1. Reaction Rate

a) What is "rate"?

example: car speed is a "rate" 50km/h means a car will travel 50 km in one hour or 100 km in two hours.

b) What is "reaction rate"?

speed at which a reaction will take place.

c) How do we measure reaction rate?

i) Measure amount of product formed in a certain time.

$$\text{Rate} = \frac{\text{amount of product formed}}{\text{Time}}$$

Q. $2N_2 + 5O_2 + 2H_2O \rightarrow 4HNO_3$ if 8 g of HNO_3 are produced in 6 hrs, what is the rate?

A. rate = $\frac{8g}{6hr}$ = 1.33 g per hour

ii) Measure amount of reactant used in a certain time.

$$\text{Rate} = \frac{\text{amount of reactant used}}{\text{Time}}$$

Q. $2H_2 + O_2 \rightarrow 2H_2O$ if 2 g of H_2 are used up every 5 minutes, what is the rate?

A. rate = $\frac{2g}{5min.}$ = 0.4 g per minute

iii) Other ways include:

monitor colour change, temperature change, pressure change etc.

c) What affects reaction rates?

Just like each make of car has a different top speed, different reactions proceed at different speeds!

Factors that affect top speed of a car

gas
mass
engine
tires
aerodynamics

Factors that affect speed of a reaction

collisions between molecules!!!
(other factors like temperature etc. will affect the collisions)