CHEMISTRY

BOOKS - MAXIMUM PUBLICATION

REDOX REACTIONS AND RATE OF CHEMICAL REACTIONS

Example

1. What is the relation between the total mass of the reactants and the total mass of

products ?

Situation	Mass of Relations		Mass of Product
	Hydrogen	Oxygen	
1.	2g	16 g	18 g
2.	4g	32 g	36 g

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2. A piece of magnesium is burned in air. What do you observe ?

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3. A piece of magnesium is burned in air.

What is the white powder formed ?

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4. A piece of magnesium is burned in air.

Which are the reactants here ?

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5. A piece of magnesium is burned in air.

Which is the product ?

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6. Is the number of atoms of each element equal on both sides ?

Total number of atoms in the reactant side		Total number of atoms in the product side	
Mg	O.	Mg	O
1	2	1	1

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7. How will you represent two molecules of magnesium oxide ?

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8. Now, is the number of magnesium atoms equal on both sides ?

Total number of atoms in the reactant side		Total number of atoms in the product side	
Mg	O.	Mg	O
1	2	1	1

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9. Is the total number of atoms of each element in the molecules present in the reactant side and that in the product side equal in this equation ?

Total number of atoms in the reactant side		Total number of atoms in the product side	
Mg	O	Mg	O
1	2	1	1

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10. What is balancing of equations ?

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11. Balance the chemical equation

$H_2 + O_2 \rightarrow H_2O$

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12. Balance the chemical equation

$Al + O_2 \rightarrow Al_2O_3$

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13. Balance the chemical equation

$H_2 + O_2 \rightarrow H_2O$

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14. Some chemical equations are given below. Note down the number of reactant atoms and that of product atoms in the table given below.

1. $C + O_2 \rightarrow CO_2$ 2. $N_2 + H_2 \rightarrow NH_3$ 3. $2H_2O_2 \rightarrow 2H_2O + O_2$ 4. $SO_2 + O_2 \rightarrow SO_3$ 5. $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$

Balance the equations which are unbalanced.

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15. The electronic configuration of magnesium and chlorine are 2, 8, 2 and 2, 8, 7 respectively. How many electrons does a magnesium atom donate ? What charge will it get ?

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16. Let us complete the equation for this process,

$Mg \rightarrow Mg^{2+} + ...$

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17. How many electrons are accepted by each chlorine atom ? What will be the charge acquired by each atom ?

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18. Complete the equation of this process.

$Cl + 1e^- \rightarrow$ .....

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19. What are oxidation and reduction ?

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20. In the above chemical reaction, Which atom is oxidised ?

$2SO_2 + O_2 \rightarrow 2SO_3$

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21. $Cl + 1e^- \rightarrow Cl^{1-}$

which atom is reduced ?

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22. $Cl + 1e^- \rightarrow Cl^{1-}$

Which is the oxidising agent in this chemical reaction ?

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23. $2SO_2 + O_2 \rightarrow 2SO_3$

Which is the reducing agent in this chemical reaction ?

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24. Analyse the following equations and list the oxidised atom, reduced atom, oxidising

agent and reducing agent.

$Mg + F_2 \rightarrow MgF_2$

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25. Analyse the following equations and list the oxidised atom, reduced atom, oxidising agent and reducing agent.

$2Na + Cl \rightarrow NaCl$

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26. Analyse the following equations and complete the table given below

1. $Mg \rightarrow Mg^{2+} + 2e^-$ $F + 1e^- \rightarrow F$ 2. $Na \rightarrow Na^+ + 1e^-$ $Cl + 1e^- \rightarrow Cl$ 3. $Fe \rightarrow Fe^{2+} + 2e^-$ $O + 2e^- \rightarrow O^{2-}$

Equation of oxidation	Reducing agent	Equation of reduction	Oxidising agent
$Mg \rightarrow Mg^{2+} + 2e^-$	Mg	$F + 1e^- \rightarrow F^-$	F
$Na \rightarrow Na^+ + 1e^-$	Na	$Cl + 1e \rightarrow Cl\text{-}Cl$	Cl
$Fe \rightarrow Fe^{2+} + 2e^-$	Fe	$O + 2e^- \rightarrow O^{2-}$	O

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27. Consider the equation $H_2 + Cl_2 \rightarrow 2HCl$

What is the oxidation number of hydrogen in H_2 ?

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28. Consider the equation $H_2 + Cl_2 \rightarrow 2HCl$

What is the oxidation number of chlorine in Cl_2

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29. Consider the equation $H_2 + Cl_2 \rightarrow 2HCl$

In the reaction, does the oxidation number of hydrogen increases or decrease ?

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30. Consider the equation $H_2 + Cl_2 \rightarrow 2HCl$

What changes takes place in the oxidation number of chlorine ?

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31. What are oxidation and reduction on the basis of change in oxidation number ?

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32. Consider the equation $H_2 + Cl_2 \rightarrow 2HCl$ During the formation of hydrogen chloride, Which atom was oxidised ?

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33. Consider the equation $H_2 + Cl_2 \rightarrow 2HCl$

Which Is the reducing agent ?

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34. Consider the equation $H_2 + Cl_2 \rightarrow 2HCl$

Which atom was reduced during this reaction

?

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35. Consider the equation $H_2 + Cl_2 \rightarrow 2HCl$

Which is the oxidising agent ?

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36. Analyse oxidation numbers in the given equation and list the oxidising agent and reducing agent in the tabel given below.

$$\overset{0}{C} + \overset{0}{O_2} \rightarrow \overset{+4\ -2}{CO_2}$$

Element	Oxidation number before the reaction	Oxidation number after the reaction	Oxidation/ reduction happened
C	0	+4	Oxidation
O	0	-2	Reduction

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37. The Oxidised atom is .....

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38. The oxidation number of hydrogen increases/ decreases from ..... to .....

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39. How do you determine the oxidation number of sulphur in H_2SO_4 ?

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40. Find the oxidation number of Mn in $KMnO_4$ (oxidation number of K is +1, oxidation number of 0 is -2)

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41. Find the oxidation number of Mn in

MnO_2

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42. Find the oxidation number of Mn in

Mn_2O_3

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43. Find the oxidation number of Mn in

Mn_2O_7

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44. What is Redox reaction ?

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45. What are the methods usually adopted to make firewood burn faster ?

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46. Describe an experiment to prove that nature of the reactants affect the rate of chemical reaction.

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47. Write an experiment to prove that concentration of reactants affect the rate of reacions ?

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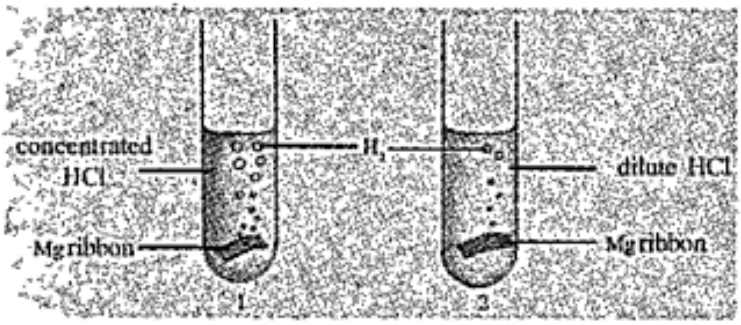
48. Write your observation

Test tube 2 : .....



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49. Why rate of reaction increases when concentration increases ?

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50. What is the relation between rate of reaction and surface area. Write an experiment to prove it.

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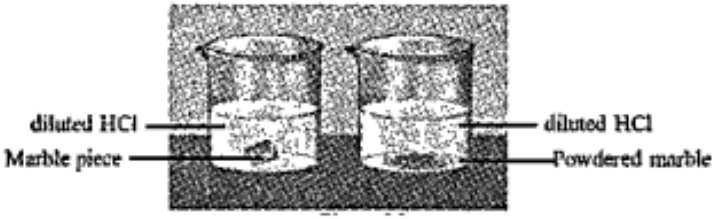
51. Is there any difference in the rate of reaction in the two beakers ?



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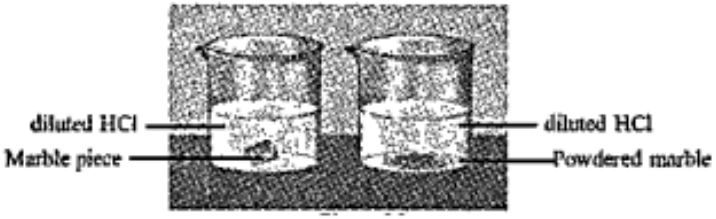
52. What about the concentration of acid in both the reactions ?



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53. What is the change in the rate of collision when surface area increases ?

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54. Why rate of reaction increases when surface area increases ?

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55. Write an experiment to prove the relation between temperature and rate of reaction.

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56. In which of the boiling tubes is the precipitate formed faster ?

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57. What is the colour of the precipitate formed ?

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58. What is Threshold Energy ?

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59. Write an experiment to prove the influence of catalyst in a chemical reaction.

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60. What are catalysts ?

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61. Magnesium combines with chloride to form magnesium chloride. The equation is given below $Mg + Cl_2 \rightarrow MgCl_2$

Write down the electronic configuration of magnesium and chlorine

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62. Magnesium combines with chloride to form magnesium chloride. The equation is given below $Mg + Cl_2 \rightarrow MgCl_2$

How many electrons are denoted by magnesium. Write the chemical equation for this process.

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63. Magnesium combines with chloride to form magnesium chloride. The equation is given below $Mg + Cl_2 \rightarrow MgCl_2$

How many electrons are accepted by chlorine ?

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64. Magnesium combines with chloride to form magnesium chloride. The equation is given below $Mg + Cl_2 \rightarrow MgCl_2$

Write the chemical equation.

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65. Explain oxidation, reduction, oxidising agent and reducing agent ?

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66. From the given chemical equation identify the oxidising agent and the reducing agent by writing the chemical equation of oxidation and reduction

$Mg + F_2 \rightarrow MgF_2$

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67. From the given chemical equation identify the oxidising agent and the reducing agent by writing the chemical equation of oxidation and reduction

$2Na + Cl_2 \rightarrow 2NaCl$

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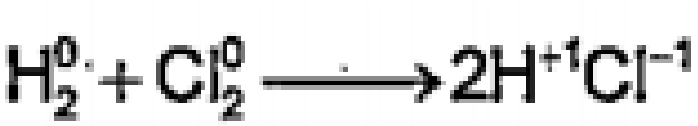
68. In the formation of hydrogen chloride does the oxidation number of hydrogen increases or decrease ?



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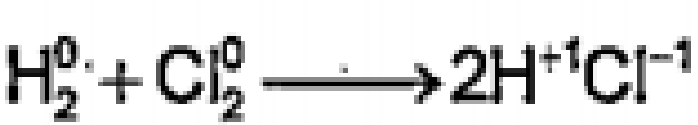
69. Whether the oxidation number of chlorine decrease or increase ?



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70. What is meant by Redox reaction ?

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71. Calculate the oxidation number of 's' in H_2SO_4 ?

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72. Find the oxidation number of the ions in ionic compound ?

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73. Some chemical equations are given below

$1) C + O_2 \rightarrow CO_2$

$2) CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

$3) N_2 + O_2 \rightarrow NO$

$4) CaCO_3 \rightarrow CaO + CO_2$ $5) H_2 + I_2 \rightarrow HI$

$6) Fe + HCl \rightarrow FeCl_2 + H_2$

7) $CO_2 + C \rightarrow CO$

Which of these are balanced equations ?

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74. Some chemical equations are given below

1) $C + 0_2 \rightarrow CO_2$

2) $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

3) $N_2 + O_2 \rightarrow NO$

4) $CaCO_3 \rightarrow CaO + CO_2$ 5) $H_2 + I_2 \rightarrow HI$

6) $Fe + HCl \rightarrow FeCl_2 + H_2$

7) $CO_2 + C \rightarrow CO$

Balance the unbalance equations.

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75. Some chemical equations are given below

1) $C + O_2 \rightarrow CO_2$

2) $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

3) $N_2 + O_2 \rightarrow NO$

4) $CaCO_3 \rightarrow CaO + CO_2$ 5) $H_2 + I_2 \rightarrow HI$

6) $Fe + HCl \rightarrow FeCl_2 + H_2$

7) $CO_2 + C \rightarrow CO$

Which among these are redox reactions ?

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76. The chemical reaction between marble and dilute HCl is given

$CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$

Which gas is formed here ? How can you identify this gas ?

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77. The chemical reaction between marble and dilute HCl is given

$$CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$$

Suggest any two ways you would choose to incease the rate of this chemical reaction. Explain the reason.

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78. Sulphur pieces do not react with cold concentrated nitric acid . But sulphur powder reacts.

Explain the reason why the rate of chemical reaction is increased here ?

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79. Sulphur pieces do not react with cold concentrated nitric acid . But sulphur powder reacts.

Suppose you want to incease the rate of reaction again. Which way you would choose ? Give reason.

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80. Small amounts of phosphoric acid is usually added to hydrogen peroxide to prevent its decomposition ?

What is the function of phosphoric acid here ?

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81. Small amounts of phosphoric acid is usually added to hydrogen peroxide to prevent its decomposition ?

By which name are these type of substances known ?

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82. Small amounts of phosphoric acid is usually added to hydrogen peroxide to prevent its decomposition

Which substance would you add to increase the rate of decomposition of hydrogen peroxide ?

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83. Find the oxidation number of the elements which are underlined in the compounds given below. Among these find out the elements which show variable oxidation numbers.

MnO_2 (Hint. Oxidation number o = -2, Cl = -1, K = +1)

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84. Find the oxidation number of the elements which are underlined in the compounds given

below. Among these find out the elements which show variable oxidation numbers.

Mn_2O_7 (Hint. Oxidation number o = -2, Cl = -1, K = +1)

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85. Find the oxidation number of the elements which are underlined in the compounds given below. Among these find out the elements which show variable oxidation numbers.

$K_2Cr_2O_7$ (Hint. Oxidation number o = -2, Cl = -1, K = +1)

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86. Find the oxidation number of the elements which are underlined in the compounds given below. Among these find out the elements which show variable oxidation numbers.

$KCrO_3$ (Hint. Oxidation number o = -2, Cl = -1, K = +1)

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87. Find the oxidation number of the elements which are underlined in the compounds given below. Among these find out the elements which show variable oxidation numbers.

$MnCl_2$ (Hint. Oxidation number o = -2, Cl = -1, K = +1)

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88. Find the oxidation number of the elements which are underlined in the compounds given

below. Among these find out the elements which show variable oxidation numbers.

MgO (Hint. Oxidation number o = -2, Cl = -1, K = +1)

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89. Find the oxidation number of the elements which are underlined in the compounds given below. Among these find out the elements which show variable oxidation numbers.

$MgCl_2$ (Hint. Oxidation number o = -2, Cl = -1, K = +1)

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90. Find the oxidation number of the elements which are underlined in the compounds given below. Among these find out the elements which show variable oxidation numbers.

Al_2O_3 (Hint. Oxidation number o = -2, Cl = -1, K = +1)

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91. Find the oxidation number of the elements which are underlined in the compounds given below. Among these find out the elements which show variable oxidation numbers.

$AlCl_3$ (Hint. Oxidation number o = -2, Cl = -1, K = +1)

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92. Some apparatus and chemicals are given. Zn, Mg, dilute HCl, $CaCO_3$ test tube, water.

Design an experiment to prove that the nature of reactants can influence the rate of reaction.

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93. Some apparatus and chemicals are given. Zn, Mg, dilute HCl, $CaCO_3$ test tube, water. Write the equations for the chemical reactions.

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94. Some apparatus and chemicals are given.

Zn, Mg, dilute HCl, $CaCO_3$ test tube, water.

Write the expression for the rate of the reaction.

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95. The experiments conducted by two students are given below.

Experiment 1: 2mL of sodium thiosulphate solution is taken in a test tube, heated and to

it 2 mL of HCl solution is added.

Experiment 2: 2 mL of sodium thiosulphate solution is taken in a test tube and to it 2 mL of HCl solution is added.

In which experiment is the precipitate formed quickly ? justify your answer.

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96. The experiments conducted by two students are given below.

Experiment 1: 2mL of sodium thiosulphate

solution is taken in a test tube, heated and to it 2 mL of HCl solution is added.

Experiment 2: 2 mL of sodium thiosulphate solution is taken in a test tube and to it 2 mL of HCl solution is added.

Write the balanced equation for the reaction.

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97. Some materials available in the laboratory are given below. Magnesium ribbon, marble powder, marble pieces, dilute HCl,

concentrated HCl

Which material will you choose for the preparation of more CO_2 in less time ?

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98. Some materials available in the laboratory are given below. Magnesium ribbon, marble powder, marble pieces, dilute HCl, concentrated HCl

Write the balanced chemical equation of the

reaction for preparation of Carbondioxide in less time

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