Date _____

Expt. No. 1. Page No. 1

Aim :→ Objective

To study the effect of various factor on the rate of filtration.

Reference :-

Requirements :→

- Glasswares :→ Beaker, filter paper, measuring cylinder, funnel, wire gauge.
- Chemicals :→ Calcium carbonate.

Theory :-

Principle :→ Filtration is a process ~~of~~ where solid particle suspension are separated from liquid or gas employing porous media which retain a solid particle but allow the fluid to pass through ~~a~~ volume of filtration obtain through the filter paper per unit time is called rate of filtration.

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Observation:

S.No.	Sample	Time taken	Vol. of filterate	Rate of filteration
1.	5% $CaCO_3$	197 sec	40 ml	0.20 ml/sec
2.	10% $CaCO_3$	300 sec	40 ml	0.13 ml/sec

Calculation:

Rate of filteration = $\frac{\text{Vol. of filterate}}{\text{Time taken}}$

(i) 5% $CaCO_3$ = $\frac{40\ ml}{197\ sec}$ = 0.20 ml/sec

(ii) 10% $CaCO_3$ = $\frac{40\ ml}{300\ sec}$ = 0.13 ml/sec.

eg :- $\left| \frac{dv}{dt} = K.A\,\Delta P / \mu L \right|$ - darey's law

where,
A = Area of filter,
V = Volume of filter,
K = Constant,
ΔP = Pressure drop across the filter media and cake,
μ = Viscosity of filterated
L = Thickness of cake
t = Time of filtration.

Procedure :-

i) Effect of thickness of cake :-

Prepare two solution of calcium carbonate using water as solvent the concentration of solution are 5% and 10%.

Filter them and note the time taken for filtration to calculate the rate of filtration and compare them.

(ii) Preparation of 5% solution of $CaCO_3$.

Accurately weigh 2.5g of $CaCO_3$ and dissolve into 50ml of distilled water.

(iii) Preparation of 10% solution of $CaCO_3$

Accurately weigh 5g of $CaCO_3$ and dissolve into 50ml of distilled water.

Result:-

The study of effect of rate of filtration was successfully performed in the laboratory.

Date _____

Expt. No. 2 Page No. 4

Aim:- Gulab

To study the effect of viscosity on the rate of filtration.

Reference :-

Requirements :-

(a) Apparatus :- - Beaker, filter paper, measuring cylinder.

(b) ~~Glass~~ Chemical :- Glycerine, $CaCO_3$, distilled water.

Theory :-

Principle :- Filtration is a process where solid particle suspension are separated from liquid or gas employing porous media which retain a solid particle but allow the fluid to pass through volume of filtration obtain through the filter paper per unit time is called rate of filtration.

eg :→ $\left[\frac{dv}{dt} = KA.\Delta P/\mu L\right]$ - darey's law.

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Observation :-

S. No.	Sample	Time taken	Volume of filtration	Rate of Fil.
1.	5% $CaCO_3$	342 sec	45 ml	0.13 ml/sec
2	5% $CaCO_3$ + Glycerine	679 sec	45 ml	0.06 ml/sec

Calculation :

Rate of filteration = $\frac{\text{Vol. of filterate}}{\text{Time taken}}$

(i) 5% $CaCO_3$ = $\frac{45\ ml}{342\ sec}$ = 0.13 ml/sec

(ii) 5% $CaCO_3$ + Glycerine = $\frac{45\ ml}{679\ sec}$ = 0.06 ml/sec.

where,
A = Area of filter,
V = Volume of filter,
K = Constant
ΔP = Pressure drop across the filter media and cake,
μ = Viscosity of filterated,
L = Thickness of cake,
t = Time of filtration.

Procedure:

(i) Take all glasswares and clean it and dry it.

(ii) Preparation of 5% $CaCO_3$ solution:-
→ (a) Take 2.5 gm of $CaCO_3$ and dissolve into 50 ml of distilled water then prepare 5% of solution of $CaCO_3$.

(iii) Preparation of mixture of glycerine water and calcium carbonate.
(a) Take 2.5 gm of $CaCO_3$ and dissolve it into 40 ml of distilled water. Now add 10 ml of glycerine in this mixture.

(iv) After preparation of solution filter with filter paper and note the time for filtration to calculate the rate of filtration and compare them.

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Result:-

The study of effect of rate of filtration was successfully performed in the laboratory.

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