

Answers to "Touro test 1" from March 2007, which is a much more difficult than average exam.

Note that in questions 7 and 8, it should say "formic acid" not "acetic acid."

1. A 2. B 3. B 4. A 5. 14.9 s 6. B 7. C 8 D 9. 0.70 10. 12.6

11. 0.00100 M 12. 15.8 13. 3.2×10^{14} 14 B 15 C 16 B 17 D

18 C 19 D 20 Inc. 21. Dec 22 Remains 23 D 24 B 25 A 26 D

27 D 28 A 29 A

I. Very tricky. Since the volume is 1 liter, you use the density to get the total mass, which would be 1280 cm^3 or 1.28 kg. A. 41.4 % B. 7.21 (the mass of the water is 750 g. Remember that molality is over mass of solvent, not mass of solution)
C, 0.115 D) 5.41 M

II A. 0.391 m B 128

III. $2 \text{ NO} + \text{H}_2 \rightarrow \text{H}_2\text{O} + \text{N}_2$ B. N_2O_2 C. Rate = $k[\text{NO}]^2[\text{H}_2]$

D. Rate = $k[\text{NO}]^2$

IV. 1.7 mole B. $K_c = 0.0572$, which in this case is the same as the K_p

D. Much more difficult. Change the moles to molarity immediately, so both gases are 2.00 molar. (4 moles in 2 liters) If x = molarity of H_2 that reacts to make HBr , the equation becomes $(2x)^2/(2-x)^2 = 0.0572$. This is solved by taking the square root of both sides. $X = 0.214 \text{ M}$, so $2x$, which is what you are trying to find, is 0.428 M

V. The $\text{C}_2\text{O}_4^{2-}$ is second order, and the HgCl_2 is first. $k = 3.33 \times 10^{-3} \text{ M}^{-2}/\text{s}$

C, 1.78 M D. $1.2 \times 10^{-4} \text{ M/s}$

VI. 28.9 s VII 106 s VIII H_2 is 0.062 N_2 is 0.038 M and H_2O is 0.076 N

$K_c = 0.75$.