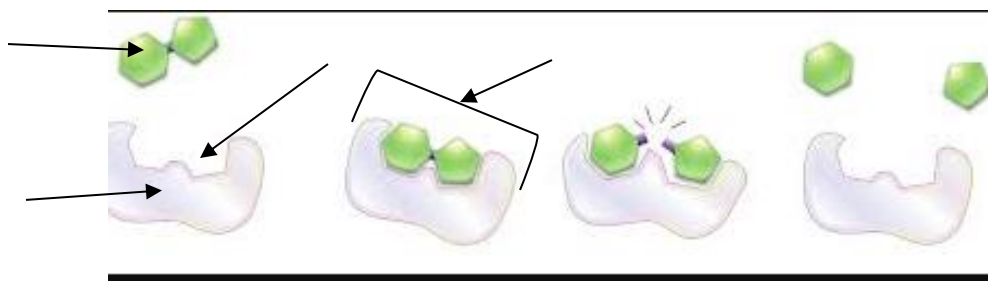


Fill in the Blank

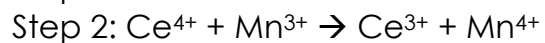
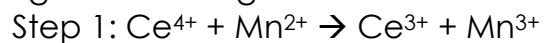
1. A _____ is a substance that changes the speed of the chemical reaction without undergoing a permanent chemical change itself.
2. A catalyst that is present in the same phase as the reactants in a reaction mixture is called a _____ catalyst.
3. A catalyst that exists in a phase different from the phase of the reactant molecules is called a _____ catalyst.
4. Heterogeneous catalysts are often composed of _____ or metal oxides.
5. _____ is the binding of molecules to an extremely reactive surface.
6. A catalyst can lower the _____ barrier.
7. _____ are large protein molecules that act to catalyze specific biochemical reactions
8. _____ is a specific location on the enzyme where a reaction takes place.
9. _____ are substances that react at an active site on an enzyme.
10. A _____ is the combination of an enzyme and substrate.
11. A _____ are molecules other than the substrate that is able to bind with the enzyme and blocks the entry of other substrates.

Short Response

12. What is the difference between a catalyst and an intermediate?
13. A catalyst may affect the rate by altering either of what two things associated with the rate constant?
14. Label the following on the image below: (a) enzyme (b) substrate (c) active site (d) enzyme substrate complex.



15. Using the following reaction mechanism below, answer the following questions.



a) Write the overall reaction.

b) Identify each of the following substances as a reactant, product, intermediate, or catalyst.

i. Mn^{2+} = _____

ii. Mn^{3+} = _____

iii. Ce^{4+} = _____

iv. Ce^{3+} = _____

v. Mn^{4+} = _____

vi. Tl^{+1} = _____

vii. Tl^{+3} = _____