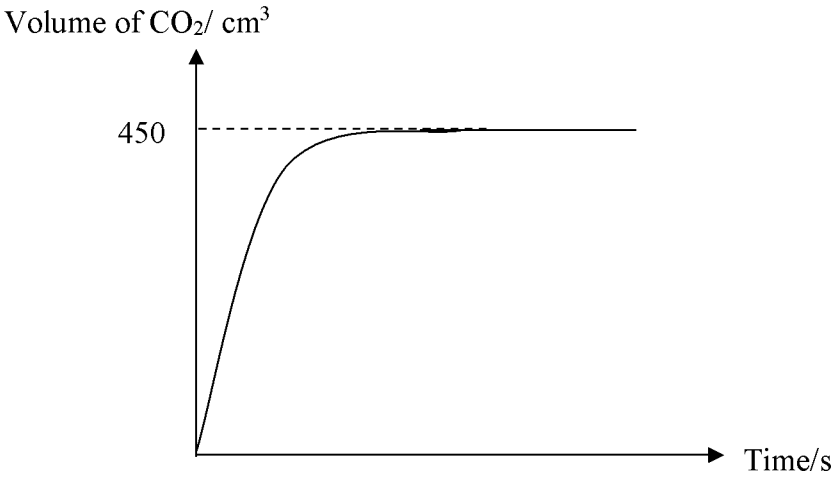
Structure {Paper02}

[MRSM11-05]

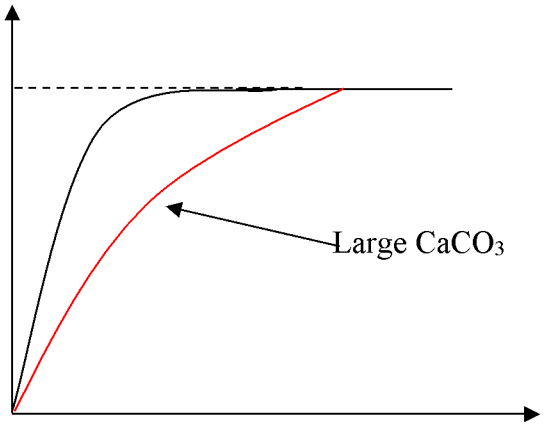
(*a*) $CaCO_3 + 2\ HCl \rightarrow CO_2 + H_2O + CaCl_2$

(*b*)



(*c*) Rate of reaction at 60 s = +- 0.25 cm^3s^{-1} [0.20 – 0.30]

(*d*)

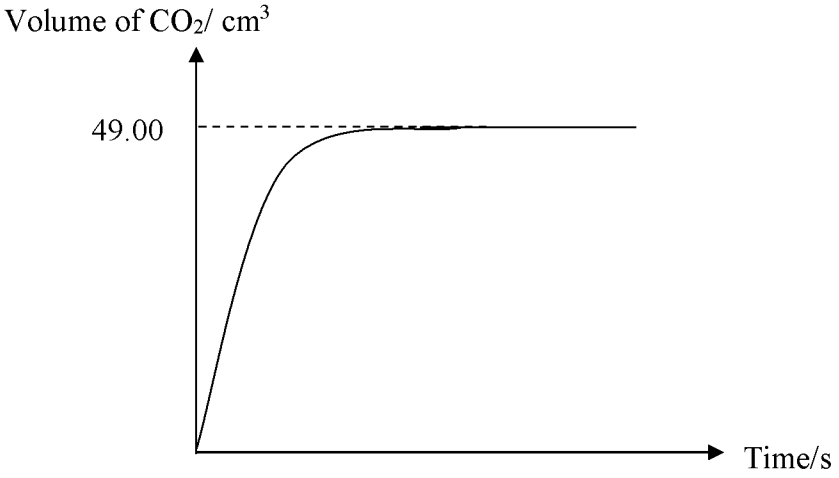


(*e*) 1. The smaller the size of calcium carbonate, the larger total surface area exposed to collision. More particles collide with each other.
2. The affective collisions between H^+ ions and CO_3^{2-} ion increase.
3. The frequency of affective collisions between H^+ ions and CO_3^{2-} ion also increases.
4. Rate of reaction increase / higher.

[MRSM04-05]

(a) $CaCO_3 + 2\ HCl \rightarrow CO_2 + H_2O + CaCl_2$

(b)



(c) Rate of reaction decreases
Because the reaction is going to completed / reactant reacted completely

(d) Rate of reaction at 80 s is = 0.17 cm^3 s^{-1} [0.10 – 0.25]

(e) Use small size/powder of $CaCO_3$ and
high concentration of HCl// high temperature of HCl solution

[SPM09-05]

(a) $CaCO_3 + 2\ HCl \rightarrow CaCl_2 + CO_2 + H_2O$

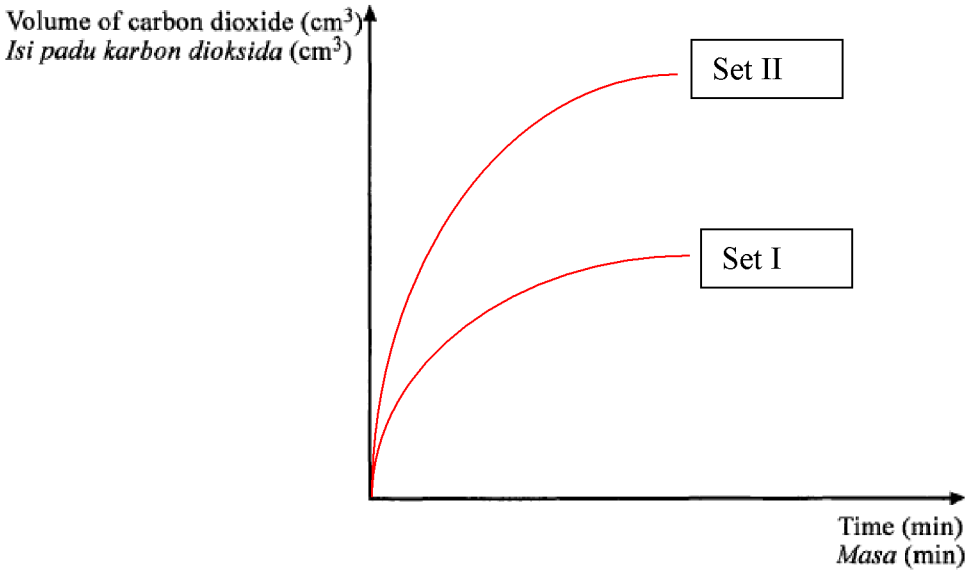
(b) Volume of CO_2 released

(c) = volume / time taken = 60/ 3 = 20 cm^3 min^{-1}

(d)(i) Set II has higher Rate of reaction than set I
Because set II has/used higher the concentration of HCl acid

(ii)Set II has higher the concentration of HCl, Set II has higher number of particles,
The frequency of collision is increases between H^+ ion and carbonate, CO_3^{2-} ion increases
The frequency of affective collision also increases

(e)

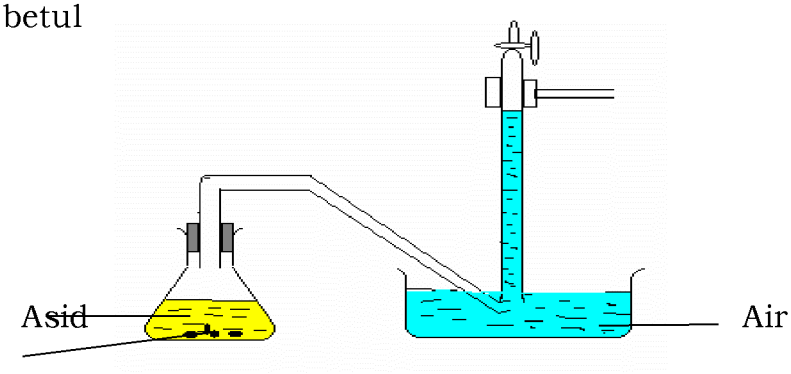


[SBPtrial04-04] {Translate}

(a) $2H^+ + CO_3^{2-} \rightarrow H_2O + CO_2$

(b) 1. Eksp 1, kepekatan ion H^+ lebih tinggi/asid kuat digunakan/bilangan ion hidrogen per unit isipadu lebih tinggi/ bilangan ion H^+ bagi isipadu yang sama lebih tinggi
2. Lebih banyak perlangaran antara ion H^+ dengan ion CO_3^{2-}
3. Bilangan perlanggaran berkesan bertambah/lebih banyak perlanggaran berkesan

(c) 1. Susunan radas betul dan berfungsi
2. Label betul



Natrium karbonat

(d) 1. Bil. Mol gas CO_2 = $\frac{25}{24000}$ / 0.001

2. 1 mol CO_2 terhasil daripada 1 mol Na_2CO_3
0.001 mol CO_2 terhasil daripada 0.001 mol Na_2CO_3

3. Jisim Na_2CO_3 = 0.001 x 106 / 0.106g

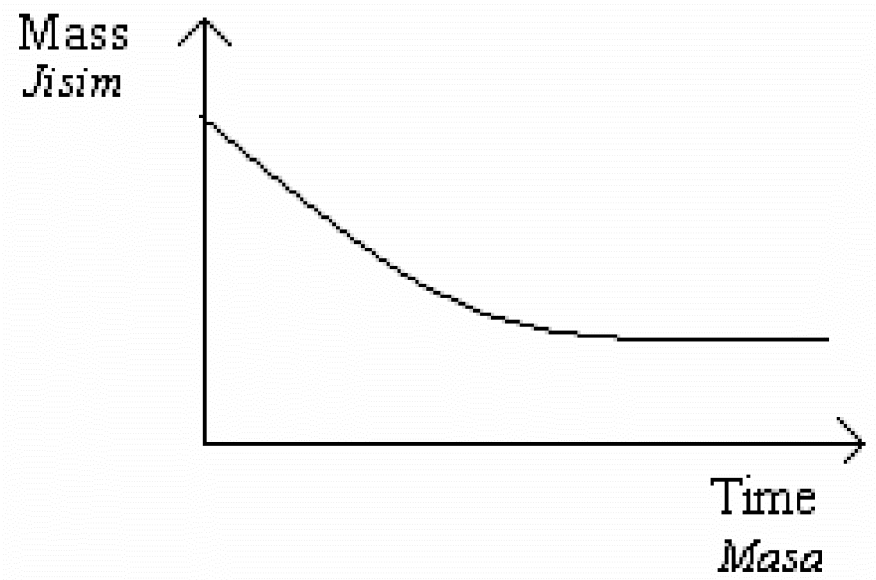
(e) $\frac{25\ cm^3}{60\ s}$ // $\frac{0.106g}{60\ s}$
= $0.42 cm^3 s^{-1}$ $0.0018\ g\ s^{-1}$

[MRSM07-04]

(a) To measure how quickly a chemical reaction happen// to measure the changes of reactant (*decreases*)/products (*increases*) per time taken

(b) The reactant/ mixture was reacted completely

(c)



(d) (i) $CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$

Mol HCl = MV/1000 = 0.5 X 50 /1000 = 0.025

2 mol HCl produce 1 mol CO_2
0.025 mol HCl produce 0.25 X 1/2 = 0.0125 mol CO_2

Mass CO_2 = mol X molar mass CO_2 = 0.0125 X 44 = 0.55 g

(ii) $CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$

Mol HCl = MV/1000 = 0.5 X 50 /1000 = 0.025

2 mol HCl produce 1 mol CO_2
0.025 mol HCl produce 0.025 X 1/2 = 0.0125 mol CO_2

Volume CO_2 = mol X molar volume CO_2 = 0.0125 X 24 = 0.3 dm^3

[SBPtrial11-05]

(a) (i) Temperature/ of HCl solution

(ii) $Mg + 2HCl \rightarrow MgCl_2 + H_2$

Mol Mg = mass/molar mass = 0.24/24 = 0.01

1 mol Mg produce 1 mol H_2
0.01 mol Mg produce 0.01 mol H_2

Volume H_2 = mol X molar volume = 0.01 X 24 = 0.24 dm^3

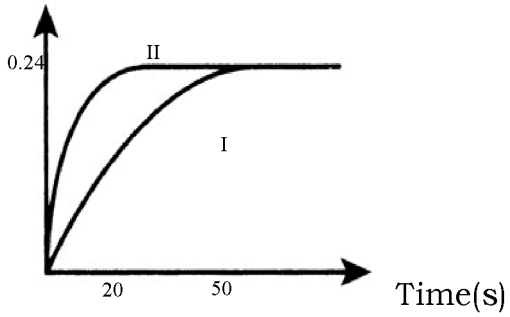
(b)

(i) Experiment I:	(ii) Experiment II:
= volume / time taken = 0.24/50 = 0.0048 dm^3s^{-1}	= volume / time taken = 0.24/20 = 0.012 dm^3s^{-1}

(c) (i) Experiment II has higher rate of reaction than experiment I

(ii) 1. Experiment II has higher temperature, the kinetic energy of particles is higher
2. In Experiment II, more frequency of collision is happen
3. The frequency of affective collision between Mg and H^+ ions increases.
4. Rate of reaction is higher

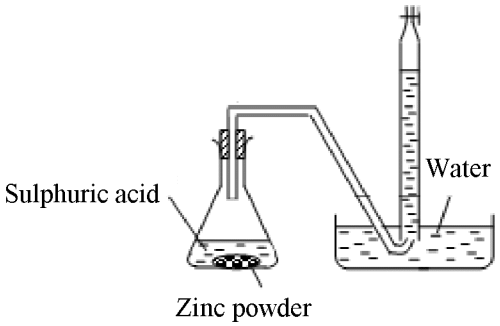
(d) Volume of gas/dm^3



Label Y axes and X axes
Correct curve and label I and II

[SBPtrial08-04]

(a) *Complete set of apparatus and can be used and label*



(b) $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$

(c) Experiment I = $\frac{20}{120}$ // 0.167 // 0.17 $cm^3\ s^{-1}$

Experiment II = $\frac{32}{120}$ // 0.267 // 0.27 $cm^3\ s^{-1}$

(d) Number of moles of H_2SO_4 = $\frac{0.1x20}{1000}$ = 0.002 mol

1 mol of H_2SO_4 produce 1 mol of H_2
0.002 mol of H_2SO_4 produce 0.002 mol of H_2

Maximum volume of H_2 = 0.002 x 24 000 = 0.048 dm^3 // 48 cm^3

(e)
- The rate of reaction in experiment II is higher than that of experiment I.
- Copper(II) sulphate solution lowers the activation energy of the reaction in experiment II. // As catalyst
- The frequency of effective collisions between hydrogen ions and zinc atoms increases in experiment II.

[SPM11-02]

(a) yellow

(b) (i). n = 0.2 x 0.05 *[0.05 ini adalah 50 cm^3 bahagi dengan 1000 – utk convert dm^3]*
= 0.01 mol

(ii) n = 1.0 x 0.05
= 0.005 mol

(c). *[based the eq, 1mol sodium thiosulphate react with 1 mol sulphuric acid, Yg kita kira di atas, yg plg sikit adalah 0.005 mol ya itu acid]*
Sulphuric acid

(d) (i). 1. Concentration of sodium thiosulphate solution
2. Temperature of sodium thiosulphate solution
3. Concentration / temperature of sulphuric acid
[*ingat – volume tidak mepengaruhi rate of reaction*]

(ii) The higher temperature of Sodium thiosulphate solution, the higher the kinetic energy of particles
The frequency of affective collision between H+ ions and thiosulphate, $S_2O_3^{2-}$ ions increases

[SBPmidyearF508-05]

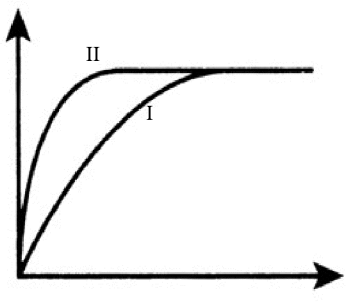
A $2H_2O_2 \rightarrow O_2 + 2H_2O$

b Number of mole of H_2O_2 = 20 x 2/1000= 0.04
2 mol of H_2O_2 produce 1 mol of O_2 //
Number of mole of O_2 = 0.04/2 = 0.02
Volume, O_2 = 0.2 x 24dm^3 = 4.8 dm^3

c (i) Rate of reaction in experiment II is higher than experiment I

(ii)
- The concentration/number of molecule per unit volume of hydrogen peroxide in II is higher
- The frequency of collision between H_2O_2 molecule is higher
- The frequency of effective collision is higher

d Volume of gas/cm^3



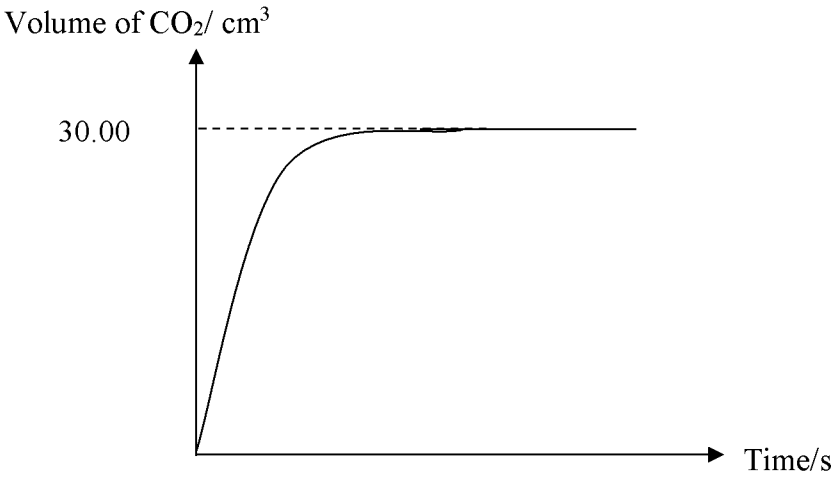
Label Y axes and X axes
Correct curve and label I and II

[MRSM08-05]

(a) As catalyst

(b) $2\ H_2O_2 \rightarrow 2\ H_2O + O_2$

(c)



(d) 180 s

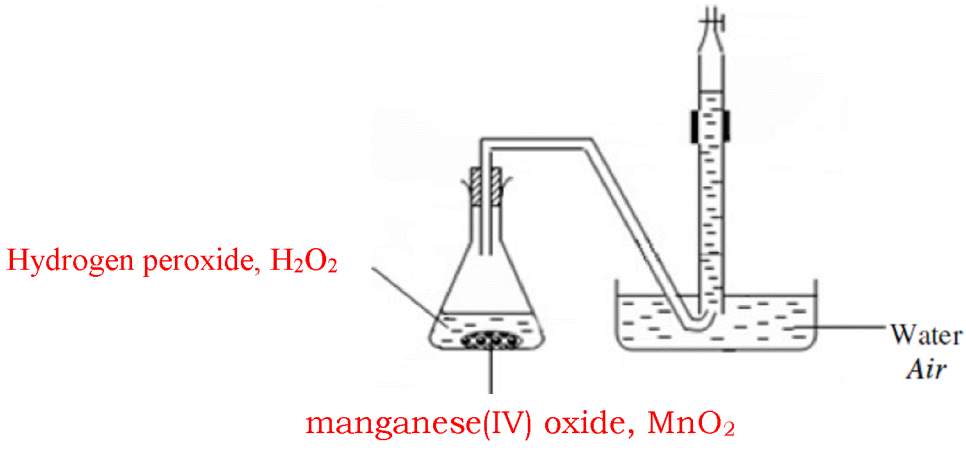
(e) (i) 1. Draw tangent at 30 s
2. then calculate the gradient

(ii)From graph *[lebih kurang]*
= Volume / time taken
= 23.0 / 90
= 0.26 cm^3s^{-1}

(f) The higher of mass manganese (IV) oxide used, the lower activation energy of reaction
The rate of reaction is high

[MRSM06-04]

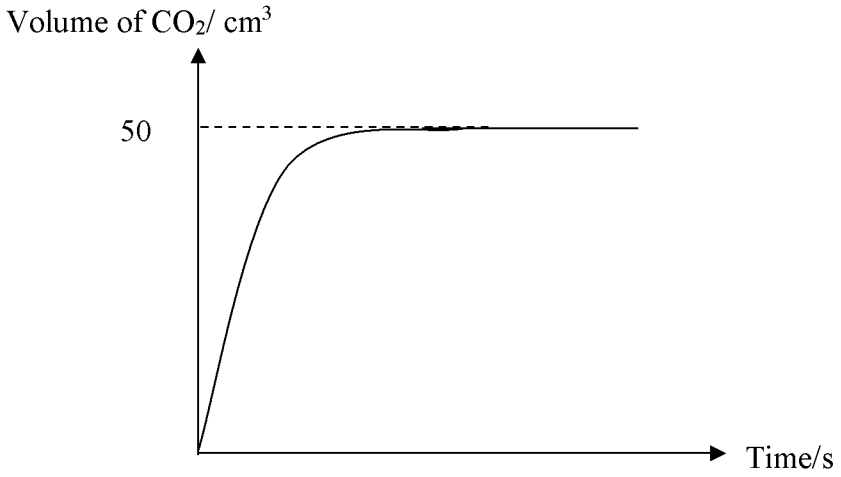
(a)



(b) $2\ H_2O_2 \rightarrow 2\ H_2O + O_2$
(c) manganese(IV) oxide acts as catalyst, not involve in the reaction

(d) The smallest size, the larger total surface area per volume of MnO_2, the highest rate of reaction

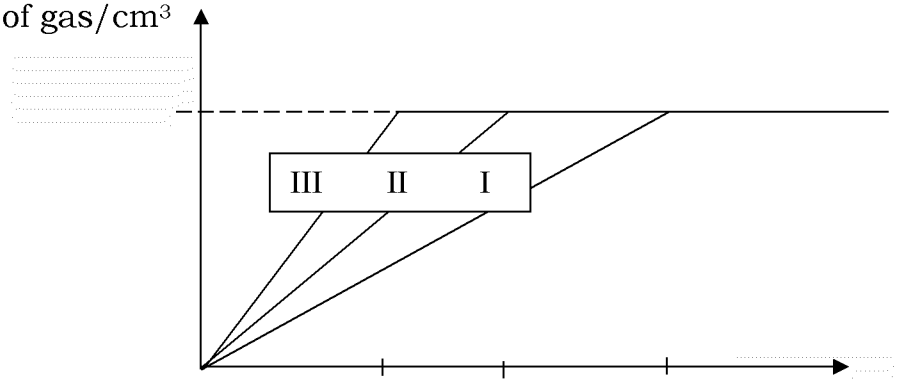
(e)(i)



(ii) 1. Draw a tangent at 90 s,
2. Calculate the gradient

[MRSM05-04]

(a) Volume of gas/cm^3



(bExp II has used $CuSO_4$ solution, that acts as catalyst

(c) 1. Exp 3, used sulphuric acid that diprotic acid. When ionise in water that will produce 2 times concentration H+ ion than HCl
2. The frequency of collision between H+ ion and Mg is increases
3. The frequency of affective collision also increases
4. The rate of reaction is highest

(d) $Mg + H_2SO_4 \rightarrow MgSO_4 + H_2$ .....[M1]
Mol of gas = volume/molar volume = [25/1000]/24 = 0.001 mol .....[M2]
1 mol H_2 was produced by 1 mol Mg
0.001 mol H_2 was produced by 0.001 mol Mg .....[M3]

Mass of Mg = mol X molar mass = 0.001 X 24 = 0.024 g .....[M4]

[SPM08-05]

(a) $\frac{\text{Change of quantity of reactant/product}}{\text{Time taken}}$

(b) (i) Draw the tangent at 120 s
Rate of reaction = (0.12- 0.18) cm^3s^{-1}

(ii) 0.267 cm^3s^{-1}

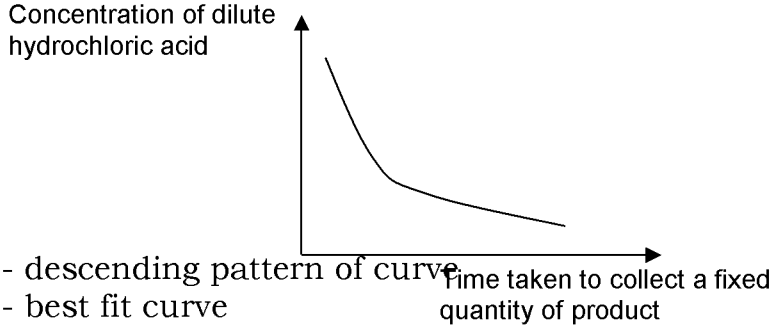
(c) Because the concentration of hydrochloric acid decreases

(d) (i) Curve II : catalyst/ temperature
Curve III : concentration

(ii) Repeat the experiment as in set I
Reduce the concentration of hydrochloric acid
The volume of hydrochloric acid remains unchanged

(iii) Because the number of mole of hydrochloric acid used is half of set I

[SPM06-06]

(a)	Total surface area of reactant	
(b)	(i)	Carbon dioxide, CO_2.
	(ii)	Because the changes in the volume of CO_2 can be measured easily.
(c)	1. Concentration of hydrochloric acid. 2. Temperature of the reactants. 3. Mass of calcium carbonate. * any two	
(d)	(i)Gradient of the curve of Experiment II is steeper than the gradient of the curve of experiment I. (ii) All the reactants have reacted completely within time x. (iii) Both experiments produced the same amount of products.	
(e)	The greater the total surface area the higher is the rate of reaction.	
(f)	 - descending pattern of curve - best fit curve	

----------oooOO aĎaŽ OOooo----------