



Aptitude

(n.) natural ability to do something

BY: RAHUL AGRAHARI

Q. 16:16::25:?

(a)52

(b)36

(c)32

(d)64

PUZZLE-TCS

Q. If $28a+30b+31c=365$ then value of $a+b+c=?$

PUZZLE

Q. Can you write 31 using only digit 3 five times?

PUZZLE-TCS

Q. It is dark in my bed room and I want to get two socks of the same color from my drawer, which contains 24 red and 24 blue socks. How many socks do I have to take from the drawer to get at least two socks of the same color?

GATE-2013

Q. There are eight bags of rice looking alike, seven of which have equal weight and one is slightly heavier. The weighing balance is of unlimited capacity. Using this balance, the minimum number of weighing required to identify the heavier bag is

(a) 2

(b) 3

(c) 4

(d) 8

GATE-2012

Q. Three friends, R, S and T shared toffee from a bowl. R took $\frac{1}{3}$ rd of the toffees, but returned four to the bowl. S took $\frac{1}{4}$ th of what was left but returned three toffees to the bowl. T took half of the remainder but returned two back into the bowl. if the bowl has 17 toffees left, how many toffees were originally there in the bowl?

- (a) 38 (b) 31 (c) 48 (d) 41**

GATE-2010

Q. $1.2 + 2.3 + 3.4 + \dots$ sum of n terms =

(a) $n(n+1)^2/2$

(b) $n(n+1)(n+2)/2n+1$

(c) $n(n+1)(n+2)/3$

(d) $n(n+1)^2/4$

GATE-2012

Q.The sum of n terms of the series

$4 + 44 + 444 + \dots$ is

(a) $(4/81) [10^{n+1} - 9n - 1]$

(b) $(4/81) [10^{n-1} - 9n - 1]$

(c) $(4/81) [10^{n+1} - 9n - 10]$

(d) $(4/81) [10^n - 9n - 10]$

TIME, SPEED AND DISTANCE

LC1545

Speed, Distance and Time

Speed determines “how fast an object is moving”. It is measured as distance travelled per unit of time.

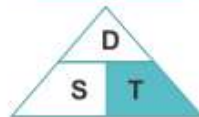


$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total Time}}$$



$$\text{Distance} = \text{Speed} \times \text{Time}$$



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

Conversion:

To convert m/s to km/h

Distance covered in 1 sec = 1 m,
∴ distance covered in
3600 s = 3600 m
i.e. in 1 hr = 3.6 km covered
i.e. **1 m/s = 3.6 km/hr**

To convert km/h to m/s

Distance covered in 1 hr = 1 km
1 hr = 3600 seconds
i.e. Distance covered in 3600 sec = 1000 m
∴ Distance covered in 1 sec = 1000/3600 m
∴ **1 km /hr = 0.2777... m/s**

AFCAT

- Q. A bus cross 19 electric poles in 10 seconds. If the distance between any two successive poles is 5 meters, then what is the speed of the bus?**
- (a) 32.4km/hr (b) 33.2 km/hr**
- (c) 35.2 km/hr (d) 34.4 km/hr**

UPSC

Q. A train moving at two-thirds of its normal speed reaches the destination half an hour late. What is the normal time taken to reach the destination?

- (a) 4 hrs (b) $3/2$ hrs**
(c) 1 hrs (d) Can't determined

RRB-JE

Q. A car travelling with $\frac{5}{7}$ of its actual speed covers 42 km in 1 hour 40 min 48 sec. Find the actual speed of the car.

(a) 32.4 km/hr

(b) 33.2 km/hr

(c) 35 km/hr

(d) 34.4 km/hr

AVERAGE SPEED

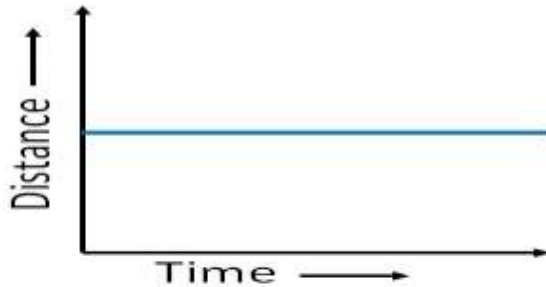


TYPE OF MOTION

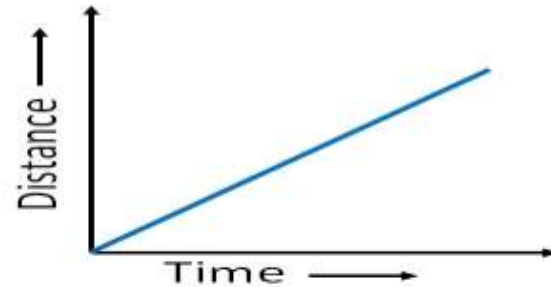
teachoo.com

Uniform and Non-Uniform Motion Graphs

Uniform Motion

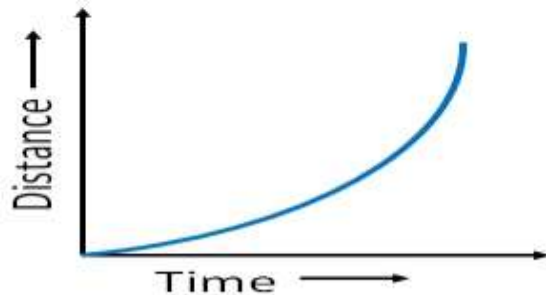


Distance remains constant with time

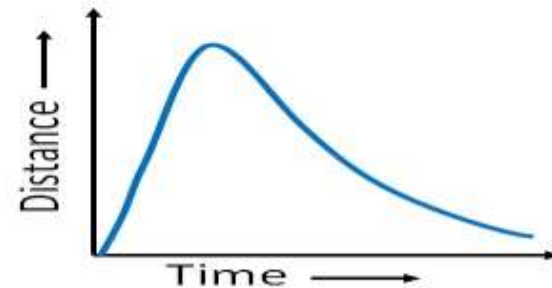


Equal Distance is covered in equal intervals of time

Non-Uniform Motion



*Unequal Distance is covered in equal intervals of time
(**Increasing** non-uniform motion)*



*Unequal Distance is covered in equal intervals of time
(**Decreasing** non-uniform motion)*

UNIFORM MOTION



UNIFORM
MOTION

Time in Seconds	0	5	10	15	20	25	30	35
Distance covered in metres	0	10	20	30	40	50	60	70

When a body covers equal distances in equal intervals of time then the body is said to describe uniform motion.

AFCAT

Q. A bus covers four successive distances of 45 km each at speeds of 10 kmph, 20 kmph, 30 kmph and 60 kmph respectively. What is the average speed of the bus?

(a) 20 kmph

(b) 30 kmph

(c) 40 kmph

(d) 50 kmph

GATE-2013

Q. A tourist covers half of his journey by train at 60 km/hr, half of the remainder by bus at 30 km/hr and the rest by cycle at 10 km/hr. The average speed of the tourist in km/hr during his entire journey is

- (a) 36 (b) 30 (c) 24 (d) 18**

GATE-2013

Q. A cars travels 8 km in the first quarter of an hour, 6 km in the second quarter and 16 km in the third quarter. The average speed of the car in km per hour over the entire journey is

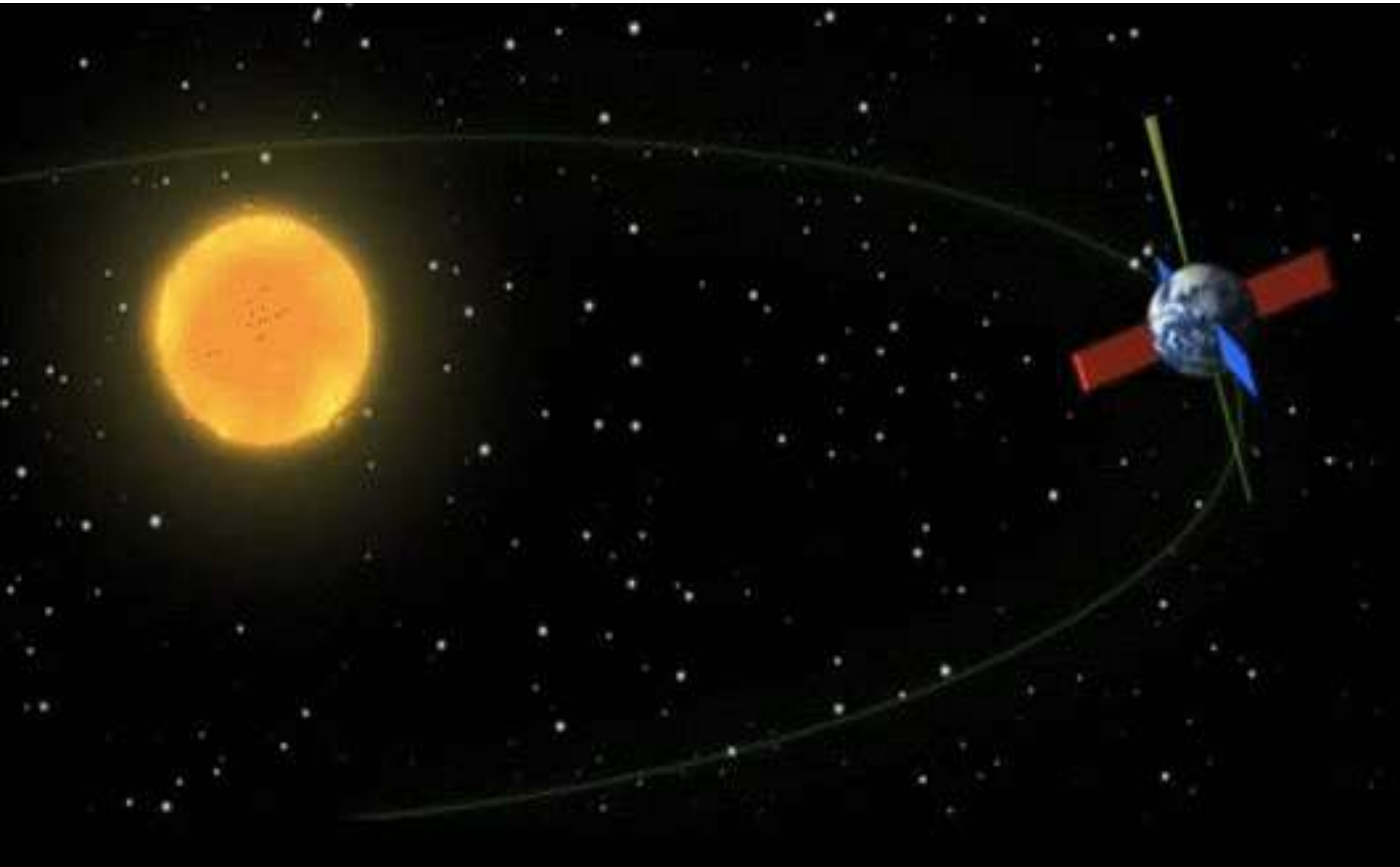
(a) 30

(b) 36

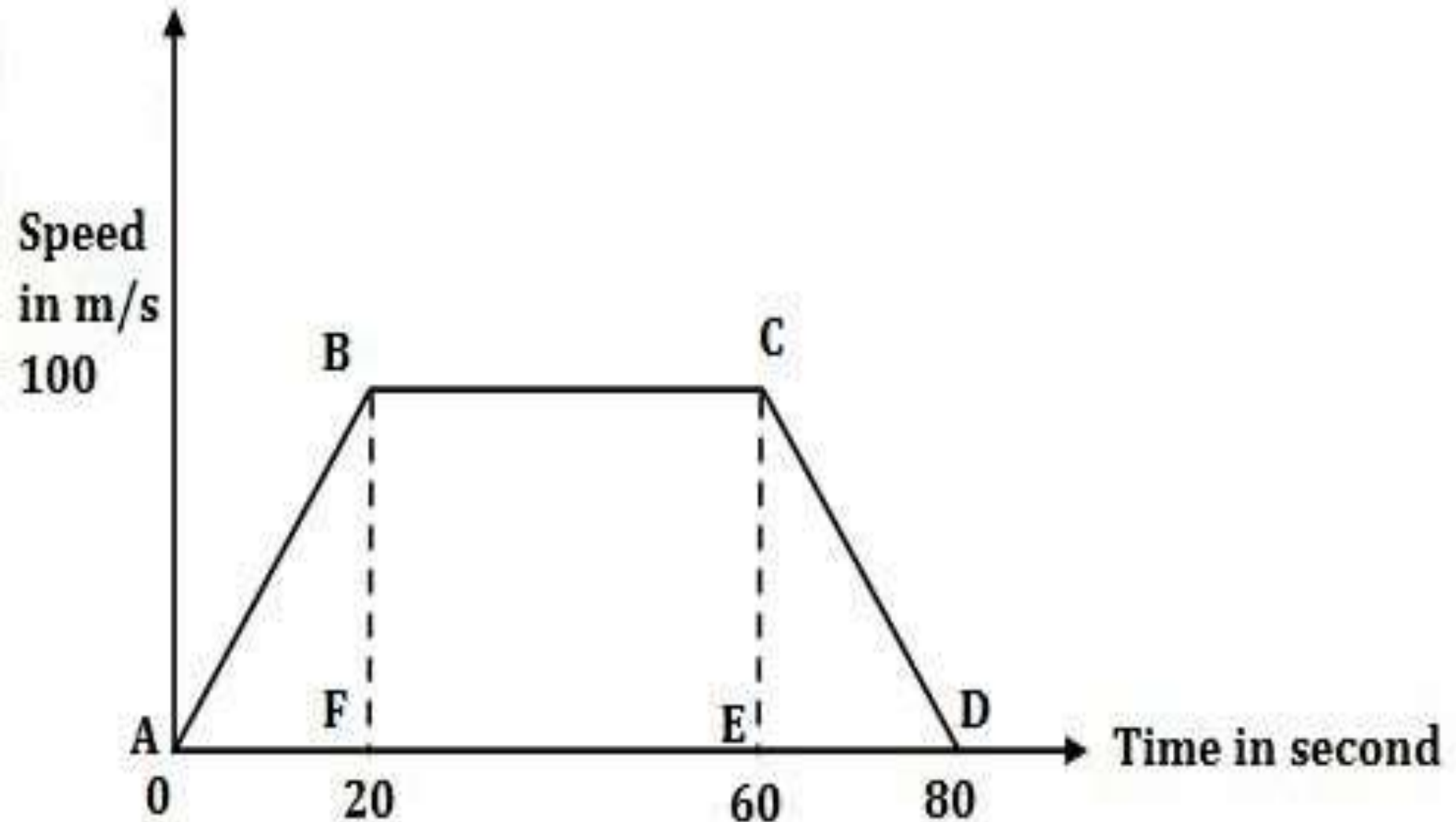
(c) 40

(d) 24

NON-UNIFORM MOTION



Find average speed?



GATE-2016

Q. A tiger is 50 leaps behind a deer. The tiger takes 5 leaps per minute to the deer's 4. If the tiger and the deer cover 8 metres and 5 metres per leap respectively, what distance in meters will the tiger have to run before it catches the deer?

NTPC-2010

- Q. A monkey climbs a greased pole 36 m high. It climbs 3m in the first minute and slips 1 meter in the second time. It climbs 3 meter again in the third minute and slips 1 meter in the fourth minute. These process continues till it reaches the top. In what time does it reach the top?**
- (a) 36 minutes (b) 33.667 minutes**
(c) 34.667 minutes (d) 18 minutes

RELATIVE VELOCITY



To the man *Q*, the girl *P* appears to move at a speed of 1 ms^{-1} towards *Q*. Relative to *Q* (observer), *P* is moving at a speed of 1 ms^{-1} due east as shown

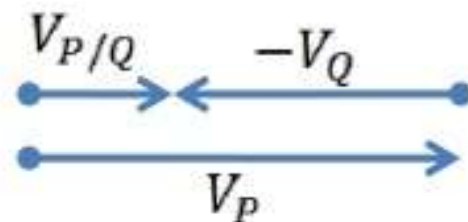
$$V_{P/Q} = 1 \text{ ms}^{-1} \longrightarrow$$

Relative Velocity Equation

$$V_P = V_{P/Q} + V_Q$$


Velocity Diagram


$$V_{P/Q} = V_P + (-V_Q)$$



QUESTION

1 PM A  3Km/hr

2 PM B  4Km/hr

3 PM C  5Km/hr

A,B and C are moving same straight line track in the same direction. When B get hold of A, B send A back to deliver a message to C. When was the message delivered to C?

CONCEPT

A and B are heading towards each other after meeting they move towards the other starting point in X hr and Y hr respectively (X and Y time taken after meeting). What is the speed ratio of A and B?

RACES



QUESTION

Two runners A and B are running in a race of 100m and A beats B by 10 m. What is the speed ratio of A and B?

UPSC

**Q. In a 200 m race A beats B by 20m.
While 250m race B beats C by 10 m.
By how many meter will A beats C in
1 km race?**

UPSC

Q. Mohan beats Satish by 20 m in a 200 m race. To do a favour to Satish, in a second similar race Mohan started from 20 m behind the start line, though Satish started from start point.

Then

- (a) They reached simultaneously**
- (b) Satish beats Mohan by 20 m**
- (c) Mohan beats Satish by 2 m**
- (d) Satish beats Mohan by 2 m**

RRB-JE

**A finished 12m a head of B and
18m a head of C. While B finished
8m a head of C. then the length of
the race?**

CIRCULAR RACES

**How to solve
problems based**

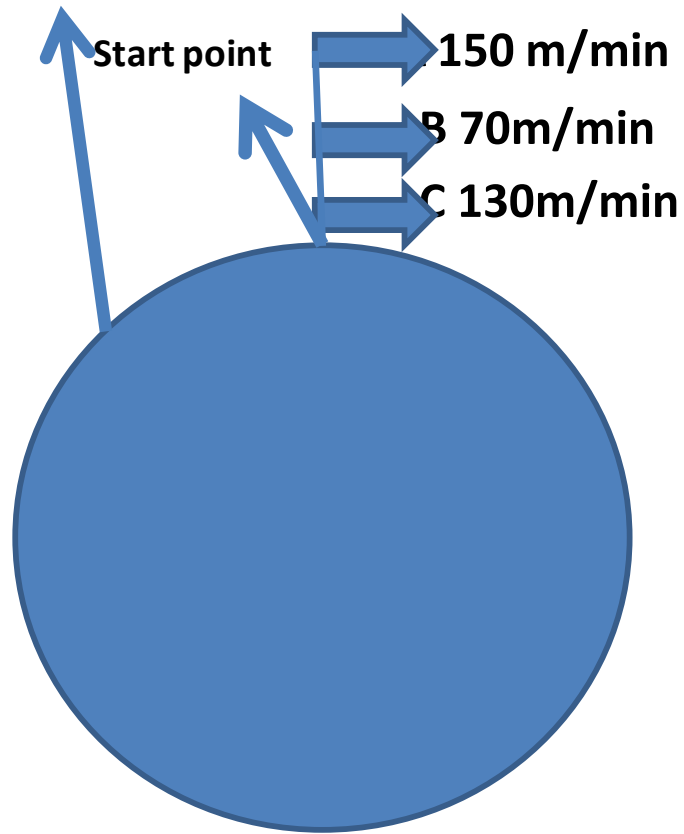
on

CIRCULAR Races



CONCEPT

Circumference=1200m



1Q. Time taken to meet at the start point for first time?

2Q. Meeting any where on the track for first time?

3Q. Number of distinct meeting point on the track?

NOTE

- 1- Number of distinct meeting point on the track will be always given by $= P/Q$**
- 2-Time taken for meeting at the start point is independent of the direction of runner.**
- 3-Relative motion is depends on the direction of motion.**

QUESTION

Q. If C is moving anticlockwise when where, at how many distinct point will all the three runner meet. Where will be there 2020 meeting point located?

ACCENTURE-2019

Q. A and B start from opposite points of a circular track of 500 m. Their speed is 5 m/s and 3 m/s respectively. When will they meet for the first time if both of them are moving in same direction?

(a) 150 sec

(b) 250 sec

(c) 360 sec

(d) 125 sec

PROBLEM ON TRAINS



GATE-2016

Q. A train that is 280 metres long, travelling at a uniform speed, crosses a platform in 60 seconds and passes a man standing on the platform in 20 seconds. What is the length of the platform in metres?

UPSC

Q. A train's average speed including stoppages is 45 km/hr while excluding stoppages it is 54 km/hr. What is the stoppage time per hour?

(a) 12 min

(b) 9 min

(c) 15 min

(d) 10 min

UPSC

Q. Two trains, separated by 480 kms, are approaching each other with speed 70 kmph and 50 kmph respectively. A bird with speed 100 km/hr started from the front of first train goes to front of second train and comes back to front of first and continues to and fro so on till the trains collide. What is the total distance travelled by the bird?

(a) 500 kms

(b) 400 kms

(c) 480 kms

(d) 600 kms

TCS

Q. From the time the front of a train enters a platform, it takes 25 sec for the back of the train to leave the platform, while train travelling at a constant speed of 54 km/hr. At the same speed, it takes 14 sec to pass a man running at 9 km/hr in the same direction as the train. What is the length of the train and that of the platform in meters respectively?

(a) 210 & 140

(b) 162.5 & 187

(c) 245 & 130

(d) 175 & 200

WIPRO-2018

Q. Two trains started at 7 AM from the same point. The first train travelled north at a speed of 80 km/h and the second train travelled south at a speed of 100 km/h. The time at which they were 540 km apart is _____AM.

(a) 9

(b) 10

(c) 11

(d) 11.30

BOAT AND STREAM



QUESTION

The speed of the boat in still water is 10 km/hr. If its downstream speed is 13 km/hr. What is the speed of current?

UPSC

Q. A boat goes 12 km upstream in 48 min. If the speed of stream 2 km/hr. What is the speed of boat in still water?

INFOSYS

Q. A man swim 60 km downstream and 36 km upstream taking 6 hr each time.

1-What is the speed of man in still water?

2-What is the speed of current?

UPSC

Q. A boat goes a certain distance down stream in 4 hr while if cover the same distance upstream in 5 hr. if the speed of stream is 2 km/hr .

1-What is the speed of boat in still water?

2-How far is the place?

3-What is the total distance travel by the boat?

GATE

Q. A man can row at 8 km per hour in still water, if it takes him thrice as long to row upstream, as to row downstream, then find the stream velocity in km per hour?

CAT

Q. A boat goes two km against the current in 1hr and 1 km along the current in 10 min. How long will take to go 5 km in still water?

UPSC

Q. A boat can move at 10 km/hr in still water if the stream is flowing 2 km/hr and if takes 5 hr in all to row a place and back. What is the total distance travel by boat?

SAIL

Q. A boat with speed 20 m/s in still water take $\frac{1}{3}$ hr and $\frac{1}{2}$ hr in order to cover same distance downstream and upstream respectively. Then the speed of the current is:

- | | |
|------------------|------------------|
| (a) 6 m/s | (b) 8 m/s |
| (c) 3 m/s | (d) 4 m/s |

UPSC

Q. Current of the river is 3 km/hr and a sailor can row 7 km/hr in the still water. How much time will he take to go 20 km down the river and come back up the river at starting place ?

INFOSYS-2015

Q. A person walking takes 26 steps to come down on a escalator and it takes 30 seconds for him for walking. The same person while running takes 18 second and 34 steps. How many steps are there in the escalator?

INFOSYS-2015

Q. It takes eight hours for a 600 km journey, if 120 km is done by train and the rest by car. It takes 20 minutes more, if 200 km is done by train and the rest by car. What is the ratio of the speed of the train to that of the car?

TCS-2014

Q. Taxi fare is equal to 15 Rs/km & Train fare is equal to 21 Rs/km. If total distance travelled is equal to 450 km and total amount charged is equal to Rs-8320. Then distance travelled by train is?

TCS-2015

Q. Brilliant software company, Chennai has been doing an excellent business in the last four years. The company went on a recruitment spree from among the engineering colleges in and around Chennai. They recruited people from ECE,CSE,IT streams. All programmers are of equal respect. They receive equal salaries and perform equal load of work. Suppose 15 such programmer stake 15 minutes to write 15 lines of code in total. How long will it take for 84 programmers to write 84 lines of code in total?

Thank You!