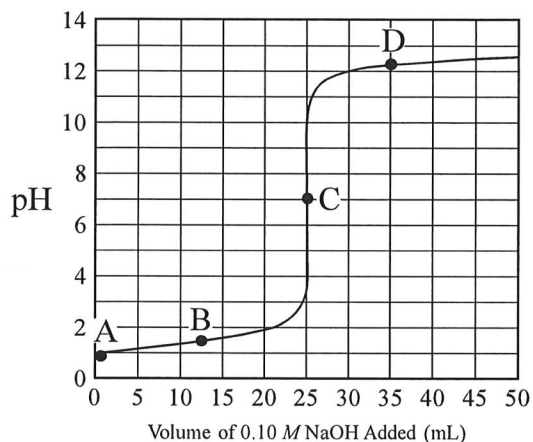


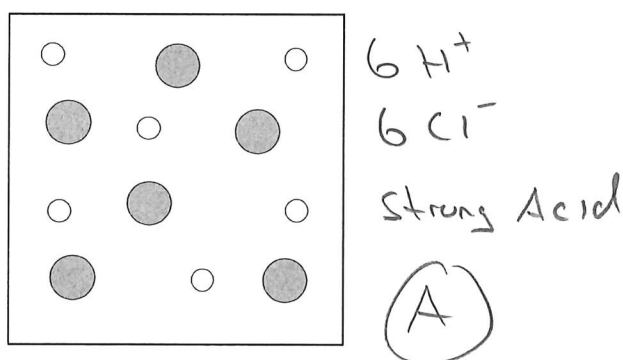
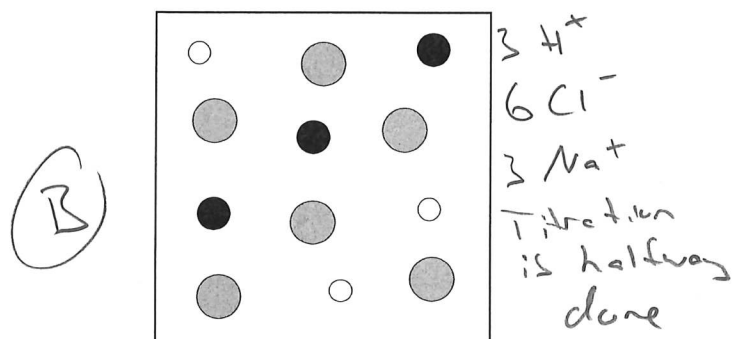
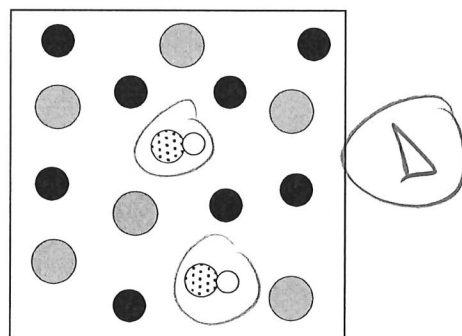
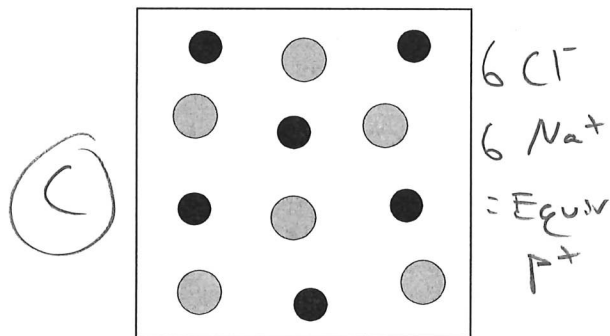
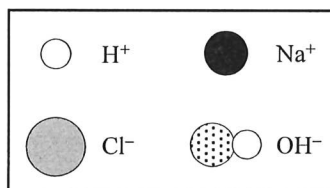
## Molecular Views with Titrations

Scenario 1: A 25.0 mL sample of 0.10 M  $\text{HCl}(aq)$  is titrated with 0.10 M  $\text{NaOH}(aq)$ . The pH of the resulting solution is measured with a pH meter and graphed as a function of the volume of the titrant added.



### Question 1:

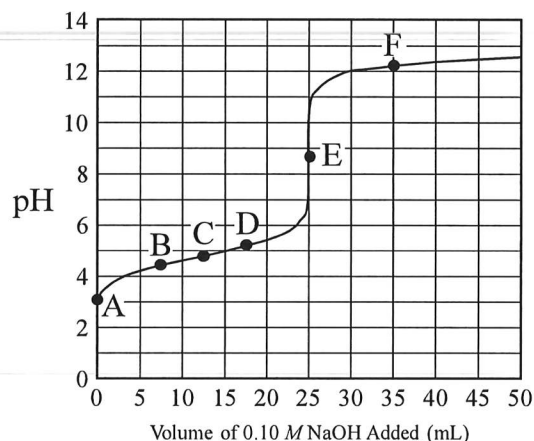
Each of the diagrams below is a particulate representation of a small representative portion of the solution. For clarity, water molecules are not shown. Based on the information in the pH curve shown above, label each diagram as A, B, C, or D.



### Question 2:

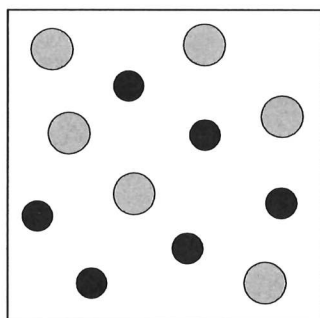
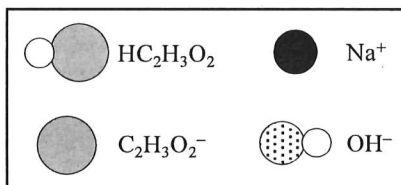
Verify that the pH is correct in the graph at point B (12.5 mL). You must show all work and calculations

Scenario 2: A 25.0 mL sample of 0.10 M  $\text{HC}_2\text{H}_3\text{O}_2(aq)$  is titrated with 0.10 M  $\text{NaOH}(aq)$ . The pH of the resulting solution is measured with a pH meter and graphed as a function of the volume of the titrant added.  $K_a = 1.8 \times 10^{-5}$

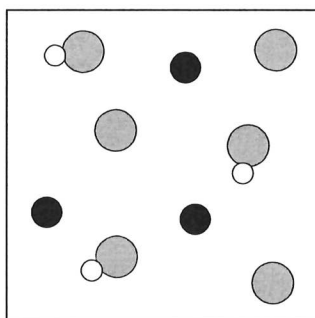


**Question 3:**

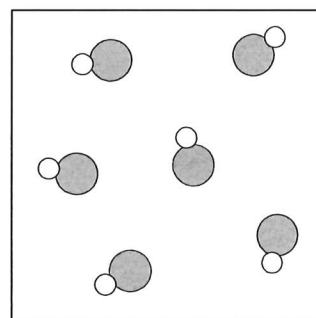
Each of the diagrams below is a particulate representation of a small representative portion of the solution. For clarity, water molecules are not shown. Based on the information in the pH curve shown above, label each diagram as A, B, C, D, E, or F.



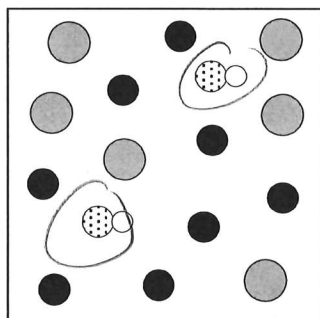
6  $\text{Na}^+$   
6  $\text{A}^-$   
= equiv  $\text{pH}$   
(E)



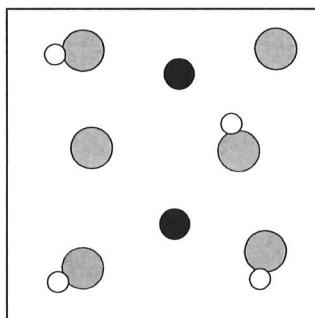
Ideal  
Buffer  
3 HA  
3  $\text{A}^-$   
(C)



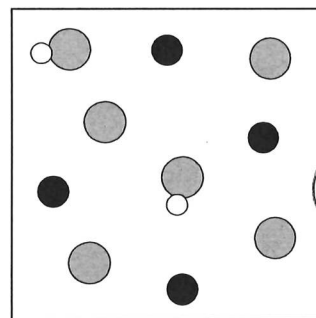
All  
HA  
(A)



(F)



more  
acid  
(B)

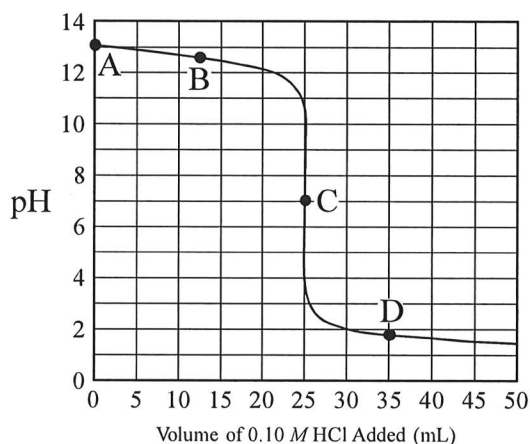


more  
 $\text{A}^-$   
(D)

**Question 4:**

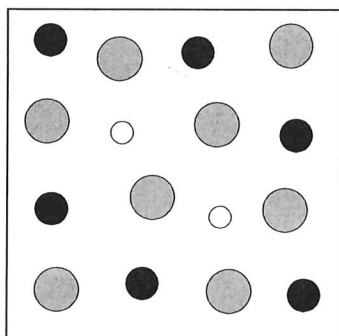
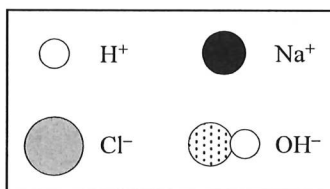
Verify that the pH in the graph is correct at points A (0 mL) and E (25 mL). You must show all work and calculations.

Scenario 3: A 25.0 mL sample of 0.10 M NaOH(aq) is titrated with 0.10 M HCl(aq). The pH of the resulting solution is measured with a pH meter and graphed as a function of the volume of the titrant added.



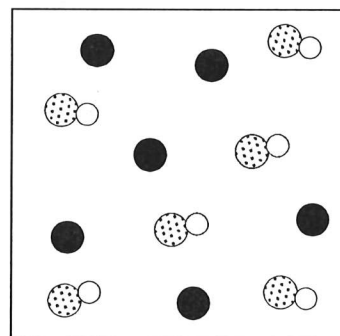
Question 5:

Each of the diagrams below is a particulate representation of a small representative portion of the solution. For clarity, water molecules are not shown. Based on the information in the pH curve shown above, label each diagram as A, B, C, or D.



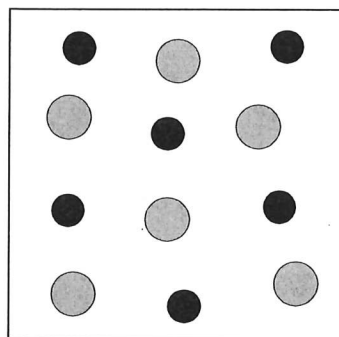
Excess  $H^+$

(D)



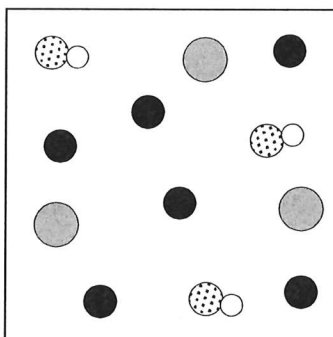
6  $OH^-$   
6  $Na^+$

(A)



6  $Na^+$   
6  $Cl^-$   
equiv pt.

(C)



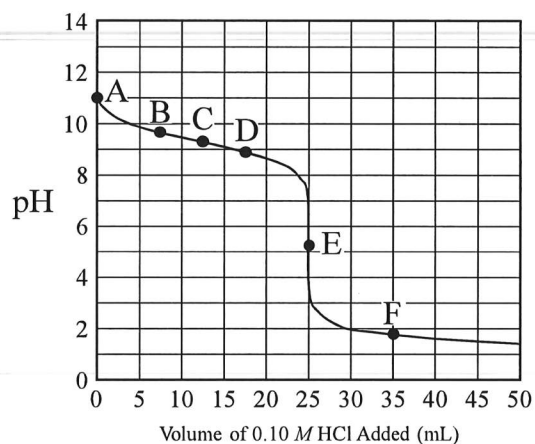
Titration  
halfway  
done  
(still  $OH^-$   
left)

(B)

Question 6:

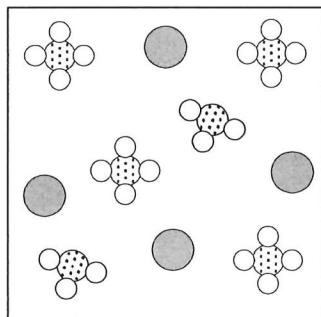
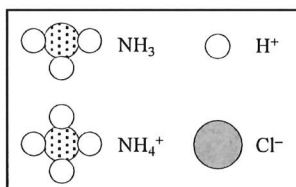
Verify that the pH at points A (0 mL) and D (35 mL) are correct in the graph. You must show all work and calculations.

Scenario 4: A 25.0 mL sample of 0.10 M  $\text{NH}_3(\text{aq})$  is titrated with 0.10 M  $\text{HCl}(\text{aq})$ . The pH of the resulting solution is measured with a pH meter and graphed as a function of the volume of the titrant added.  $K_b = 1.8 \times 10^{-5}$

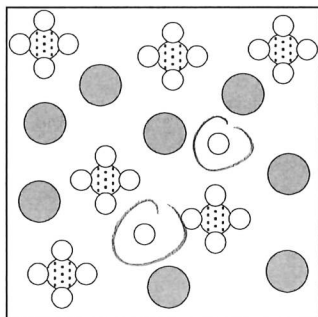


**Question 7:**

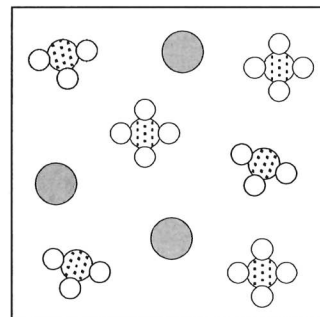
Each of the diagrams below is a particulate representation of a small representative portion of the solution. For clarity, water molecules are not shown. Based on the information in the pH curve shown above, label each diagram as A, B, C, D, E, or F.



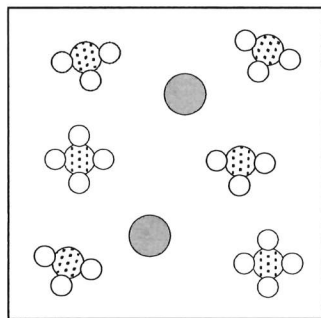
more  
conj.  
acid  
than  
base  
(D)



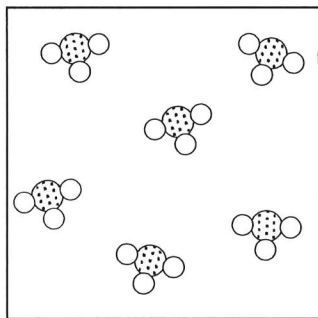
(F)  
Excess  
 $\text{H}^+$



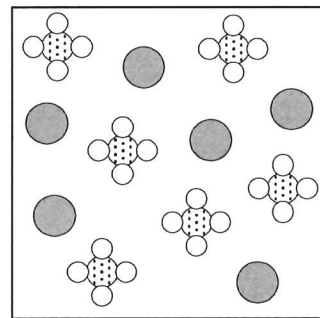
Equal  
Base  
and  
conj.  
acid  
= ideal  
buffer  
(C)



more  
base  
than  
conj. acid  
(B)



(A)  
all  
 $\text{NH}_3$



conj.  
acid  
+  
spectator  
ions  
= equiv  
pt  
(E)

**Question 8:**

Verify that pH is correct on the graph at points C (12.5 mL) and E (25 mL). You must show all work and calculations.