A COMPREHENSIVE HANDBOOK FOR SSC /RRB AND BANKING EXAMS

For

SSC/RRB AND BANKING

SAHARA

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SAHARA IAS

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Average Aptitude Concepts and Formulas

Points to remember:

1) The average of n quantities of the same kind is equal to the sum of all the quantities divided by the number of quantities;

$$\text{Average} = \frac{Sum\ of\ quantities}{\text{Number of quantities}}$$

Sum of quantities = Average $*$ Number of quantities

$$\text{Number of quantities} = \frac{Sum\ of\ quantities}{\text{Average}}$$

2) Average of two or more than two groups;
If the number of quantities in two groups are n_1 and n_2 respectively and their individual average is X and Y respectively, the combined average of the two groups is given by;

$$= \frac{n1X - n2Y}{n1 - n2}$$

3) If the average of n_1 quantities is X and the average of n_2 quantities out of n_1 quantities is Y, the average of the remaining quantities is given by;

$$= \frac{n1X - n2Y}{n1 - n2}$$

4) The average of n quantities is equal to X. One quantity of value P is replaced with a new quantity having value Q the average of quantities becomes Y. Then Q is given by;

Q = P+n (Y-X)

Average Aptitude Test

1. What is the average of first five multiples of 12?

   A. 36
   B. 38
   C. 40
   D. 42

2. Average of five numbers is 20. If each number is multiplied by 2, what will be the new average?

   A. 30
   B. 40
   C. 50
   D. 60

3. If the average of three consecutive even numbers is 34, find the largest of these numbers.

   A. 30
   B. 32
   C. 34
   D. 36

4. The average of Sohan's marks in 6 subjects is 74. If his average in five subjects excluding science is 70, how many marks he obtained in science?

   A. 94
   B. 92
   C. 90
   D. 88

Problems on Trains Concepts and Formulas

Points to remember:

Keep same units for all values mentioned in the problem i.e. as per the units of the given answers convert kilometer per hour (km/hr) to meters per second (m/s) and vice versa. In a similar way, convert meter (m) into centimeter (cm) and vice versa. See the examples given below:

Formula to convert Km/hr into m/s:

- 1km is equal to 1000 meters
- 1 hours is equal to 3600 seconds
- 1Km/hr is equal to $\frac{1000\ meters}{3600\ Sec}$ or $\frac{5}{18}$ meter/sec or m/s

So, to convert a value in Km/hr to m/s, we need to multiply it with $\frac{5}{18}$ See the example given below:

60 km/hr* $\frac{5}{18} = \frac{300}{18}$ = 16.7 m/s

Formula to convert m/s to Km/hr

- 1 meter is equal to 1/1000 km
- 1 sec is equal to 1/3600 hours
- 1 m/s is equal to $\frac{1/1000}{1/3600}$ km/hr or $\frac{3600}{1000} = \frac{18}{5}$ km/hr

So, to covert a value in m/s to Km/hr, we will multiply it with 18/5. See the example given below:

20 m/s* $\frac{18}{5} = \frac{360}{5}$ =72 km/hr

Important facts about moving trains:

1. The distance traveled by a train to cross a pole or person is equal to the length of the train.
2. The distance traveled by train when it crosses a platform is equal to the sum of the length of the train and length of the platform.

3. When two trains are travelling in opposite directions at speeds V1 m/s and V2 m/s then their relative speed is the sum of their individual speeds (V1+V2) m/s.
4. Two trains are travelling in the same direction at V1 m/s and V2 m/s where V1 > V2 then their relative speed will be equal to the difference between their individual speeds (V1-V2) m/s.
5. When two trains of length X meters and Y meters are moving in opposite direction at V1 m/s and V2 m/s then the time taken by the trains to cross each other is $= \frac{X+Y}{V1+V2}$
6. When two trains of length X meters and Y meters are moving in same direction at V1 and V2 where V1> V2 then the time taken by the faster train to cross the slower train $= \frac{X+Y}{V1-V2}$
7. When two trains X and Y start moving towards each other at the same time from points A and B and after crossing each other the train X reaches point B in a seconds and train Y reaches points A in b seconds, then

   Train X speed: Train Y speed = $b^{1/2}$: $a^{1/2}$

Problem on Trains

1) A train moving at speed of 90 km/hr crosses a pole in 7 seconds. Find the length of the train.

A. 150 m
B. 165 m
C. 175 m
D. 170 m

The correct option is (C).

Answer with explanation:

Length of the train is equal to the distance covered by train to cross the pole. So, we will find the distance travelled by the train in 7 seconds by applying the following formula:

Distance= Speed x Time

Speed is given in Km/hr so we will convert it into m/s as answers are given in meters.

Speed=90* $\frac{5}{18}$ = 25 m/s

Time = 7 seconds

Distance = 25 * 7= 175 meters

2) A train of length 200 meters crosses a man running at 10 km/hr in the same direction in 10 seconds. What is the speed of the train?

A. 72 km/hr
B. 95 km/hr
C. 85 km/hr
D. 82 km/hr

The correct option is (D).

Answer with explanation:

When the train and man are moving in same direction then relative speed will be the difference between their individual speeds. In this problem the other way to find the relative speed is to divide the distance covered (length of train) by the time taken by the train to cross the man.

Relative Speed= $\frac{200}{10}$

We will convert it into Km/hr

$\frac{200}{10} * \frac{18}{5}$ = 72 km/hr

Now, let the speed of the train is X km/hr. So, the relative speed, 72 km/hr = X km/hr - 10 km/hr

X-10=72

X= 72+10

X= 82 km/hr