Question Number	Answer	Mark
10	**The only correct answer is B** (12) *A is not correct because this is the rate increase when the rate has been multiplied by 6 (2 × 3)* *C is not correct because this is the rate increase when the concentration of NO has been tripled and the O_2 doubled* *D is not correct because this is the rate increase when the concentrations of both the NO and O_2 have been tripled*	**(1)**

Question Number	Answer	Mark
11	**The only correct answer is B** $((CH_3)_3CCl)$ *A is not correct because CH_3CH_2Cl is a primary halogenoalkane* *C is not correct because $CH_3CHClCH_3$ is a secondary halogenoalkane* *D is not correct because $(CH_3)_3CCH_2Cl$ is a primary halogenoalkane*	**(1)**

Question Number	Answer	Mark
7	**The only correct answer is A** (rate = $k[H_2O_2]^2[I^-]$) *B is incorrect because the concentration of hydrogen peroxide should be squared* *C is incorrect because this includes an intermediate* *D is incorrect because the concentration of hydrogen peroxide should be squared and includes an intermediate*	**(1)**

Question Number	Answer	Mark
1(a)	**The only correct answer is B** (measurement of change in volume) *A is incorrect because none of the gases is coloured* *C is incorrect because there is no loss or gain of mass* *D is incorrect because there are no bases in the mixture*	**(1)**

Question Number	Answer	Mark
1(b)	**The only correct answer is D** (quenching followed by titrating with acid) *A is incorrect because nothing in the mixture is coloured* *B is incorrect because there is no change in volume* *C is incorrect because there is no loss or gain of mass*	**(1)**

Question Number	Answer	Mark
2	**The only correct answer is D** (16) *A is incorrect because doubling $[BrO_3^-]$ and $[Br^-]$ will both double the rate, doubling $[H^+]$ increases the rate by 2^2* *B is incorrect because doubling $[BrO_3^-]$ and $[Br^-]$ will both double the rate, doubling $[H^+]$ increases the rate by 2^2* *C is incorrect because doubling $[BrO_3^-]$ and $[Br^-]$ will both double the rate, doubling $[H^+]$ increases the rate by 2^2*	**(1)**

Question Number	Answer	Mark
4	**The only correct answer is C** $((-gradient) \times R)$ *A is incorrect because the gradient = $-E_a/R$* *B is incorrect because the gradient = $-E_a/R$* *D is incorrect because the gradient = $-E_a/R$*	**(1)**

Question Number	Answer	Mark
1(a)	**The only correct answer is A** (colorimetry) *B is not correct because there is no change in mass* *C is not correct because titration is not a continuous monitoring method* *D is not correct because no gas is produced*	1

Question Number	Answer	Mark
1(b)	**The only correct answer is D** ($dm^9 \, mol^{-3} \, s^{-1}$) *A is not correct because these are the units of rate* *B is not correct because these are the units of the rate constant for a second order reaction* *C is not correct because these are the units of the rate constant for a third order reaction*	1

Question Number	Answer	Mark
1(c)	**The only correct answer is D** (1/16) *A is not correct because the rate would change by this factor for an overall first order reaction* *B is not correct because the rate would change by this factor for an overall second order reaction* *C is not correct because the rate would change by this factor for an overall third order reaction*	1

Question number	Answer	Mark
2	**The only correct answer is C** (the time taken for the concentration of a reactant to halve) *A is incorrect because the reaction is slower and slower as it progresses* *B is incorrect because the rate constant does not change at a given temperature* *D is incorrect because time taken for the concentration of a product to double will vary*	(1)

Question number	Answer	Mark
3	**The only correct answer is A** (rate = k[E][F]) *B is incorrect because the rate depends on concentrations of the reacting species in the slow step and the stoichiometry of this step* *C is incorrect because the rate equation cannot include intermediate concentrations* *D is incorrect because the rate depends on concentrations of the reacting species in the slow step and the stoichiometry of this step and the rate equation cannot include intermediate concentrations*	(1)

Question Number	Answer	Mark
15	**The only correct answer is B** (132 minutes) *A is incorrect because this is the time taken for the concentration to reach $5.5 \times 10^{-3} \, mol \, dm^{-3}$ which is half-way between the starting concentration and the final concentration* *C is incorrect because this is half of the time shown on the graph* *D is incorrect because this is the time at the end of the graphical data*	(1)

Question Number	Answer	Mark
2	**The only correct answer is D** (0.125) *A is incorrect because this is the amount that has decomposed after three half-lives* *B is incorrect because this is the concentration remaining after one half-life* *C is incorrect because this is the concentration remaining after two half-lives*	(1)

Question number	Answer	Mark
1(a)	**The only correct answer is A** (rate = k[NO]^2[O$_2$]; rate = k[NO]^2[O$_2$]) *B* is incorrect because the rate equation is not determined by the stoichiometric equation *C* is incorrect because the rate cannot depend only on the concentration of products *D* is incorrect because the rate cannot depend only on the concentration of products	**(1)**

Question number	Answer	Mark
1(b)	**The only correct answer is B** (colorimetry; volume change) *A* is incorrect because titration cannot be used for continuous monitoring of a reaction *C* is incorrect because the mass of the system does not change *D* is incorrect because the mass of the system does not change and titration cannot be used for continuous monitoring of a reaction	**(1)**

Question Number	Answer	Mark
9	**The only correct answer is A** (quenching and titrating with an acid) *B* is not correct because there is a change in mass as a gas is given off *C* is not correct because there is a change in colour *D* is not correct because a gas is given off so there will be a change in volume	**(1)**

Question Number	Answer	Mark
3(a)	**The only correct answer is A** ( ) *B* is incorrect because the graph shows a reaction where the rate decreases as concentration of Q increases *C* is incorrect because the graph shown is correct when rate is plotted against concentration of Q *D* is incorrect because the graph shows a reaction where the rate increases as concentration of Q increases	**(1)**

Question Number	Answer	Mark
3(b)	**The only correct answer is B** (20s) *A* is incorrect because the half-life for a first order reaction is constant *C* is incorrect because the half-life for a first order reaction is constant *D* is incorrect because the half-life for a first order reaction is constant	**(1)**