I**mportant Formulas - Time and Distance**

1. Basics
speed=distancetime

distance=speed×time

time=distancespeed

2. Convert kilometres per hour(km/hr) to metres per second(m/s)
x km/hr=x×518m/s

3. Convert metres per second(m/s) to kilometres per hour(km/hr)
x m/s=x×185 km/hr

4. Average Speed If an object covers a certain distance at x kmph and an equal distance at y kmph, the average speed of the whole journey
=2xyx+y kmph

5. Relation Between Distance, Speed and Time (5.1) Speed and time are inversely proportional (when distance is constant)
⟹speed∝1time (when distance is constant)

(5.2) If the ratio of the speeds of A and B is a:b, then, the ratio of the time taken by them to cover the same distance is
1a:1b=b:a

(5.3) Assume two objects A and B start at the same time in opposite directions from P and Q respectively. After passing each other, A reaches Q in a seconds and B reaches P in b seconds. Then,
Speed of A : Speed of B =√b:√a

(5.4) An object covered a certain distance at a speed of v kmph. If it had moved v1 kmph faster, it would have taken t1 hours less. If it had moved v2 kmph slower, it would have taken t2 hours more. Then,
v=v1v2(t1+t2)v1t2−v2t1 kmphx=vt1(1+vv1) km

Special Case:
If t1=t2, v=2v1v2v1−v2 kmph

6. Relative Speed (6.1) If two objects are moving in the same direction at v1 m/s and v2 m/s respectively where v1>v2, then their relative speed =(v1−v2) m/s

(6.2) Consider two objects A and B separated by a distance of d metre. Suppose A and B start moving in the same direction at the same time such that A moves towards B at a speed of a metre/second and B moves away from A at a speed of b metre/second where a>b. Then,
relative speed =(a−b) metre/second
time needed for A to meet B =da−b seconds

(6.3) If two objects are moving in opposite directions at v1 m/s and v2 m/s respectively, then their

relative speed =(v1+v2) m/s

(6.4) Consider two objects A and B separated by a distance of d metre. Suppose A and B start moving towards each other at the same time at a metre/second and b metre/second respectively. Then,
relative speed =(a+b) metre/second
time needed for A and B to meet each other =da+b seconds