

Structure {Paper03}

[SPM08-01]

(a)	Acid coagulates latex while alkali does not coagulate latex.							
(b)	Set I: 5 minutes Set II: 6 hours or 300 minutes							
(c)	<table border="1"> <thead> <tr> <th>Set</th> <th>Time taken / minute</th> </tr> </thead> <tbody> <tr> <td>I</td> <td>5</td> </tr> <tr> <td>III</td> <td>300</td> </tr> </tbody> </table>		Set	Time taken / minute	I	5	III	300
Set	Time taken / minute							
I	5							
III	300							
(d)	Set I: A white solid lump is formed. (or latex coagulated) Set II: There is no visible change observed. (or latex does not coagulate) Set III: A white solid lump is formed. (or latex coagulated)							
(e)	Operational definition for the coagulation of latex is latex becomes solid when acid is added or when exposed to air.							
(f)	(i)	The manipulated variable : Ethanoic acid and ammonia solution						
	(ii)	The responding variable : Latex coagulates or does not coagulate. (or time taken for coagulation of latex)						
	(iii)	The constant variable : Volume of latex, volume and concentration of acid and ammonia solution. Temperature						
(g)	(i)	Latex coagulates after excess hydrochloric acid is added. (or latex becomes solid after excess hydrochloric acid is added.)						
	(ii)	[For more detailed pictorial explanation, please refer to text book page 93] When acid is added, the H⁺ ions from the acid neutralized the ammonia in the latex. The excess H⁺ ions then neutralized the negative charge on the protein membrane. The protein membrane then breaks during collision and rubber molecules combine and become entangled causing latex to coagulate.						
(h)	[For more explanation, please refer to text book page 93] This is because the bacteria from the air enter the latex . The growth and spread of bacteria produce lactic acid that causes the coagulation of latex.							
(i)	(i)	Latex in Set I coagulates faster than the latex in Set III because the concentration of H⁺ ions is higher in Set I.						
	(ii)	<table border="1"> <tbody> <tr> <td>Can coagulate latex</td> <td>Cannot coagulate latex</td> </tr> <tr> <td>Nitric acid</td> <td>Potassium hydroxide</td> </tr> <tr> <td>Methanoic acid</td> <td>Sodium hydroxide</td> </tr> </tbody> </table>	Can coagulate latex	Cannot coagulate latex	Nitric acid	Potassium hydroxide	Methanoic acid	Sodium hydroxide
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