



Polytechnic Tutoring Center

Final Exam REVIEW Answer Key – CM 1003, Fall 2021

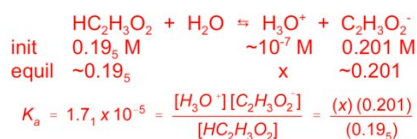
Disclaimer: This mock exam is only for practice. It was made by tutors in the Polytechnic Tutoring Center and is not representative of the actual exam given by the Academic Department.

Answer Key

1. Using Le Chatelier's principle, going against the effects of reaction

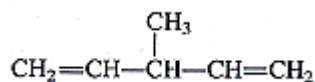
- a. right
- b. left
- c. right
- d. left
- e. no effect

2. D
3. A
4. E



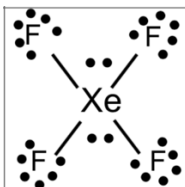
$$x = 1.6_6 \times 10^{-5} \text{ M} = [\text{H}_3\text{O}^+] \rightarrow \text{pH} = 4.78$$

5. C
6. A
7. A
8. $2\text{Ag}^+ (\text{aq}) + \text{SO}_4^{2-} (\text{aq})$
 $\text{Ag}_2\text{SO}_4 (\text{s})$
9. A
10. B
11. 2,3,7-trimethyldecane
12. B
13. D
14.



15. D
16. C
17. B
18. E
19. B
20. B
21. D

22. A
23. B



24. 1)
2) AX₄E₂
3) sp³d²
4) octahedral
5) square planar
6) 90 degrees
7) nonpolar

25. $k_1 = 6.20 \times 10^{-4}$ for $T_1 = 700\text{K}$

$$\text{First Order reaction } t_{\frac{1}{2}} = \frac{\ln(2)}{k}$$

$$\text{so } k = \frac{\ln 2}{t_{\frac{1}{2}}} \text{ at } 760\text{K.}$$

$$\text{yielding } k_2 = \frac{\ln 2}{29 \text{ min}} = 2.39 \times 10^{-2} \text{ min}^{-1}$$

$$\frac{1}{T_1} = 1.429 \times 10^{-3} \text{ K}^{-1} \text{ and}$$

$$\frac{1}{T_2} = \frac{1}{316} \times 10^{-3} \text{ K}^{-1} \text{ then}$$

$$\ln\left(\frac{k_1}{k_2}\right) = \left[-\frac{E_a}{R}\right] \left[\left(\frac{1}{T_1}\right) - \left(\frac{1}{T_2}\right)\right] \text{ correct R,}$$

$$R = \frac{8.314 \text{ J}}{\text{mol K}}$$

$$\ln\left(\frac{6.2}{239}\right) = \left[-\frac{E_a}{8.314}\right] [1.429 \times 10^{-3} - 1.316 \times 10^{-3}] \text{ K}^{-1}$$

$$E_a = \frac{(3.65)(8.314) \times 10^{-4} \text{ J}}{1.1} = \frac{275874 \text{ J}}{\text{mol}} = 276 \text{ KJ/mol}$$