



The Rate and Extent of Chemical Change

Multiple Choice Questions

Set 5 (HT)

Tick **one** box.

Equation 1 shows the reaction between sodium thiosulfate and hydrochloric acid.

Equation 1



When the reactants are mixed in a flask, the reaction mixture becomes turbid (cloudy).

1. Which product is responsible for the increased turbidity of the mixture?

- A. NaCl
- B. H₂O
- C. SO₂
- D. S

A student investigated how the concentration of hydrochloric acid affected the rate of reaction of **Equation 1**. They timed how long it took the reaction mixture to obscure an 'X' on a piece of paper placed beneath the flask. Their results are shown in **Table 1**.

Table 1

Hydrochloric Acid Sample	Time Taken for 'X' to be Obscured (s)
W	34
X	63
Y	48
Z	15

2. Which sample of hydrochloric acid had the highest concentration?

- A. W
- B. X
- C. Y
- D. Z

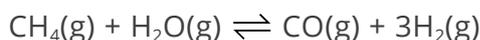


Over many years, copper objects change from being a shiny, orange-pink colour to a dull, green-blue colour. This change in appearance is due to an oxidation reaction.

3. Why does this reaction take place over many years?
- A. the pressure on copper objects increases over time
 - B. the reactants were not all available until recently
 - C. the reaction has a very high activation energy
 - D. the reaction only occurs on hot days
4. How does the size of the particles in a solid affect its rate of reaction?
- A. larger particles have a greater surface area to volume ratio which increases the rate of reaction
 - B. larger particles have a smaller surface area to volume ratio which increases the rate of reaction
 - C. smaller particles have a greater surface area to volume ratio which increases the rate of reaction
 - D. smaller particles have a smaller surface area to volume ratio which increases the rate of reaction
5. What does Le Chatelier's Principle describe?
- A. a system at equilibrium responds to counteract any changes made to it
 - B. catalysts increase the rate of a reaction by lowering the activation energy
 - C. particles will only react if they collide with enough energy
 - D. reversible reactions are exothermic in one direction and endothermic in the opposite direction

Equation 2 shows how hydrogen gas can be obtained by reacting methane with steam. This reaction is endothermic in the forward direction and will reach equilibrium in a closed system.

Equation 2



6. What effect would increasing the temperature have on the rate of the forward reaction in **Equation 2**?
- A. the rate would decrease
 - B. the rate would increase
 - C. the rate would stay the same
 - D. it is not possible to predict the effect on the rate



7. What effect would increasing the temperature have on the yield of hydrogen in **Equation 2**?
- A. the yield would decrease
 - B. the yield would increase
 - C. the yield would stay the same
 - D. it is not possible to predict the effect on the yield
8. What effect would increasing the pressure have on the rate of the forward reaction in **Equation 2**?
- A. the rate would decrease
 - B. the rate would increase
 - C. the rate would stay the same
 - D. it is not possible to predict the effect on the rate
9. What effect would increasing the pressure have on the yield of hydrogen in **Equation 2**?
- A. the yield would decrease
 - B. the yield would increase
 - C. the yield would stay the same
 - D. it is not possible to predict the effect on the yield
10. What effect would using a catalyst have on the rate of the reaction in **Equation 2**?
- A. the rate would decrease
 - B. the rate would increase
 - C. the rate would stay the same
 - D. it is not possible to predict the effect on the rate