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RATES

Content	Page number			Exam paper
	C FT	**C HT**	**Sep**	
The rate of a chemical reaction can be found by measuring the quantity of a reactant used or the quantity of product formed over time: $mean\ rate\ of\ reaction\ =\ quantity\ of\ reactant\ used\ /\ time\ taken$ or $mean\ rate\ of\ reaction\ =\ quantity\ of\ product\ formed\ /\ time\ taken$ The quantity of reactant or product can be measured by the mass in grams, by a volume in cm^3 or by an amount in moles. The units of rate of reaction may be given as g/s, cm^3/s or mol/s.	138-143	142-146	67-71	2
Factors which affect the rates of chemical reactions include: the concentrations of reactants in solution, the pressure of reacting gases, the surface area of solid reactants, the temperature and the presence of catalysts. Collision theory explains how various factors affect rates of reactions. According to this theory, chemical reactions can occur only when reacting particles collide with each other and with sufficient energy. The minimum amount of energy that particles must have to react is called the activation energy. Increasing the concentration of reactants in solution, the pressure of reacting gases, and the surface area of solid reactants increases the frequency of collisions and so increases the rate of reaction. Increasing the temperature increases the frequency of collisions and makes the collisions more energetic, and so increases the rate of reaction. Catalysts change the rate of chemical reactions but are not used up during the reaction. Different reactions need different catalysts. Enzymes act as catalysts in biological systems. Catalysts increase the rate of reaction by providing a different pathway for the reaction that has lower activation energy. A reaction profile for a catalysed reaction can be drawn in the following form:	138-139	142-143	67-68	2