ≠ 250

So, option C can't be the answer.

Hence, the correct option is C.

Q6 Text Solution:

Initial speed of the train = 16 m/s = 57.6 km/h

The time, in which the train would cover 288 km = $\frac{288}{57.6}$ = 5 hours

The time, in which the train covered 288 km = 5 hours + 50 minutes = $5\frac{5}{6}$ hours

The distance covered by the train in 2.5 hours = 57.6 × 2.5 = 144 km

Time taken by the train to cover the remaining distance of 144 km = $5\frac{5}{6}$ - 2.5 = $3\frac{1}{3}$ hours

The speed of the train after the accident = $\frac{144 \times 3}{10}$ = 43.2 km/h

The value of 'x' = 57.6 - 43.2 = 14.4 km/h

Q7 Text Solution:

Let speed of train = 's' m/s

Speed of person 15 km/h = $15 \times \frac{5}{18} = \frac{25}{6}$ m/s

According to the question:

[(x + 100) + (x - 50)] = s × 13.5

(2x + 50) = 13.5s

$s = \frac{2x+50}{13.5}$ ..... (1)

(x + 100) = (s + $\frac{25}{6}$) × 8

(x + 100) = 8s + $\frac{100}{3}$ ..... (2)

From (1) and (2):

$x + 100 = 8 \times \frac{2x+50}{13.5} + \frac{100}{3}$

$x + 100 = \frac{16x+400}{13.5} + \frac{100}{3}$

$x + 100 = \frac{16x}{13.5} + \frac{400}{13.5} + \frac{100}{3}$

$100 - \frac{400}{13.5} - \frac{100}{3} = \frac{16x}{13.5} - x$

$100 - \frac{800}{27} - \frac{100}{3} = \frac{32x}{27} - x$

$\frac{2700-800-900}{27} = \frac{32x-27x}{27}$

$1000 = 5x$

x = 200

From equation (1):

$s = \frac{2x+50}{13.5} = \frac{100}{3}$ m/s

Lenght of platform = x - 50 = 150 meters

Q8 Text Solution:

Let the usual speed of the train = 4y m/s

Let the length of the train = 'd' metres

We have, (d/4y) = x

Or, 4xy = d

Also, (d + 540) ÷ 4y × 1.5 = 1.5x

Or, $\frac{d+540}{6y}$ = 1.5x

Or, 9xy = d + 540

So, 9xy – 4xy = 5xy = d + 540 – d = 540

Or, xy = (540÷5) = 108

So, d = 4xy = 432

Also, we have (d + 168) ÷ 4y × 1.25 = $\frac{d+168}{5y}$ = (x + 2)

Or, 5xy + 10x = d + 168

Or, 540 + 10x = 432 + 168 = 600

Or, x = (600 – 540) ÷ 10 = 6

Therefore, usual speed of the train = 432÷6 = 72 m/s

Hence, option D.

Q9 Text Solution:

Let the speed of the first train be x and the speed of the second train be y.

Since the length of each train is 150 meters, distance = 150 meters

$Speed = \frac{\text{DIstance}}{\text{Time}}$

$x = \frac{150}{15} = 10\ m/s$

$y = \frac{150}{10} = 15\ m/s$

When the two trains are traveling in opposite directions,

relative speed $= x + y = 10 + 15 = 25\ m/s$

Total distance $= 2(length\ of\ train) = 300m$

Time $= \frac{300}{25} = 12\ sec$

(0.5 × a + 2a) = 6 + 24 = 30

Q10 Text Solution:

Given that,

The distance between both the trains is 717km.

Trains are running in opposite directions.

Let the length of both the train be L1 and L2 respectively and the speed be S1 and S2 respectively.

As we know, Speed = Distance/Time

⇒ S1 + S2 = (L1 + L2 + Distance)/Time

⇒ 180 = [717 + ((Z/5) + 960 + 4Z/3 + 200)× (1/1000)] ÷ 4

⇒ 720 – 717 = (1160 + 23Z/15) (1/1000)

⇒ 3 = (1160 + 23Z/15) (1/1000)

⇒ 3000 = (1160 + 23Z/15)

⇒ 1840 = 23Z/15

⇒ Z = 1200

Now,

Speed of train C whose length is (3Z/2) meters

⇒ 3Z/2 = 3 × 1200/2

⇒ 3 × 1200/2 = 1800m

⇒ Length = 1800m

⇒ Speed = (Length + Platform) / Time

⇒ Speed = (1800 + 250)/41

⇒ 2050/41

⇒ 50 m/s

⇒ 50 × 18/5

⇒ 180 km/hr

∴ The speed of train C is 180 km/hr.

Ans: option (E)