Aptitude class no.:04   **Problems on TRAINS**   **Date:29.08.2016**

Formulae:

1.km/hr to m/s conversion:

a km/hr = $\left(a \times \dfrac{5}{18} \right)$ m/s.

2.m/s to km/hr conversion:

a m/s = $\left(a \times \dfrac{18}{5} \right)$ km/hr.

3.Speed, Time and Distance:

Speed= $\left(\dfrac{\text{Distance}}{\text{Time}} \right)$, Time= $\left(\dfrac{\text{Distance}}{\text{Speed}} \right)$, Distance= (Speed ×Time).

4.km/hr to m/sec conversion:

x km/hr = $\left(x \times \dfrac{5}{18} \right)$ m/sec.

5.m/sec to km/hr conversion:

x m/sec = $\left(x \times \dfrac{18}{5} \right)$ km/hr.

6.If the ratio of the speeds of A and B is $a : b$, then the ratio of the

the times taken by then to cover the same distance is $\dfrac{1}{a} : \dfrac{1}{b}$ or $b : a$.

7.Suppose a man covers a certain distance at x km/hr and an equal distance at y km/hr. Then,

the average speed during the whole journey is $\left(\dfrac{2xy}{x+y} \right)$ km/hr.

Note:

1.Time taken by a train of length l metres to pass a pole or standing man or a signal post is equal to the time taken by the train to cover l metres.

2.Time taken by a train of length l metres to pass a stationery object of length b metres is the time taken by the train to cover $(l + b)$ metres.

3.Suppose two trains or two objects bodies are moving in the same direction at u m/s and v m/s, where $u > v$, then their relative speed is = $(u - v)$ m/s.

4.Suppose two trains or two objects bodies are moving in opposite directions at u m/s and v m/s, then their relative speed is = $(u + v)$ m/s.

5.If two trains of length a metres and b metres are moving in opposite directions at u m/s and v m/s, then:

The time taken by the trains to cross each other = $\dfrac{(a + b)}{(u + v)}$ sec.

6.If two trains of length *a* metres and *b* metres are moving in the same direction at *u* m/s and *v* m/s, then:

The time taken by the faster train to cross the slower train = $\dfrac{(a + b)}{(u - v)}$ sec.

7.If two trains (or bodies) start at the same time from points A and B towards each other and after crossing they take *a* and *b* sec in reaching B and A respectively, then:

(A's speed) : (B's speed) = $(\sqrt{b} : \sqrt{a})$

PROBLEMS:

1. 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?

2. Two, trains, one from Howrah to Patna and the other from Patna to Howrah, start simultaneously. After they meet, the trains reach their destinations after 9 hours and 16 hours respectively. Find the ratio of their speeds.

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

4. 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?

5. 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.Find the ratio of their speeds.

6. 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?

7. 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.Find the length of each train.

8. Two trains are moving in opposite directions @ 60 km/hr and 90 km/hr. Their lengths are 1.10 km and 0.9 km respectively. The time taken by the slower train to cross the faster train in seconds is:

9. 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:

10. A train travelling at a speed of 75 mph enters a tunnel $3\frac{1}{2}$ miles long. The train is $\frac{1}{4}$ mile long. How long does it take for the train to pass through the tunnel from the moment the front enters to the moment the rear emerges?

11. Two goods trains each 500m long,are running on parallel tracks in opposite directions.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 train.

12. A 300 metre long train crosses a platform in 39 seconds while it crosses a signal pole in 18 seconds. What is the length of the platform?

13. A train speeds past a pole in 15 seconds and a platform 100 m long in 25 seconds.Find its length.

14. 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?

15. A train X starts from Meerut at 4 p.m. and reaches Ghaziabad at 5 p.m. while another train Y starts from Ghaziabad at 4 p.m. and reaches Meerut at 5.30 p.m.When the two trains will cross each other?