	Experiment No. 3. Name: EDTA Method.  Date   2 6   04.
	15) Edgministen of Total Hardrey
	ESTEMATION OF TOTAL HARDNESS, PERMANGINT
	AND TEMPRARY HARDNESS BY EDT/S ME71400
	Aim:
	To estimate the amound of total haydness, perma-
	-new haraness und temporary hardness of a gren
	sample of mater by EDTS method by using ammonia
	Doffer (PH=10) and enochsome black 7-indicator
	B + 11 + 1 A
	wrette, pipette, conital flask, standard flush
	Burette, pipette, conical flask, standard flush, burnel, burner and 280 ml braker
	Rows of that 6000 my lates
	EDTA sol" standard hard water, sample water,
	endualer NA, - NA U
	buffer solution
	the last the last
	Dirochina salt of oth land in
	CEDIA) is used to deter in the till amin
(6)	and the william of the think of the
	of the given hard water. The hardness causing
	metal ions (calcium and magnerium) form a.
	which were complex with estoch and
	black 7- inducator in the presence of buffer solution. When 50,50 is added, the indicator in
	Teacher's Signature:

#### is standardiction of EDTA.

### standard Hard water us EDTA 5017.

A CONTRACTOR OF THE PARTY OF TH	St. M.	Vol of Sample	Busette	Reading.	10 lov	7 diedos	
Thermore Tree with		Vol of Sample Hard Water (mi)	Initial	Final	GO7A (me)	Marcana	
-		O. W.	- 90/20/- 10	The state of the s	See M.		
	1	20.4	0	40,4	15.4	GO7A	
-		U. W.	Te M.M	6.1	1 10 1	Aliensk	
-	2	20.4	NO N	20.4			1

#### Calculation

Int of standard hard water = Imy of CaCo; Notume of standard hard water laker = 20 mL 20 mL of standard hard water = 20 mg of CaCo,

Therefore 1 ml of 0070 = 20 mg deg. Caco,

	Experiment No. 3. Name: 14ardness by GD7/3 Date
	Replaced long EDTA and a stable complex is formed Due to the liberation of wiothrome black
	Due to the beberation of wiochrome black
-	Tindicator wine red color changes to steel blue This is the end point for the titration blue EDTA and hard water.
-	EDTA and hard water.
-	Relantene diamin telen
	carbonalis acid which has all lace a tetra
	relylene diamine taken cuetic and is a telesa carbonylic and which has the following formuly.
	1400 CH2 C / CH3 40011
	N-CH, -CH, -N
	HOOCH, C N-CH, -(H, -N) +00 C H2C CH2 COO1
	The entire reaction between C+, My win &
	To 24 1 Co 24
	En-7 in represented an [Ca21 - EB7] wins & [My"] + EB7 - [Ca21 - EB7] wins rw.  (Past Water sumples
	(Past water sample)
L	
	[ Ga 24 EB7] + ED7A - [ Ga 24 ED7A] + EB7 [ Mg 24 (Blue)
	L Mg2+ [B/ve]
	al a lie sample water is boiled, bicarbonates
	By tallium and mangresum are converted into
	Aftration which can be removed by
	When the sample water is boiled, bicarbonates of calcium and mangresim are converted into hydrocarbon which can be removed by filtration
1	The permanent hordnen which is not removed by boiling is once again eliminated by GOTH winn
	Teacher's Signature:

## (ii) <u>Determination</u> of <u>Total Hardness</u> Sample Hard Water is GD71 521"

	A STATE OF THE PARTY OF T	The second secon					
	Sa.No.	Vol of afd.	Property	Pending	10" OV	Indicator	I
	A GOL	Hard Wals (16)		1 Binal	8070 (NO)	o ancusor	
	Red A	As Pour Low hours	14 Decay	13.9	Leady agents and	Me3.14 + -	
	Ness	MING ANNIE	melbuds	() E07A	12.4	F071	
1	2	John 20 1 116	1 Bull	13.9	( ( PH = 10 ) a	Paties	-

Molume of EDTA consumed = V2 mil
= 13.9 ml
Now if Int GDTA = 20 mg Cally.

Then vi mil of 60713: 20 x V2 mg Ca CO3

= 13.622 mg Call,

of 20 ml rample hard water taken for titration contain - 20 x V2 mg.

Then 1000 ml will contain a 20 xr, x 1000 mg Ca Coz

2/681 · 37 ppm/

_	Experiment No. 3. Name: Hardness by 60 TA. Date Date
	criochrome black T- interato.
	PROCE DURE +
	STAN DARDI ZATZON OF EDTA-
	a clean coming the Add 5 hard water into
	and 3 or 4 drops of 5 ch will buffer woln
	coloured robuties against EDTA laken in lourette: The change from swine red to steel blue is end point. Repeat Tetration for comordent walks
	o of the second
	Determination of Total Hardness,
	Diffette out 20 ml of rample hard water in a clean contral flark. Add 5 ml of buffer roln. Add 3 or 4 drops of Eviochrome bluck Tendicator
	That the wine red rolution against 607s. Change
	of wine sed to steel blue is end point. Repedto
	Teacher's Signature:

# Boiled sample Hard Water - GD7/1 5012

	Santon	rest of Sources	Buscles Imilian		volume of	In dreases
		10/108 M		e de la companya della companya della companya de la companya della companya dell	Liver delle	COM
Section 100 Sections	2	2200	0	B	15	4000H

Nolume of GDIA consumed 2 Ame 46 Iml of GDIA, 20 mg to Co,

: V3 ED7D 2 20 x V3 mg GCO, - 7.8/2

The boiled hard mater rample in equivalent to permanent hardner = 20, x v, x cooping (a co,

= V2 x 1000 m 1 ando,

= 392. 15. Jus miles 10

Per muneral Hard ness = 392-15 ppm

 DOM5 Page No.
Experiment No Name :
 Climination of temposary Hardness:
The temporary hardnen of water rampe
= Total Hydners - Permanent Hardness
Determination of Permanent Handness:
Take 100 ml of hard water rample in a 250 ml
beaker and boil gently for atteast I hour, coul
beaker and boil gently for atleast I hour, coul Filler it into a 100 ml standard flask and
make the volume upto the mork take round of
this robuled and proceed libration in same way
The volume of GOTA used coresponds to the
permanent hardisen of the sample. Tem progression
hardnen is calculated by slibbiating the
permanent hordnen from total hordner
The state of the graphy of
RESULT:-
Total Hardness off sample hard water ?
Permyries of Sample hard water ?  Permyries Marchess of Sample hard water. >  Temprorary Marchess of sample hard water?
Temprorany Verdness of simple hard auter ?
Teacher's Signature: