EXPERIMENT-01

Object- To determine total hardness of given water sample in PPM in terms of CaCO3 equivalents by complexometric titration using EDTA salution as an intermediate and Exiochrome Black-I (FBT) as an internal metal ion indicator. The strength of Standard hard water of CaCO3 is 1.09/L.

1) Apparatus Required, Pipette, Conical flask, beaker, dropper etc.

extrementure at which oil aires

Elask, beaker, oropped 2) Chemical Required: EDTA; water sample, Standard hard water, Eriochrome Black-T, buffer Solvetion of NH9 cla NH4:OH,

Theory - AS EDTA is a chelating agent, hence catt and Matt ions

Form a complex with EDTA and at the end point all the Catt and Matt ions present in the water sample convert to Ca-EDTA and Matersample convert.

I) Mtt. + [EBT] at topH > [M-FBT]

Hard water Wine seed,

Mtt = Catt or Mgtt Complex

		DATE: / /
	(II)	[M-EBT] + [Nao EDTA] - > [M-EDTA] + [EBT] Colorless, Soluble Blue Stable complex +
		In this oceaction the result is expressed
	3	in terms of Cacos equivalents by converting
	3	the amount of all types of hardness
	2	Causing Salts in Cacos equivalents due to
L	3 30	the following sceasons - will state in ?
	3	(in ev) (WH270 smulov)
1	3 1	To convert the amount of all types of Salts
	2	un one unit.
4	3)	Molecular weight of cacos is 100 and its.
	à	equivalent weight is 50. therefore calculation
	3)	becomes easier.
		Calos is the most insoluble salt in water.
	3	Perocedure -
	EDTE C	S.No. Pipotle reading Burnotte reading Volume of
	4	Bugatte in Filler with standard FDTD
		Burette in Filled with standard FDTA Solution
	2)	Standard hard water is pipette out in conical
		Flask.
-	3)	2 ml of buffer Solution and other 2-3 drops
-		of Friochrome Black-T are added into it.
		the solution becomes wine xed in color.
		Calculation -
	4)	The Solution is distrated with EDTA Solution
		till the color changes to sky blue.
	5)	The Valueme OF EDTA Solution consumed is note
		and same experiment is supported to get
	alli	concordant reading.

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				DATE: 1 1
NAC.	The Same expurates sample. Observation: Ta	ble 4	jk-000e	cidle of
(I)	For Standard	hard wa	HE (SH	W. M.
S, No	(Valume of SHW)	Burette (ml	final	Volume Of EPTA (V2 ml)
163 %	0 001-21,000	o na trag	ase use	
Medine)	o to some office of		ises ton	anad C
(<u>İ</u> T)	For water S		- (2U	150000
S.No.	Mame)	Burette re (me)	eadings 1	(V2'ral)
Johns		1. 892 mil	6 00 Am L	Appropriate Strandar
10	ati batho in	constant of	2. was said	A-DARBIE
realty (se	Calculation -	to some	od noite	
hator 25	As the Strength So its norma	OF SHW.	is = 4.0	
	(Nor)	nality = St	rength/Fq	quevalent weight)

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Now using NV = constant equation
$N_1V_1 = N_2V_2$ (SHW) (EDTA)
CCDIVI = N2V2
(EDTA)
where,
It is the normality of class.
The marmalilian
the contract of the
13 is the Land water that water
Ve is the Volume OF EDTA
And N. V N. 2
And Novi = Nova (EDTA) (WS)
Atha No Vo = No Vo do Posico in it
(EDTA) (WS)
where
Now the normality of water sample
No in the water sample
No is the normality of EDTA
V3 is the Volume of Water Sample
V, is the volume of EDTA
$\frac{1}{50} \times \frac{V_1}{V_2} \times \frac{V_2}{V_3} = N_3$
50 V ₂ V ₃
Strength of water sample = N3X50g/L
13/50g/L
= 8/L
So total hardness of water Sample
= N3X50X 4000 mg/Litte
= Led (Tobbu

-	Result - The total	hardness present
	in the given wa	
	7A CA	bbw
	Digital Maria Carlos N	
	Recautions -	a softer
ha	was all the all sharpers to	sent and
11	Burette and pipette	. should be rinsed before
	exporiment.	ce off as all
2)	Brucette should be	"lled up to zero mark.
3)	Air bubbles should be	removed from bevalle
4)	Last drop form pipe	He should not be
	transferred into co	prical flask.
5)	transferred into co End point should be	· noted carefully.
	(201)	(ATAR)
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	James rokofu to stillor	ryon of dist
	mality of Epts	vor at a. or
	comperatory of wall	
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+		
		SO VE SO
	A School & Nax 2001	SO VE SO
	1207XEV = Naprose x	SO VE SO
		SO VE VE