Problems on Trains

Solved Examples

Question No. 01

Two trains of equal length are running on parallel lines in the same direction at 46 km/hr and 36 km/hr. The faster train passes the slower train in 36 seconds. The length of each train is:

(A) 50 m

(B) 72 m

(C) 80 m

(D) 82 m

Answer: Option A

Explanation:

Let the length of each train be x meters.

Then, distance covered = $2x$ meters.

Relative speed = (46 - 36) km/hr

$\qquad\qquad$ = $[10 \times (5/18)]$ m/sec

$\qquad\qquad$ = $(25/9)$ m/sec

$\therefore 2x/36 = 25/9$

=> $2x = 100$

=> $x = 50$.

Question No. 02

Two stations A and B are 110 km apart on a straight line. One train starts from A at 7 a.m. and travels towards B at 20 kmph. Another train starts from B at 8 a.m. and travels towards A at a speed of 25 kmph. At what time will they meet?

(A) 9 a.m.

(B) 10 a.m.

(C) 10.30 a.m.

(D) 11 a.m.

Answer: Option B

Explanation:

Suppose they meet x hours after 7 a.m.

Distance covered by A in x hours = $20x$ km.

Distance covered by B in $(x - 1)$ hours = $25(x - 1)$ km.

∴ $20x + 25(x - 1) = 110$

=> $45x = 135$

=> $x = 3$

So, they meet at 10 a.m.

Question No. 03

A train overtakes two persons who are walking in the same direction in which the train is going, at the rate of 2 kmph and 4 kmph and passes them completely in 9 and 10 seconds respectively. The length of the train is:

(A) 45 m

(B) 50 m

(C) 54 m

(D) 72 m

Answer: Option B

Explanation:

2 kmph = $[2 \times (5/18)]$ m/sec = $(5/9)$ m/sec

4 kmph = $[4 \times (5/18)]$ m/sec = $(10/9)$ m/sec

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

Then, $[x/\{y - (5/9)\}] = 9$ and $[x/\{y - (10/9)\}] = 10$

∴ $9y - 5 = x$ and $10(9y - 10) = 9x$

=> $9y - x = 5$ and $90y - 9x = 100$

On solving, we get: $x = 50$

∴ Length of the train is 50 m.

Question No. 04

A train moves past a telegraph post and a bridge 264 m long in 8 seconds and 20 seconds respectively. What is the speed of the train?

(A) 69.5 km/hr

(B) 70 km/hr

(C) 79 km/hr

(D) 79.2 km/hr

Answer: Option D

Explanation:

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

Then, $x/y = 8$

$\Rightarrow x = 8y$

Now, $[(x + 264)/20] = y$

$\Rightarrow 8y + 264 = 20y$

$\Rightarrow y = 22$

$\therefore$ Speed = 22 m/sec = $[22 \times (18/5)]$ km/hr = 79.2 km/hr.

Question No. 05

A train traveling at 48 kmph completely crosses another train having half its length and traveling in opposite direction at 42 kmph, in 12 seconds. It also passes a railway platform in 45 seconds. The length of the platform is:

(A) 400 m

(B) 450 m

(C) 560 m

(D) 600 m

Answer: Option A

Explanation:

Let the length of the first train be x meters.

Then, the length of the second train is $(x/2)$ meters

Relative speed = $(48 + 42)$ kmph = $[90 \times (5/18)]$ m/sec = 25 m/sec

$\therefore [x + (x/2)]/25 = 12$

Or, $(3x/2) = 300$

Or, $x = 200$

∴ Length of first train = 200 m.

Let the length of platform be y meters.

Speed of the first train = $[48 \times (5/18)]$ m/sec = $(40/3)$ m/sec

∴ $[(200 + y) \times (3/40)] = 45$

=> $600 + 3y = 1800$

=> $y = 400$ m.

Question No. 06

Two goods train each 500 m long, are running in opposite directions on parallel tracks. Their speeds are 45 km/hr and 30 km/hr respectively. Find the time taken by the slower train to pass the driver of the faster one.

(A) 12 sec

(B) 24 sec

(C) 48 sec

(D) 60 sec

Answer: Option B

Explanation:

Relative speed = $(45 + 30)$ km/hr = $[75 \times (5/18)]$ m/sec = $(125/6)$ m/sec.

We have to find the time taken by the slower train to pass the DRIVER of the faster train and not the complete train.

So, distance covered = Length of the slower train.

Therefore, Distance covered = 500 m.

∴ Required time = $[500 \times (6/125)]$ = 24 sec.

Question No. 07

Two trains, each 100 m long, moving in opposite directions, cross each other in 8 seconds. If one is moving twice as fast the other, then the speed of the faster train is:

(A) 30 km/hr

(B) 45 km/hr

(C) 60 km/hr

(D) 75 km/hr

Answer: Option C

Explanation:

Let the speed of the slower train be x m/sec.

Then, speed of the faster train = $2x$ m/sec.

Relative speed = $(x + 2x)$ m/sec = $3x$ m/sec.

$\therefore (100 + 100)/8 = 3x$

$=> 24x = 200$

$=> x = 25/3$

So, speed of the faster train = $(50/3)$ m/sec = $[(50/3) \times (18/5)]$ km/hr = 60 km/hr.

Question No. 01
A 300 meter long train crosses a platform in 39 seconds while it crosses a signal pole in 18 seconds. What is the length of the platform?
(A) 320 m
(B) 350 m
(C) 650 m
(D) None of these
Answer: Option B
Explanation:
Speed = $(300/18)$ m/sec = $(50/3)$ m/sec.
Let the length of the platform be x meters.
Then, $[(x + 300)/39] = 50/3$
$=> 3(x + 300) = 1950$
$=> x = 350$ m.

Question No. 02
A train passes a station platform in 36 seconds and a man standing on the platform in 20 seconds. If the speed of the train is 54 km/hr, what is the length of the platform?
(A) 120 m
(B) 240 m
(C) 300 m
(D) 120 m
Answer: Option B
Explanation:
Speed = $[54 \times (5/18)]$ m/sec = 15 m/sec
Length of the train = (15×20) m = 300 m.
Let the length of the platform be x meters.
Then, $(x + 300)/36 = 15$
$=> x + 300 = 540$
$=> x = 240$ m.

Question No. 03
A goods train runs at the speed of 72 kmph and crosses a 250 m long platform in 26 seconds. What is the length of the goods train?
(A) 230 m
(B) 240 m
(C) 260 m
(D) 270 m
Answer: Option D
Explanation:
Speed = [72× (5/18)] m/sec = 20 m/sec
Time = 26 sec.
Let the length of the train be x meters.
Then, $(x + 250)/26 = 20$
=> $x + 250 = 520$
=> $x = 270$

Question No. 04
A train 800 meters long is running at a speed of 78 km/hr. If it crosses a tunnel in 1 minute, then the length of the tunnel (in meters) is:
(A) 130 m
(B) 360 m
(C) 500 m
(D) 540 m
Answer: Option C
Explanation:
Speed = [78 × (5/18)] m/sec = (65/3) m/sec
Time = 1 minute = 60 seconds.
Let the length of the tunnel be x meters.
Then, $[(800 + x)/60] = 65/3$
=> $3(800 + x) = 3900$
=> $x = 500$.

Question No. 05
A train speeds past a pole in 15 seconds and a platform 100 m long in 25 seconds. Its length is:
(A) 50 m
(B) 150 m
(C) 200 m
(D) None of these
Answer: Option B
Explanation:
Let the length of the train be x meters and its speed by y m/sec.
Then, $x/y = 15$
=> $y = x/15$
∴ $[(x + 100)/25] = x/15$
=> $15(x + 100) = 25x$
=> $15x + 1500 = 25x$
=> $1500 = 10x$
=> $x = 150$ m.
Question No. 06

A train overtakes two persons walking along a railway track. The first one walks at 4.5 km/hr. The other one walks at 5.4 km/hr. The train needs 8.4 and 8.5 seconds respectively to overtake them. What is the speed of the train if both the persons are walking in the same direction as the train?
(A) 66 km/hr
(B) 72 km/hr
(C) 78 km/hr
(D) 81 km/hr
Answer: Option D
Explanation:
4.5 km/hr = [4.5 × (5/18)] m/sec = (5/4) m/sec = 1.25 m/sec, and
5.4 km/hr = [5.4 × (5/18)] m/sec = (3/2) m/sec = 1.5 m/sec
Let the speed of the train be x m/sec.
Then, $(x - 1.25)$ x 8.4 = $(x - 1.5)$ x 8.5
=> 8.4x - 10.5 = 8.5x - 12.75
=> 0.1x = 2.25
=> x = 22.5
∴ Speed of the train = [2.25 × (18/5)] km/hr = 81 km/hr

Question No. 07
A 270 meters long train running at the speed of 120 kmph crosses another train running in opposite direction at the speed of 80 kmph in 9 seconds. What is the length of the other train?
(A) 230 m
(B) 240 m
(C) 250 m
(D) None of these
Answer: Option A
Explanation:
Relative speed = (120 + 80) km/hr = [200 × (5/18)] m/sec = (500/9) m/sec
Let the length of the other train be x meters.
Then, $(x + 270)/9 = 500/9$
=> x + 270 = 500
=> x = 230

Question No. 08
A train 125 m long passes a man, running at 5 km/hr in the same direction in which the train is going, in 10 seconds. The speed of the train is:
(A) 45 km/hr
(B) 50 km/hr
(C) 54 km/hr
(D) 55 km/hr
Answer: Option B
Explanation:
Speed of the train relative to man = (125/10) m/sec
= (25/2) m/sec
= [(25/2) × (18/5)] km/hr
= 45 km/hr.

Let the speed of the train be x km/hr. Then, relative speed = $(x - 5)$ km/hr.

∴ $x - 5 = 45$

=> $x = 50$ km/hr.

Question No. 09

Two trains are running in opposite directions with the same speed. If the length of each train is 120 meters and they cross each other in 12 seconds, then the speed of each train (in km/hr) is:

(A) 10

(B) 18

(C) 36

(D) 72

Answer: Option C

Explanation:

Let the speed of each train be x m/sec.

Then, relative speed of the two trains = $2x$ m/sec.

So, $2x = (120 + 120)/12$

=> $2x = 20$

=> $x = 10$

∴ Speed of each train = 10 m/sec = $[10 \times (18/5)]$ km/hr = 36 km/hr.

Question No. 10

Two trains running in opposite directions cross a man standing on the platform in 27 seconds and 17 seconds respectively and they cross each other in 23 seconds. The ratio of their speeds is:

(A) 1 : 3

(B) 3 : 2

(C) 3 : 4

(D) None of these

Answer: Option B

Explanation:

Let the speeds of the two trains be x m/sec and y m/sec respectively.

Then, length of the first train = $27x$ meters,

And length of the second train = $17y$ meters.

∴ $(27x + 17y)/(x+ y) = 23$

=> $27x + 17y = 23x + 23y$

=> $4x = 6y$

=> $x/y = 3/2$