A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A)
(Accredited by NAAC with 'B' Grade, Cycle 3)
KAKINADA – 533 002, EAST GODAVARI, A.P.

DEPARTMENT OF CHEMISTRY
FIELD TRIP TO *NATIONAL INSTITUTE OF HYDROLOGY*
KAKINADA
DATE: 04-05-2022

From
V. Mallikarjuna Sarma
Head, Dept. of Chemistry
ASD Govt. Degree College for Women
Kakinada

To
Principal
ASD Govt. Degree College for Women
Kakinada.

Respected Madam,

Sub: Request to grant permission for the field trip of III B.Sc cluster chemistry students to National Institute of Hydrology on **04-05-2022.**

With due regards, this is to bring for your kind perusal and consideration that as a part of curriculum the final year cluster students of B.Sc. Chemistry are planning to visit National Institute of Hydrology, Kakinada on **4th May 2022** to provide basic Research experience to the students.

In this connection, I request you to kindly grant the permission for the visit, so that the students will get benefitted.

Thanking you for your Consideration,

29/4/22
Principal
(Dr. V. Anantha Lakshmi)

Yours Sincerely
29/4/2022
V. Mallikarjuna Sharma

Annavaram Satyavathi Devi
GOVERNMENT DEGREE COLLEGE FOR WOMEN (AUTONOMOUS), KAKINADA
(Under Jurisdiction of Adikavi Nannaya University, Rajamahendravaram)
Re-accredited by NAAC with B Grade
Dr. V. Ananta Lakshmi M. Sc., Ph. D.,
Principal
Mobile: 99637 86386
email: jkcrjyec.asdkkd@gmail.com

Date: 30.04.2022

To

Dr. Y. R. Satyaji Rao
Scientist - F & Head
Deltaic Regional Centre,
NIH, Kakinada.

Sir,

Sub: Department of Chemistry – Request for permission to allow our students to pursue project work in your organization – reg.

I wish to submit the following few lines for your kind perusal.

We have 28 students pursuing B. Sc (Final year) who have chosen Chemistry as cluster subject in their VI semester. It is mandatory for every student to pursue, complete and submit one project in chemistry as a part of curriculum. The project report carries 50 marks in the evaluation. Our students have chosen a project entitled "Evaluation of quality parameters of water samples in the local area".

We came to know that National Institute of Hydrology is one of the premier organizations in Kakinada that take up projects in water analysis.

In this regard, I request you to support our students in pursuing the project on water analysis for one week from 04.05.2022 to 11.05.2022 in your organization.

The list of students is enclosed herewith.

Thank you.

V. Ananta Lakshmi

(Dr. V. Ananta Lakshmi)

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN (A), KAKINADA

DEPARTMENT OF CHEMISTRY

LIST OF STUDENTS PURSUING PROJECT WORK IN CHEMISTRY

S. No.	Regd. No.	Class	Name of the student
1	192009	III B. Sc (MPC)	M. Mani Ratna Mala
2	192015	III B. Sc (MPC)	R. Suguna
3	192010	III B. Sc (MPC)	K.Neela veni
4	192015	III B. Sc (MPC)	R.Naga lakshmi
5	192015	III B. Sc (MPC)	M.Mani priya
6	192015	III B. Sc (MPC)	A.Varshitha
7	192015	III B. Sc (MPC)	K.Mani kanta
8	192015	III B. Sc (MPC)	V.Jagadeeswari
9	192015	III B. Sc (MPC)	D.Ratnam
10	192015	III B. Sc (MPC)	K.Siva rani
11	192015	III B. Sc (MPC)	D.Mery
12	192015	III B. Sc (MPC)	P.Jyothi
13	192015	III B. Sc (MPC)	P.Jyothika
14	192015	III B. Sc (CZAQT)	M.Phaneedra
15	192015	III B. Sc (MPC)	V.Vasantha
16	192015	III B. Sc (MPC)	D.Reethu sri
17	192015	III B. Sc (MPC)	D.Bala sri
18	192015	III B. Sc (MPC)	D.Jyothi
19	192015	III B. Sc (MPC)	CH.Basaweswari
20	192015	III B. Sc (MPC)	T.Venkata sri durga
21	192015	III B. Sc (MPC)	S.Krupa sowndarya
22	192015	III B. Sc (MPC)	A.Jaya sri rama leela
23	192015	III B. Sc (MPC)	J.Uma devi
24	192015	III B. Sc (MPC)	G.Rajeswari
25	192015	III B. Sc (CBZ)	M.Malleswari
26	192015	III B. Sc (CBZ)	R.Mamatha
27	192015	III B. Sc (CBZ)	N.Ramya
28	192015	III B. Sc (MPC)	V.D.Reshma

Place: Kakinada
Date: 30.04.2022

V. Ananta lakshmi

(Principal)

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN (A) KAKINADA – DEPARTMENT OF CHEMISTRY

FIELD TRIP TO NIH, KAKINADA

4th MAY 2022

The department of chemistry, A.S.D. Govt. Degree College for Women (A) kakinada has organized a field trip to National Institute of Hydrology, kakinada. Mr. V. Mallikarjuna sharma, head, dept. of chemistry, conceived the idea of executing a project in NIH, kakinada for chemistry cluster students. Around 29 students did their final year cluster project on "Analysis of chemical parameters of water."

III B.Sc Chemistry cluster students field visit to NIH, Kakinada.

Dr. Vijay, Scientist-B, NIH, Kakinada demonstrating the brief history of NIH.

A.S.D. Government Degree College for Women (A)
Kakinada

Dept. of Chemistry - field Trip to NIH

Date: 04/05/2022

A POSE BY THE FACULTY OF DEPARTMENT OF CHEMISTRY IN FRONT OF NATIONAL INSTITUTE OF HYDROLOGY KAKINADA.

from left to right: Dr. S. Priyadarshini, Mr. Vijay kumar, Mr. V. Mallikarjuna sharma, Dr. K. Jhansi Lakshmi and Ms. P. Leena.

FEEDBACK

Department of Chemistry

G.H.V.L Phaneendra.
III B.Sc Aquaculture
Technology

Visit - National Institute of Hydrology
Deltaic, DRC

from 4-5-2022 to 6-5-2022 we went to the feild trip on behalf of A.S.D. Govt. Degree college to NIH.

Feedback :-

- Firstly we thankful to sir satyaji rao, Scientist G. for allowing us to learn.
- I am very greatful to learn from Vijay Kumar sir (Scientist -B)
- Now I am able to know which water is better to drink and what are the elements and physicochemical parameters are there in water.

G.H.V.L. Phaneendra,
III B.Sc Aquaculture
Technology,
A.S.D. Govt. Degree college,
Jaganaickpur, Kakinada.

Feedback

Department of chemistry

K.Manikanta
III B.sc Mpc

visit - National Institute of Hydrology
(NIH)

Go to field trip on 4/5/22 wednesday visiting national Institute of Hydrology. To learn about water analysis.

We learn Testing physical and chemical parameters of water. It is a very good Experiance by visiting National Institute of Hydrology.

Scientist-B VIJAY KUMAR Sir give very good lecture about water Analysis. He Explained very detailed about water resources and water analysis.

We learn laboratory Equipments, water testing etc.. This trip is very useful to our future.
It is Best Experience..

K.Manikanta
III B.sc Mpc (E.M)
A.S.D WOMEN's college
Jaganaickpur
Kakinada

Department of Chemistry :-

feed back.

1).S.D. GOVT DEGREE COLLEGE WOMEN [A]

Name :- M. malleswari.

Group :- III B.Sc CBZ.

from 4-5-22 to 6-5-22. on behalf of A.S.D.Govt degree college, we went to the field trip to "National institute of hydrology" Gudariguntha.

feedback :-

=> we learnt the physical and chemical parameters of water.

=> The scientists are very cooperative and Explained about all the parameters.

=> They also Explained about the technique of conversion of ground water or waste water into drinking water.

=> uses of ground water,

=> Surface water

=> Rain water.

=> We also learnt the techniques to detect the sodium by the method flame photometer

=> detection of the Nitrate by the spectrophotometer.

=> we felt pleasure by learning all the above techniques.

M. Malleswari

Department of chemistry
chemistry feedback

Name :- V. Jagadeeswari
class :- III Bsc
section :- MPC R.NO:-193101
group :- Mpc (chemistry)

Visiting - National institute Hydrology (NIH)
Kakinada.

ది. 4/05/2022 తేదిన NIH ఫీల్డ్ ట్రిప్ కు వెళ్ళాము. మా కాలేజ్ A.S.D. government college for women's, kakinada Department of chemistry తరుపున వెళ్ళాము.

NIH ద్వారా చాలా బాగా తెలుసుకోన్నాము. అక్కడ T. vijay sir (scientist - B) మాకు water samples కోసం, వివరించి నేర్పించారు. water కోసం మాకు చాలా బాగా భూగర్భజలాన్ని, సముద్ర జలాన్ని ఎలా శుభ్రం చేస్తారో, ఎలా వాడుకోవాలో, ప్రపంచలో జలాశాతాం, వర్షం నీటిని ఎలా వాడుతారాని కూడా మాకు చాలా బాగా వివరించారు.

physical parameter's ద్వారా నీటిలో pH, Do, Electric current, TDS, salinity, Temperature ఎలా చూడాలో కూడా vijay sir చేసి, మాతో కూడా చేయించారు. నాకు అయితే చాలా బాగా నచ్చాయి. నేను చాలా నేర్చుకోన్నాను. నాకు తెలియనివి కూడా చూసి, నేర్చుకోన్నాను. physical parameters and wether observation's నాకు బాగా నచ్చాయి. వాటిని ఎలా చూడాలో, చేయ్యాలో కూడా చూసి నేర్చుకోన్నాను. NIH ద్వారా నేను చాలా నేర్చుకోన్నాను చాలా ఆనందంగా చూసి నేర్చుకోన్నాను.

V. Jagadeeswari
III BSC (mpc)
Cluster Chemistry

A.S.D. Govt college for women (A)

Department of chemistry

Name :- M. Mani Ratna Mala
Group :- III, Bsc (Mpc)
Regd No :- 1931011

Visit :- National Institute of Hydrology (NIH)
the Deltaic Regional center (DRC)

Date :- 4/5/22 Wednesday

on 4/5/22 Wednesday from A.S.D govt college. chemistry students visit NIH as a field trip to learn water Analysis.

In NIH we saw a pleasant environment. By the guidness from sir. vijay of water and gain lot of knowledge about water sources.

we take water samples from ground water and the water is tested by multi parameter we take the pH, E-C, TDS, sality of water.

sir. vijay give the detailed information about the ~~tta~~ laboratory equipments By this trip we learn so many things. this trip is very useful for the farther projects thanks to our HOD V.M. sharma sir and lectures of chemistry department

M.M.R.Mala

A.S.D. Govt college for Women (A)
Department of chemistry

Feed back on Field trip

Name: Relangi. Suguna
Group: III BSC MPC.
RegdNO: 1931015

Visit :- National Institute of Hydrology (NIH)
The Deltaic Regional center (DRC)

Date :- 4/5/22 Wednesday.

On 4/5/22 Wednesday From A.S.D govt college. chemistry students visit NIH as a field trip To learn water analysis.

In NIH We saw a pleasant Environment. By the guidness from Sir. vijay (Scientist B) we learn testing physical parameters of water and gain lot of knowledge about water sources.

We take water samples from ground water and The water is tested by multi parameter we take the pH, E.C, TDS, sality of water.

Sir. vijay give the detailed information about the laboratory Equipments By this trip we learn so many things. This trip is very useful for the farther projects. Thanks to our HoD V.H.Sharma sir and lectures of chemistry Department.

R. Suguna.

A S.D.GOVT.DEGREE COLLEGE(W), KAKINADA

DEPARTMENT OF CHEMISTRY

స్త్రీవిద్యాప్రవర్ధతాం

STUDENTS WHO ATTENDED IN THE PROGRAMME

Sl.No.	Signature of the Student	Sl.No.	Signature of the Student
1	1931035, P.Jyothi	20	1933002. Sk Kariyluna
2	2131001, S.P.S.S.M.Nirmala	21	1933005; D.Eswarikumari
3	1931039, R.Pushpalatha	22	1933024 ~~[illegible]~~; K.Rajeswari
4	1931034; M.Padma Sri	23	1933015 Ch.Sai lakshmi
5	1931040; R.Padma	24	1933011 S.Nagasatya
6	1931046; Y.Akhila.	25	1933004 - b.Pb-therise
7	1931036, P.Jyothika	26	1933018. D.Jelatya
8	1931042; T.venkata sridurga	27	1933016 .Ch.manasa
9	1931031; K.Durga Bhavani.	28	1933017 D.Sravani
10	1931038; P Sai Devi	29	1933019 – D.Sivamma
11	1931033, K. Sameera	30	1933014 – Ch.kumari
12	1931041, S.karuna.	31	1933021 - G.Prema Jyothi
13	1931044, v.leela Malleswari	32	1933001 – SK.Basheer.
14	1931011, M.Mani Ratna Mala	33	1933003 - A.Devi.
15	1931002 A.S.N.S.S.vaishika.	34	1933008 M-Malleswari
16	1931008 K.Manikanta	35	1933023 G.Anjali Devi
17	1931007 K.Neelaveni	36	1933020 D.Mahalakshmi.
18	1931001 R.Nagalakshmi	37	1933007 M.sobhi
19	1933006 L.Priyanka.	38	

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN
(A), KAKINADA - 533002, EASTGODAVARI, ANDHRA PRADESH

DEPARTMENT OF BOTANY & HORTICULTURE

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN
(A), KAKINADA - 533002, EASTGODAVARI, ANDHRA PRADESH

WORKSHOP ON PLANT PROPAGATION TECHNIQUES

DEPARTMENT OF BOTANY & HORTICULTURE

ACTIVITY REGISTER FOR THE MONTH OF FEBRUARY 2022

Title of the Activity	Workshop on "Plant Propagation Techniques in Nurseries"
Date	24-02-2022
Conducted by	Department of Botany & Horticulture
Nature of Activity	Workshop is being conducted and Mr.Raju Managing Director of Veeralakshmi Nursery, Kadiyam acted as a resource person
Number of Students Participated	100
Brief Report on the Activity	Mr. M.Raju M.Sc.,Horticulture M.BA , Managing Director of Veeralakshmi Nursery, kadiyam acted as a resource person and gave hands on experience on various propagation techniques like cuttings, Grafting & Layering to the students in the workshop
Name of the Lecturer who planned and conducted the Activity	Ms. K.N.V.S.N.Eswari Dr.M.Sulakshana Smt.N.Pushpa
Signature of the Dept. Incharge / Convenor of the Committee	
Signature of the Principal	
Remarks	

Mr. V.Raju. Managing Director of Veeralakshmi Nursery , kadiyam demonstrating the techniques of Propagation to the students in the workshop 24|2|22

S.No	Name of the Student	Group	SIGNATURE
	S.Ramya Sri	III CBZ E.M.	S. Ramyasri
2.	Ch.Swathi Sri	III CBZ E.M.	Ch. Swathi Sri
3.	O. Guna Sri	III CBZ E.M.	O.Guna
4.	S.Srilatha Durga	III CBZ E.M.	S. Srilathadurga
5.	K.Usha Satya Swaroopa Rani	III CBZ E.M.	K.Usha Satya Swaroopa Rani
6.	P.Himabindhu	III CBZ E.M.	P.Himabindhu
7.	P.Aparnamanogna	III CBZ E.M.	P.Aparnamanogna
8.	K.Vijaya Durga Bhavana	III CBZ E.M.	K.Vijaya Durga Bhavana
9.	V. Anjali	III CBZ E.M.	V. Anjali
10.	P.Chandini Devi	III CBZ E.M.	A Anjali
11.	V. Indhu Priya Darshini	III CBZ E.M.	V.Indupriya
12.	P.Kusuma	IIICBZ E.M.	P. Kusuma
13.	P.Meghana	IIICBZ E.M.	P. Meghana
14.	P.Manasa	IIICBZ E.M.	P manasa
15.	G.Sandhya Rani	III CBZ E.M.	P.Manasa
16.	A. Teja Sri	IIICBZ E.M.	A.Teja Sri
17.	P. Kavya Varshini	IIICBZ E.M.	P. Kavya varshini
18.	K.Meenaskshi	IIICBZ E.M.	K. meenakshi
19.	K. Ramya	IIICBZ E.M.	K. Ramya
20.	P.Bhargavi	IIICBZ E.M.	P.Bhargavi
21.	J.Lovakumari	IIICBZ E.M.	J.Lovakumari
22.	G.Varalakshmi	IIICBZ E.M.	G.varalakshmi
23.	N.Jyothi	IIICBZ T.M.	N.Jyothi
24.	K.V.V.Satyaveni	IIICBZ T.M.	K.V.V.Satyaveni
25.	Y.Pravalika	IIICBZ T.M.	Y.Pravalika
26.	G.Nagabhanumathi	IIICBZ T.M.	G.Nagabhanumathi
27.	M. Srilekha	IIICBZ T.M.	m.Srilekha
28.	Y.Ramani	IIICBZ T.M.	Y. Ramani
29.	G.Harika	IIICBZ T.M.	G.Harika.
30.	K.Satyasai Lakshmi	IIICBZ T.M.	K.satyasaiLakshmi
31.	Y.Sridevi	IIICBZ T.M.	Y. Sridevi
32.	M.Keerthi	IIICBMB	M.keerthi
33.	Sk.Museera	IIICBMB	Sk.museera
34.	Jyothi	IIICBMB	Jyothi
35.	Chinnathalli	IIICBMB	Chinthali
36.	Bibijan	IIICBMB	Bibijan

37.	Nagaparvathi	IIICBMB	Nagaparvathi
38.	M.Ramyajoy	III CBHT	M.Ramya Joy
39.	R.Dedepiya	III CBHT	R.Dedepiya
40.	P.Akhila	III CBHT	P.Akhila
41.	L.Raveeena	III CBHT	L.Raveena
42.	B.Dhanavenkata Lakshmi	III CBHT	B.Dhana
43.	Y.Manisha	III CBHT	Y.Manisha
44.	A.Jhansi	III CBHT	A.Jhansi
45.	M.Suma	III CBHT	M.Suma
46	P.Meher Gayatri	III CBHT	P.meher Gayatri
47	K.Kavitha Kalyani	III CBHT	K.kavitha
48	P.Naga Lakshmi	III CBZ	P.Naga lakshmi
49	P.Devisri	III CBZ	P.Devisri
50	S.Yamini	III CBZ	S.yamini
51	K.Divya	III CBZ (T.M)	K.Divya

me of the Students	Red no	Group	Signature.
Ch. Devi	2033005	II CBZ (T.M)	Ch. Devi
N. Jyothi	2033019	II CBZ T.M	N. Jyothi
M. Srilekha	2033018	II CBZ T.M.	M. Srilekha
K. v. v satyaveni	2033016	II CBZ T.m	K.V.V. Satyaveni
K. Satya Sai lakshmi	2033012	II nd CBZ (TM)	K.S.S. Lakshmi.
Y. V. Ramani	2033029.	II CBZ (T.M)	Y.V. Ramani
Y. Sridevi			
N. Asha.			
R. Uma Satya Tejaswini	2033024	II CBZ T.M	R.U.S Tejaswini
G. Bhanu mathi			
Ch. Keerthi	2033004	II CBZ (T.M)	Ch. Keerthi
K. Veera sunitha.	2033013	II CBZ (T.M)	K. Veera sunitha.
E. Anusha	2033008	II CBZ (T.M)	E. Anusha.
R. Renuka	2033025	II CBZ (T.M)	R. Renuka
P. kasturi	2033003	II CBZ (T.M)	P. kasturi
G. Haneesha	2033	II CBZ (T.M)	
D. suseela		II CBZ (T.M)	

PITHAPUR RAJAH'S GOVT.COLLEGE
An Autonomous Institution Accredited By NAAC At Grade 'A' (3.17 CGPA)
(Affiliated to Adikavi Nannaya University, Rajamahendravaram)
Opp. Mc. Laurin High School, Raja Rammohanroy Road,
KAKINADA - 533 001, E.G.Dt., Andhra Pradesh, India.

Dr. B.V. TIRUPANYAM., Ph.D
PRINCIPAL

Mobile : 91777 86215
Fax & Phone : 0884 - 2387888 (P)
Ph : 0884 - 2379480 (O)

Date -/2/2022...............

To
The Principal,
A.S.D. Govt Degree College for Women (Autonomous),
Kakinada.

Madam,

Sub: PRGC(A)-Student Exchange Programme 2022-II B.Sc. Aquaculture Technology girl students-Allotment for Classwork to A.S.D. Govt Degree College for Women (Autonomous)-Reg.

Ref: 1) Terms of MoU as agreed upon in the meeting held on 3/2/2022 in the Principal's Chamber of A.S.D. Govt Degree College for Women, Kakinada
2) Letter of HOD of Zoology& Aquaculture, PRGC (A), dated11/2/2022 submitting the list of girl students for Student Exchange Programme

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This is to inform you that Department of Zoology & Aquaculture of our College has come forward to send its II B.Sc. Aquaculture Technology students to your College under 'Student Exchange Programme' from 16/2/22 to 23/2/22. The list of students who are allotted for classwork to your college, along with their phone numbers and also syllabus to be covered by your faculty is attached herewith as Annexure-I.

I thank you whole-heartedly for extending full cooperation in fulfilling the responsibilities of our MoU.

Note: For the smooth conduct of this 'Student Exchange Programme', Lecturer in Zoology of our College, Dr.B.Elia will coordinate with the 'Coordinator' of your College. He can be contacted on his mobile 9441715670.

Thanking you,

Yours sincerely,

B.V.Tirupanyam
Dr.B.V.Tirupanyam
12 Feb 2K22

---Copy to the Academic Coordinator, PRGC (A)
---Copy to the IQAC Coordinator, PRGC (A)

PRINCIPAL
P.R.Govt. College (A)
KAKINADA

List of students for Student Exchange Programme

B.Sc. CZAC - II yr

S.No.	Name of the Student	Student Ph. Number	Parent Ph. Number
1	P. Maha Lakshmi	7093564328	8374997295
2	V.S.L. Sailaja	8317511825	9494105716
3	Y. Rajeswari	9701257508	8074512026
4	K. Jaya Harika	9494104823	6300191767
5	N. Rikhitha Sai Lakshmi	9110329491	9390711726
6	J. Sri Devi	6304176374	9666379096
7	Y. Harathi	8919984242	8374119552
8	P. Gayathri	9398695684	9381106870
9	A.Devi	7013083066	9505548743
10	S. Ramya Sri	7013509857	6302857929
11	P. Yeshika Sharon	7386144693	6300773060
12	M. Shruthi	7981975202	9493064128
13	M. Niharika Devi	8919606154	9493651853
14	K. Lavanya	9441591722	9491872274
15	P. Jhansi	7382128353	9030737143
16	S. Lakshmi Anjali	7032466816	7661996367
17	G. Yestheru Rani	9133671477	9133671477
18	A.Manju Lakshmi	9032819591	9866705951

B. Chakravarthi
Lecturer in Charge

भारतीय गैर न्यायिक

एक सौ रुपये

Rs. 100

रु. 100

ONE HUNDRED RUPEES

सत्यमेव जयते

भारत INDIA

INDIA NON JUDICIAL

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DB 012814

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No 5099 Rs 100/- 15.02.2022

Princ P.R. Govt College (Autonomous) Kakinada

Memorandum of Understanding (MoU)

(Non-Commercial)

For

Educational Partnership to Enhance Research and Life skills of students through Student and Faculty Exchange Programme

Between

Department of Zoology

ASD Government Degree College for Women (Autonomous)

Kakinada

&

Department of Zoology

P.R.Government College (Autonomous)

Kakinada

MEMORANDUM OF UNDERSTANDING (MoU)

(Non-Commercial)

Between

Department of Zoology

ASD Government Degree College for Women (Autonomous)

&

Department of Zoology

P.R.Government College (Autonomous), Kakinada

Kakinada

For

Educational Partnership to Enhance Research and Life skills of students through Student and Faculty Exchange Programme

1. Parties:

This Memorandum of Understanding (hereinafter referred to as "MoU") is made and entered into by and between the

Department of Zoology

ASD Government Degree College for Women (Autonomous), Kakinada

(**hereinafter Party 1**)

And

Department of Zoology

P.R.Government College (Autonomous), Kakinada (**hereinafter Party 2**)

2. Purpose:

The purpose of this MoU is to promote and enrich Teaching and Learning process and also research activity between the two Parties and possible placement of the UG/PG students of Party 1 and for the absorption of quality instructors for the Party 2.

3. Terms of MoU:

This MoU is effective upon the day and signed and will be executed by the parties from--16 Feb'--2022 and shall remain in full force and effect for not longer than 2 years.

This MoU may be terminated without cause by either party upon two months written notice, which notice shall be delivered by hand or by certified mail to the address listed above.

4. Responsibilities of Parties

Both the Parties found it mutually beneficial to explore cooperative activities for the following purposes:

------Collaboration in research activities

------Support the development of an ecosystem in learning and innovation to Promote entrepreneurial skills

------Sharing the knowledge resources and infrastructure facilities

------OrganizingJointSeminars/Conferences/Training programmes/Meetings/any other related academic activity

------Curriculum Design

------Text book Production

------Developing e-content

------Faculty Exchange

------Guest Lectures/Workshops for students and faculty

------Student Exchange Programmes

------Extension of support to run Certificate courses

5. Financial Arrangement

This MoU is non-financial and non-exclusive in nature, and does not create binding financial or legal obligations on either of the two Parties. Nor does it prohibit both participants from entering into separate agreements as an outcome of this MoU.

6. Disputes

Any disputes about the interpretation or application of this MoU will be resolved by consultations between the two Parties

7. Intellectual Property

Both the Parties have decided that neither Parties will acquire any rights to the intellectual property of the other Party under this MoU.

5.Signatures

In witness where of the parties to this MoU through their duly authorized representatives have executed this MoU on the days and dates set out below, and they have read, understood, and agree to the terms and conditions of MoU as set forth herein.

The effective dates of this MoU are the date of signature last affixed to this page.

Party 1: **Department of Zoology** Party 1 Representative: **Sri.B.Chakravarthi** Designation: **Head of the Department-Zoology& Aquaculture** Address: **P.R. Govt College (Autonomous), Kakinada 533001, AP.** Mobile: 9492299446 E-mail:zoology_dept@prgc.ac.in	Party 2: **Department of Zoology** Party 2 Representative: **Smt.M.Vasantha Lakshmi** Designation: **Head of the Department-Zoology** Address: **ASD Govt Degree College for Women, Jagannaickpur, Kakinada-533002, AP.** Mobile: 8309677943 E-mail:

Party 1: Signature

LECTURER - INCHARGE
DEPT. OF ZOOLOGY & AQUACULTURE
P.R.GOVT (A) COLLEGE
KAKINADA

Party 2: Signature

Lecturer-in-Charge
DEPARTMENT OF ZOOLOGY
A.S.D. GOVT. COLLEGE FOR WOMEN
KAKINADA-2

On behalf of P.R. Government College (Autonomous), Kakinada, East Godavari district, AP B.V.J. 16 Feb 2022 The Principal P.R.Government College (Autonomous) Kakinada PRINCIPAL P.R.GOVT.COLLEGE (Autonomous) KAKINADA-533 001 Place: DATE: Seal: Date	On behalf of ASD Government Degree College for Women (Autonomous), Kakinada, East Godavari district, AP 16/2/2022 The Principal ASD Government Degree College for Women (Autonomous) Kakinada PRINCIPAL A.S.D.GOVT.DEGREE COLLEGE (W) AUTONOMOUS KAKINADA Place: DATE: Seal:

ASD GOVT DEGREE COLLEGE FOR WOMEN (A), KAKINADA
DEPARTMENT OF ZOOLOGY AND AQUACULTURE TECHNOLOGY

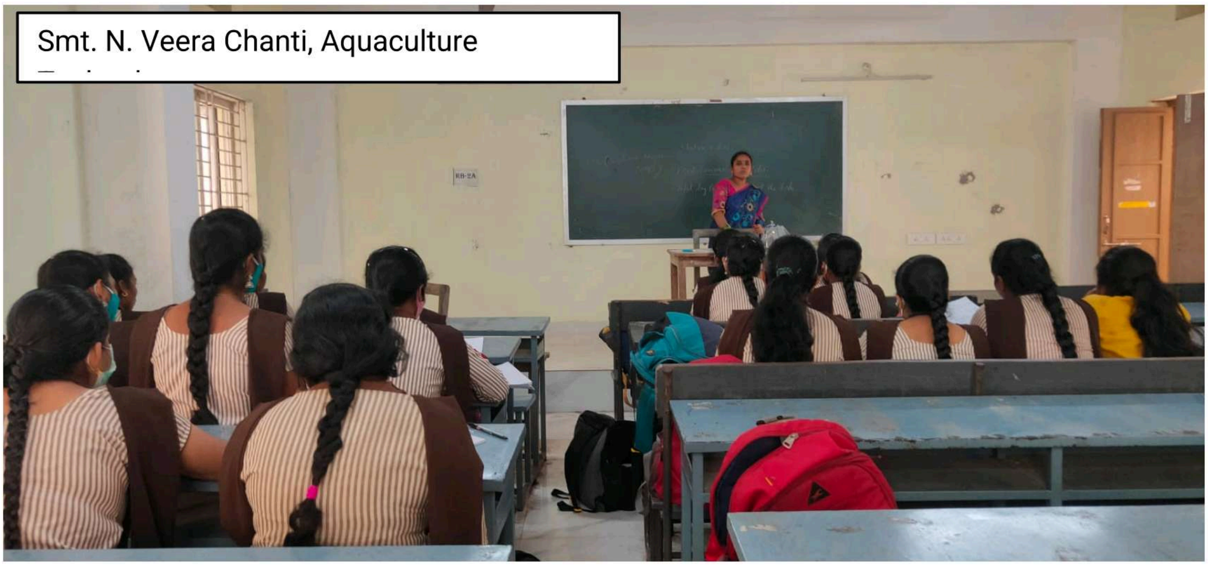
MOU- STUDENT EXCHANGE PROGRAMME 2021-2022

The Department of Zoology & Aquaculture Technology has conducted a student exchange programme from 16-02-2022 to 23-02-2022 as a part of MoU between ASD Government Degree College for Women (A) and P.R Government College (A) Kakinada. 36 students (II CZAqT) of both colleges have participated in the programme. II CZAqT students of PR Government College (A) Kakinada have attended classes at our college and II CZAqT students ASD Government Degree College for Women(A), Kakinada have attended classes at PR Government College (A) Kakinada. The Department has arranged a field trip to the State Institute of Fisheries Technology (SIFT), Kakinada on 19-02-2022 and 22-02-2022 (Two days) for PR Government College(A) students to expose them to the latest diagnostic tools and techniques used in Aquaculture in assessing various quality parameters. The students visited PCR lab, Microbiology lab, Soil analysis lab, Feed analysis lab and Water analysis lab. Sri K. Chalapathi, FDO, SIFT has explained working mechanism of machinery used in these labs. Students visited Aquaria maintained at SIFT and acquainted themselves with aquarium maintenance and different types of ornamental fish. They also visited museum and observed different types of culture and capture fishery.

Objective of the programme is to expose the students to different teaching–learning methodologies adopted by the faculty of both the colleges and to develop adaptive behaviour among the students.

MOU between ASD Government Degree College for Women, (A) and PR Government College (A) Kakinada and Inauguration of Student Exchange Programme at Seminar Hall of PR Government College (A) Kakinada.

Faculty members engaging classes for PR Government College students.

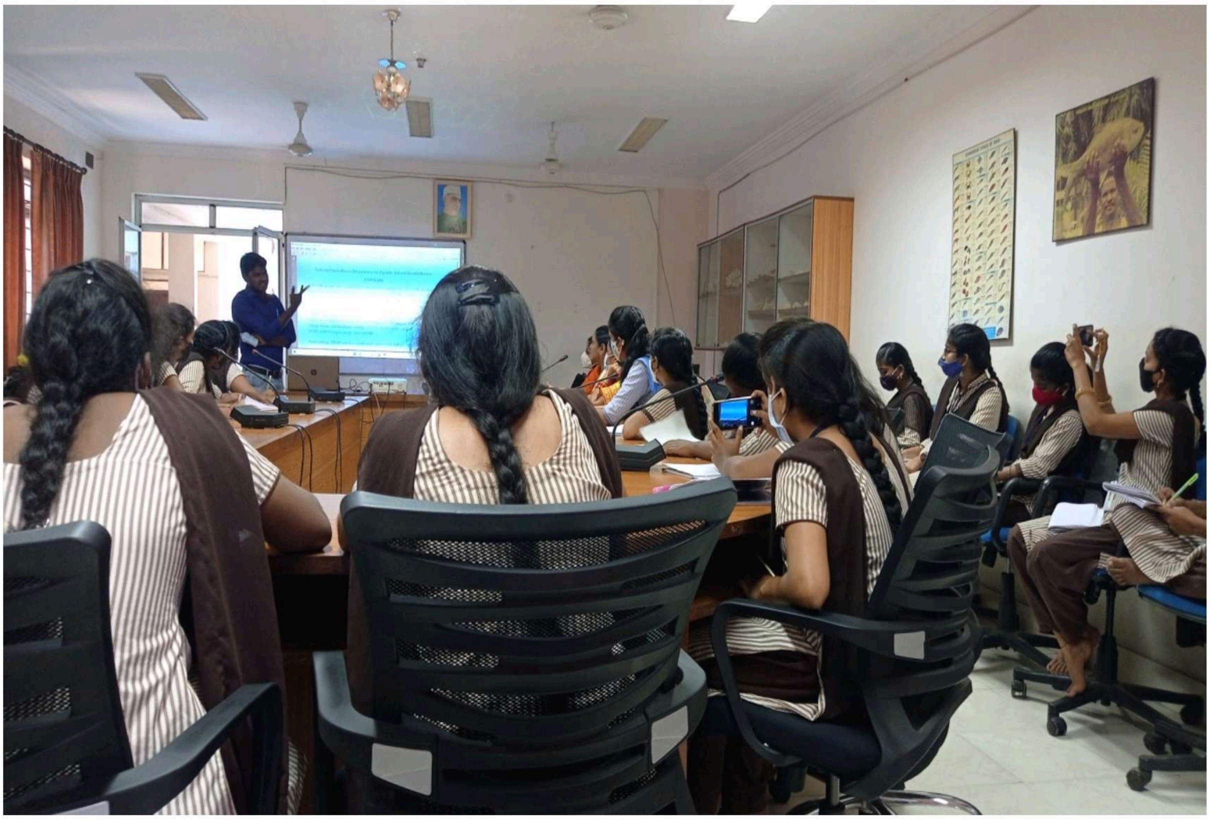


Smt. N. Veera Chanti, Aquaculture

Smt. S. Madhavi, Lecturer in

Smt. P. Sanjotha, HOD of

Field Visit to SIFT, Kakinada



Sri. K. Chalapathi, FDO, SIFT, Kakinada explaining about the activities of SIFT and opportunities in aquaculture industry.

PCR

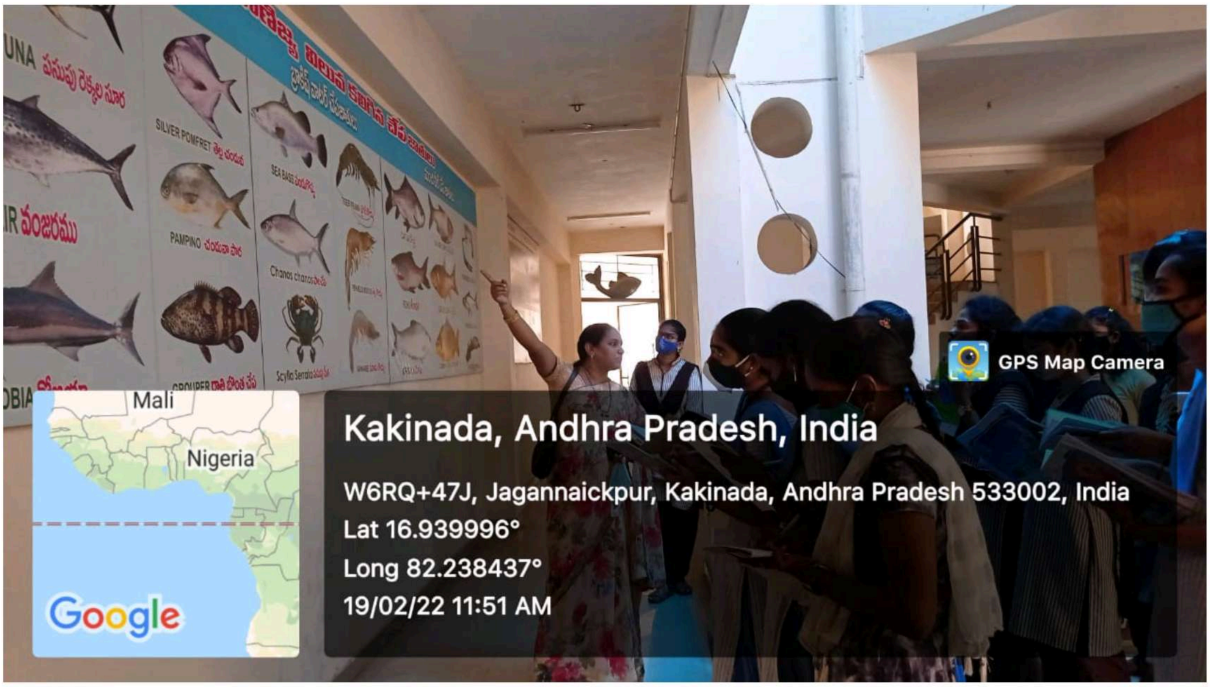
Students Learning about the mechanism of HPLC

Water Analysis

Microbiology Lab

Observing Ornamental Fish in

Visit to SIFT museum



Valedictory session of Student Exchange Programme conducted at ASD Government Degree College for Women(A), Kakinada

Principals, Staff & students of Zoology departments of both ASD Government Degree College for Women, (A) and P.R Government College (A) Kakinada with certificate of student Exchange Programme.

From
The Principal,
A.S.D.Govt Degree College for W (A),
Kakinada.

To
Principal,
State Institute of Fisheries Technology,
Kakinada.

Sir,

Sub: A.S.D.Govt Degree College for Women [A], Kakinada - Department of Aquaculture Technology- Permission to conduct project work for III B.Sc (CZAqT) Semester VI (2021-22) Students -at State Institute of Fisheries Technology, Kakinada - Requested - Regarding.

With reference to the subject cited, I bring to your kind notice that III B.Sc Aquaculture Technology students have project work in paper titled '**QUALITY CONTROL IN PROCESSING PLANTS'** in the VI semester for 50 marks. in this connection I request you to permit our **17** III B.Sc (C.Z.AqT) students to carry out the project work at your Institute in the month of March or April 2022.

Thanking you sir,

Yours sincerely

Enclosure: List of students and project titles.

V. Ananta lakshmi 22/2/22

PRINCIPAL
A.S.D.GOVT.DEGREE COLLEGE F
AUTONOMOUS
KAKINADA

ASD Govt. Degree College for Women (A) Kakinada

Department of Aquaculture Technology

The following students are interested to carry out the project work as mentioned below.

S.No	Roll No.	Name of the student	Name of the project
1.	192205	K. Sai Lalitha	Water and soil analysis
2.	192206	A. Santhi Rupa	Water and soil analysis
3.	192207	M. Suguna	Water and soil analysis
4.	192209	M. Bharathi	Water and soil analysis
5.	192210	M. Chandini	Water and soil analysis
6.	192211	L. Durga Bhavani	Water and soil analysis
7.	192212	G.H.V.L Phaneendra	Water and soil analysis
8.	192213	M. Lakshmi	Water and soil analysis
9.	192214	B.N.D Lakshmi	Water and soil analysis
10.	192215	Ch. Harshitha	Water and soil analysis
11.	192216	V. Keerthana	Water and soil analysis
12.	192217	P.K.Ch Kumari	Water and soil analysis
13.	192218	P. Pushpa Latha	Water and soil analysis
14.	192219	D.Srivani	Water and soil analysis
15.	192221	P.Suguna kumari	Water and soil analysis
16.	192222	N. Usha Rani	Water and soil analysis
17.	192223	B. Vennisha Rani	Water and soil analysis

Principal 22/2/22

PRINCIPAL
A.S.D.GOVT.DEGREE COLLEGE (
AUTONOMOUS
KAKINADA

ASSESSMENT OF PHYSICO-CHEMICAL PARAMETERS OF GODAVARI CANAL WATER AT KOVVURU PANCHAYATI, KAKINADA

PROJECT SUBMITTED FOR THE DEGREE OF B.Sc., CZAqT

By

G. H. V. L. PHANEENDRA
B.Sc., CZAqT
Reg. No: 1936005

ASD Govt. Degree College for Women, Kakinada
స్త్రీ విద్యా ప్రవర్ధతాం

Project Guidance by

(Smt. M. Vasantha Lakshmi)
Project Co-Guide

(Smt. N. Veera Chanti)
project Guide

<u>Project Submitted to</u>

EPARTMENT OF ZOOLOGY & AQUACULTURE TECHNOLOGY
.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A), KAKINADA

2021-2022

Regd. No: 1936005

CERTIFICATE

This is to certify that **G. H. V. L. Phaneendra** is a student of III year B.Sc., Aquaculture Technology and has done the project entitled **"Assessment of Physico- Chemical Parameters of Godavari canal water at Kovvuru Panchayati, Kakinada"** in the Dept. of Zoology and Aquaculture Technology, A.S.D. Govt. Degree College for Women (A), Kakinada during the academic year 2021-2022 under our supervision.

(Smt. M. Vasantha Lakshmi)

Project co-Guide

Dept. of Aquaculture Technology,
A.S.D. Govt. Degree College (W) (A)
KAKINADA

(Smt. N. Veera Chanti)

Project Guide

External examiner

DECLARATION

I **G. H. V. L. Phaneendra** III B.Sc, CZAqT to hereby declare that the project entitled **"Assessment of Physico- Chemical Parameters of Godavari canal water at Kovvuru Panchayati, Kakinada"** is an authentic record of project work done by me under the guidance of Smt. N. Veera Chanti, Lecturer in Aquaculture Technology and Smt. M. Vasantha Lakshmi, Head Dept. of zoology, A.S.D.Govt.Degree College for Women (A), Kakinada. This work has not been submitted for the award of any other degree or diploma earlier.

G. H. V. L. phaneendra

Signature

CONTENTS

ABSTRACT

In present study Physico-Chemical parameters such as, pH, Electrical conductivity, Total dissolved solid, Total hardness, Total alkalinity, dissolved oxygen, salinity, ammonia, nitrate, Calcium and Magnesium ions of Godavari canal water samples were analyzed. Samples were collected weekly from 19-03-2022 to 19-4-2022.

INTRODUCTION

Water is the most vital factor for the existence of all living organisms. Discharge of domestic waste and sewage without any treatment into the water bodies has resulted in deterioration of the quality of aquatic habitat. Indiscriminate discharge of industrial effluents is toxic to the aquatic environment, creates water pollution, making water unfit for drinking, agriculture and for aquatic life. The World Water Assessment Program indicates that, in the next 20 years the quality of water available to everyone is predicted to decrease by 30%.

Monitoring and Assessment with the help of water quality analysis techniques provide basic information on the condition of our water bodies. The availability of good quality water is an indispensable feature for preventing diseases and improving quality of life. It is necessary to know information about different Physico-Chemical Parameters before it is used for different purposes. In developing countries such as India the most of the rivers E.g., Godavari, Ganga etc., are the ends of effluents and sewage discharge from urban as well as industrial areas.

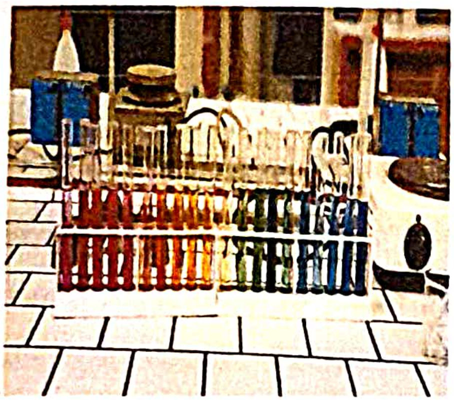
The objective of the present study has been considered, to evaluate the Physico-Chemical Parameters of Godavari canal water (upstream and downstream) at Kovvuru Panchayati, Kakinada.

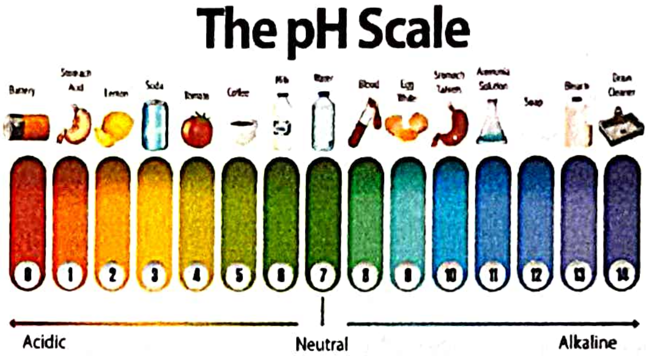
MATERIALS AND METHODS

The Godavari canal selected for the present investigation originates in Kovvuru at Kakinada in Andhra Pradesh.

pH:

The pH of the water sample is identified with the help of Digital pH meter.or by using 2 drops of universal indicator in 10 ml of sample then it generates a new color. By comparing the color with the pH scale, one can find the pH of the sample.





SALINITY:

Salinity of the sample was funded by using a Refract meter. Determination of salinity, as the total measure of inorganic dissolved matter, is by evaporation of the water and weighing of the residue. This is a difficult process because some carbon dioxide and hydrogen chloride escape during the evaporation process and corrections must be made for this. Furthermore, at sea, these methods involving weighing cannot be used. So the methods to be applied in it have to be indirect ones.

ELECTRICAL CONDUCTIVITY (EC).

EC is measured by using TDS conductivity meters. When the electrode is placed in the sample the reading can be seen in the digital meter. And note down the reading.

TOTAL DISSOLVED SOLIDS (TDS):

TDS is measured by using a TDS conductivity meter. When the electrode is placed in the sample it can be seen in the digital meter. And note down the reading.

TOTAL ALKALINITY (TA):

Procedure: Take 10ml of sample in conical flask then add 2 drops of phenolphthalein indicator. If the sample turns to pink (CO3 hardness) and then nitrate with N/50 sulphuric acids until it turns to colourless and then add 2 or 3 drops of Methyl orange indicator(sample turns to yellow) then nitrate with N/50 sulphuric acids then sample turns to light orange . Then note down the burette reading and apply it in the formula.

Alkalinity=Burette reading ×1000/volume of sample taken

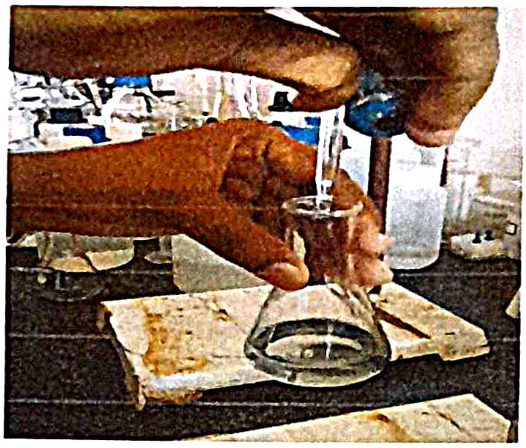
TOTAL HARDNESS (TH):

The calculation of hardness in water by EDTA titration can be found by adding a small amount of a dye such as Eriochrome Black T is added to an aqueous solution containing Ca++ and Mg++ ions at a pH of 10 ± 0.1, Ca++ and Mg++ form chelated complexes of wine red color with EBT.

But EDTA has a stronger affinity towards Ca++ and Mg++. Hence, if EDTA is added, the former complex (Ca-EBT and Mg-EBT) is broken and a new complex (Ca-EDTA and Mg-EDTA) of blue color is formed. When all the ions are complexed the solution will turn blue. This is the endpoint of the titration. The higher the pH, the sharper the endpoint.

However, above pH 10 there is a danger of precipitation of CaCO3 and Mg(OH)2. Hence the pH is fixed to 10 ± 0.1. The sample is diluted with distilled water to reduce the concentration of Ca++ and Mg++ ions.

. Alkalinity=Burette reading ×1000/volume of sample taken.



DISSOLVED OXYGEN (DO):

Dissolved oxygen levels can be measured by a basic chemical analysis method (titration method), an electrochemical analysis method (diaphragm electrode method), and a phytochemical analysis method (fluorescence method). The diaphragm electrode method is the most widely used method.

Titration Method

- Winkler's Method

Add a manganese peroxide solution and a sodium hydroxide solution to sample water, and a precipitate of manganese hydroxide (II) will be produced. This precipitate of manganese hydroxide (II) reacts with dissolved oxygen in the water and is oxidized according to the amount of DO, forming a brown precipitate.

If DO is not present: White precipitate
If it reacts with DO: Brown precipitate

Dissolve this brown precipitate in an acid in the presence of iodine ions (I-), and iodine (I2) will be released according to the amount of DO. Then, titrate the released iodine (I2) with sodium thiosulfate and determine the quantity.

- Modified Winkler's Method Using Sodium Azide

This method is intended to improve the accuracy of DO measurement by Winkler's method. In this method, I2 remaining after the titration of I2 with sodium thiosulfate in the final process of Winkler's method is titrated again with a starch solution.

Procedure: Collect the sample in a Stoppard D.O bottle, add 1ml of Winkler-A solution and Winkler-B solution , Restore the bottle and mix the content and add 1ml of Conc. Sulphuric acids restorer the bottle and shake the bottle (the precipitates will be dissolved), and Take 50ml of dissolved sol solution conical flask . Then nitrate with N/40 Hypo until the solution turns to Paper straw color and add 5ml of starch solution(solution turns to sample color), continue titration until the blue color disappears. Then note the burette reading and multiply by 4 to know the DO.

CALCIUM AND MAGNESIUM:

Calcium and magnesium can be determined by titration methods.

Procedure: Take 0.01M EDTA solution in burette then Take 10ml sample in conical flask and add 0.5ml NaOH solution and add a lunch of murexide indicator then solution turns link to purple. Note the burette reading. Calcium hardness=volume of EDTA consumed ×Molarity of EDTA×100×1000/ volume of sample taken.

Calcium as Ca+2= volume of EDTA consumed ×Molarity of EDTA×40×1000/ volume of sample taken.

Magnesium as Mg +2=TH-Ca Hardness ×0.243 .

AMMONIA:

Traditionally, Kjeldahl distillation methods have been used to determine ammonia levels in biological tissue, but other methods (e.g., colorimetric or ion-specific electrodes) are also available.

Procedure: Take 10ml of sample in test tube and add 0.4ml of Phenol solution, 0.4ml of Sodium nitro Prusside solution and 1ml of oxidizing solution then cover opening of test tube with Aluminium foil and keep the rest tube in dark for one hour and measure in spectrophotometer.

NITRATE:

The first analytical approach utilizes direct measurement of NO3-N by the following methods: (a) colorimetric (after a color producing reaction with NO3-N), (b) potentiometric, (c) absorption of UV radiation by NO3-N in a complex matrix, (d) trans nitration of salicylic acid, and (e) chromatographic (separation and measurement of NO3-N) methods. The second approach is based on the reduction of NO3-N to nitrite-nitrogen (NO2-N), ammonium-nitrogen (NH4-N), or nitric oxide and measurement of the reduction product. When NO3-N is reduced to NO2-N, the measurement may be achieved by (a) colorimetric, (b) fluorimetric, (c) coulometric, and (d) catalytic kinetic methods. When NO3-N is reduced to NH4-N, the measurement is done by (a) colorimetric (after a color producing reaction with NH4), (b) potentiometric, (c) steam distillation, and (d) gas diffusion conductometric methods. A chemiluminescence detection method is utilized when NO3-N is reduced to nitric oxide. The third approach determines NO3-N concentration by measuring the change in the concentration of the chemical species that react with NO3-N and form a complex.

Procedure: Take 10ml of sample and add 0.1 ml of Sulphanilamide then wait for 5 minutes and add 0.1ml of NED and wait for 10 minutes then measure in Spectrophotometer.

Principle: Nitrates react with phenoldisulphonic acid and produce a nitrate derivative, which in alkaline solution develops yellow color due to rearrangement of its structure. The color produced is directly proportional to the concentration of nitrates present in the sample.

Apparatus required: Nessler's tube, pipettes, beakers, spectrophotometer, cuvettes, measuring jar and hot water bath.

Procedure: A known volume (50ml) of the sample is pipetted into a porcelain dish and evaporated to dryness in a hot water bath. 2ml of phenol disulphonic acid is added to dissolve the residue by constant stirring with a glass rod. Concentrated solution of sodium hydroxide or conc. ammonium hydroxide and distilled water is added with stirring to make it alkaline. This is filtered into a Nessler's tube and made up to 50ml with distilled water. The absorbance is read at 410 nm using a spectrophotometer after the development of color. The standard graph is plotted by taking concentration along the X-axis and the spectrophotometric readings (absorbance) along the Y-axis. The value of nitrate is found by comparing absorbance of the sample with the standard curve and expressed in mg/L.

Calculation:

$$\text{Nitrates (As mg/L)} = \frac{\text{Absorbance of sample X Conc. of STD X 1000}}{\text{Absorbance of Std. X Sample taken}}$$

The high concentration of nitrate in water is indicative of pollution.

ELECTRICAL CONDUCTIVITY (EC)

Procedure: The electrode of the conductivity meter is dipped into the sample, and the readings are noted for stable values shown as mS/cm.

TOTAL DISSOLVED SOLIDS (TDS)

Principle: The difference in the weight of total solids and the total suspended solids expressed in the same units gives the total dissolved solids.

Apparatus: Glass-fiber filter disks, membrane filter funnel, filtration apparatus, suction flask and pump, drying oven and Grooch crucible.

Procedure: The difference in the weights of Total Solids (W1) and Total Suspended Solids (W2) expressed in the same units gives Total Dissolved Solids (TDS).

BIOLOGICAL OXYGEN DEMAND:

Principle: The method consists of filling the samples in airtight bottles of specified size and incubating them at specified temperature (20 oC) for 5 days. The difference in the dissolved oxygen measured initially and after incubation gives the BOD of the sample.

Apparatus required: BOD bottles - 300ml capacity, air incubator - to be controlled at 20 oC -\+ 1 oC, oximeter and magnetic stirrer.

Procedure: The sample having a pH of 7 is determined for the first day DO. Various dilutions (at least 3) are prepared to obtain about 50% depletion of D.O. using sample and dilution water. The samples are incubated at 20 oC for 5 days and the 5th day D.O is noted using the oximeter. A reagent blank is also prepared in a similar manner.

Calculation:

$$\text{BOD} = \frac{(D1 - D2) - (B1 - B2) \text{ X } f}{p \text{ (in mg/L)}}$$

D1 - 1st day D.O of diluted sample

D2 - 5th day D.O of diluted sample

P - Decimal volumetric fraction of sample used.

B1 - 1st day D.O of control

B2 - 5th day D.O of control

CHEMICAL OXYGEN DEMAND

Chemical oxygen demand (COD) is the measure of oxygen equivalent to the organic content of the sample that is susceptible to oxidation by a strong chemical oxidant. The intrinsic limitation of the test lies in its ability to differentiate between the biologically oxidisable and inert material. It is measured by the open reflux method.

Principle: The organic matter in the sample gets oxidized completely by strong oxidizing agents such as potassium dichromate in the presence of conc. sulphuric acid to produce carbon-di-oxide and water. The excess potassium dichromate remaining after the reaction is titrated with Ferrous Ammonium Sulphate (FAS) using ferroin indicator to determine the COD. The dichromate consumed gives the oxygen required for the oxidation of the organic matter. **Apparatus required**: Reflux apparatus, Nessler's tube, Erlenmeyer flasks, hot plate and lab glassware.

Procedure: 15ml of conc. sulphuric acid with 0.3g of mercuric sulphate and a pinch of silver sulphate along with 5ml of 0.025M potassium dichromate is taken into a Nessler's tube. 10ml of sample (thoroughly shaken) is pipetted out into this mixture and kept for about 90 minutes on the hot plate for digestion. 40ml of distilled water is added to the cooled mixture (to make up to 50ml) and titrated against 0.25M FAS using a ferroin indicator, till the colour turns from blue green to wine red indicating the end point. A reagent blank is also carried out using 10ml of distilled water.

- **Eriochrome Black**: Take 0.5 grams of Eriochrome black-T and 4.5 grams of Hydroxylamine hydrochloride and dissolved in 100ml of 70% Ethanol.

Calcium:

- **1N NaOH**: Take 4 grams of NaOH and make up to 100ml of distilled water.
- **Muroxide indicator**: Take 0.5 grams of pure murexide and mix with 100 grams of NaCl.
- **EDTA**:Take 3.723 grams of EDTA and make up to 100ml of distilled water.

Ammonia:

- **Phenolphthalein solution**: Take 10 grams of analytical Phenolphthalein and dissolve in 100ml of 95% Methyl alcohol.
- **Sodium nitroPrusside sol**: Take 0.5 grams of sodium nitroprusside and dissolved inb100ml of deionized water and preserve Amber coloured bottles. The solution can be preserved for months.
- **Alkaline Reagent**: Take 20 grams of Trial Sodium Nitrate and 1 grams of Sodium Hydroxide and dissolve in 100ml of deionized water.
- **Oxidizing sol**: Mix the alkaline Reagent and sodium Hypo chlorides in a 4:1 ratio. This sol can be preserved for 24 hours only.

Nitrate:

- **Sulphanilamide**: Take 1 grams of Sulphanilamide and add 10ml Conc. Hcl to this. Then make up to 100ml with distilled water.
- **NED (naphthyl Methyl Diamine dihydrochloride)** :. Take 0.1 grams of NED and dissolve in 100ml of distilled water and preserve in an Amber coloured bottle.

Dissolved Oxygen:

- **Winkler-A sol (manganous sulfate)**: Take 48 grams of MnSO4 4H2O or 40 grams of MnSO4 2H2O or 36.5 grams of MnSO4 H2O and dissolve in distilled water and make up to 100ml.
- **Winkler-B sol (alkaline iodide):** Take 50 grams of sodium Hydroxide and 30 grams of potassium iodide and make up to 100ml with distilled water.
- **N/40 HpO:**
    - To prepare 0.1N sodium thiosulphate 'standard sol Take 2.482 grams of sodium thiosulphate and 0.4 grams of Borax as preservation and dissolve in 70ml of distilled water and make up to 100ml.
    - To prepare N/40 (0.02N) Hypo, Take 125ml of 0.1N sodium thiosulphate and make up to 500ml with distilled water.

Starch sol (0.2%): Take 0.4 grams of starch and 6ml of 20% NaOH and dissolve in 70 ml of distilled water. Store it until clean sol is obtained. Then neutralize with 0.2 ml of HCl and acidity with 0.2 ml of glacial acetic acid. Finally dilute the sol up to 200 ml with distilled water.

Turbidity:

- **Distilled water and Stock primary Formazin suspension:**
- **Solution 1**: 1.0 g Hydrazine sulphate is dissolved in 100ml of distilled water.
- · **Solution 2:** 10.0g of Hexamethylenetetramine is dissolved in distilled water and made up to 100ml in a volumetric flask.
- **Stock Turbidity Suspension**: 5ml of solutions 1 and 2 are mixed in a volumetric flask and allowed to stand for 24 hrs at about 25o C (±3o C) and diluted to 1000ml with distilled water to give a 400 NTU suspension.
- **Standard Turbidity Suspension**: 10ml of the stock solution is diluted to 100ml with distilled water to give a standard solution of 40 NTU.

Phosphate:

- **Ammonium molybdate reagent**: 25g ammonium molybdate is dissolved in 175ml distilled water. 280ml concentrated sulphuric acid is added to 400ml distilled water and cooled. Molybdate solution is added and the mixture diluted to 1000ml.
- **Stannous chloride reagent**: 2.5g fresh stannous chloride is dissolved in 100ml glycerol, heated in a water bath and stirred with the glass rod to hasten dissolution.
- **Standard phosphate solution**: 219.5 mg of dried AR potassium hydrogen phosphate is dissolved in distilled water and made up to 1000ml, where 1ml = 50.0 mg. of phosphate. 10ml of the stock solution is made up to 1000ml to give 1ml = 0.05 mg. Standards of strength ranging from 0 (blank) to 0.05mg/L at intervals of 0.01mg are prepared by diluting the stock with distilled water.

Sulphate

- **Conditioning reagent**: 50 ml of glycerol was mixed in a solution containing 30 ml of conc. hydrochloric acid, 300ml distilled water (10% HCl), 100 ml of 95% ethyl alcohol or isopropyl alcohol and 75g NaCl.
- ·**Barium Chloride**
- **Standard sulphate solution**: 147.9mg of AR grade sodium sulphate was dissolved in distilled water and made up to 1000ml, to give 1ml = 100mg sulphate.

Chlorides

- **Potassium chromate indicator solution**: 50g of potassium chromate is dissolved in a minimum amount of distilled water and silver nitrate is added dropwise till a red precipitate is formed. The mixture is allowed to stand for about 12 hours and diluted to 1000ml with distilled water.

- ·**Silver nitrate solution (0.014N):** 2.395g of silver nitrate is dissolved in distilled water and made up to 1000ml.

BOD:

- **Preparation of dilution water**: To 1000ml of water, 1ml each of phosphate buffer, magnesium sulphate and calcium chloride and ferric chloride solution is added, before bringing it to 20 °C and aerating it thoroughly.

COD

- **Standard potassium dichromate solution (0.250M):** 12.25g of potassium dichromate dried at 103 °C for about 2 hours is dissolved in distilled water and made up to 1000ml.
- **Standard ferrous ammonium sulphate (FAS) 0.25N:** 98g of FAS is dissolved in minimum distilled water to which 20ml of conc. sulphuric acid is added and made up to 1000ml using distilled water to give 0.25N of ferrous ammonium sulphate.
- ·**Ferroin indicator**: 1.485g of 1, 10-Phenanthroline monohydrate and 695 mg of ferrous sulphate is dissolved in 100ml of distilled water.
- ·**Conc. sulphuric acid**
- ·**Silver sulphate crystals**
- ·**Mercuric sulphate crystals**

STUDY AREA

Kovvuru canal water, kakinada 2.6km from the origin of Godavari Rivers which is situated in Kovvuru at Kakinada in Andhra Pradesh, India. Kovvuru falls within latitudes 16°92'46.35"N and longitudes 82°22'25.74"E. This Godavari canal water is used in agricultural fields and ponds.

PHYSICO-CHEMICAL ANALYSIS OF WATER

Physical parameters:

Color, Temperature, Transparency, Turbidity and Odor.

Chemical Parameters:

pH, Electrical Conductivity (E.C), Total Solids (TS), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Total Hardness, Calcium Hardness, Magnesium Hardness, Nitrates, Phosphates, Sulphates, Chlorides, Dissolved Oxygen (D.O), Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD).

RESULTS AND DISCUSSION

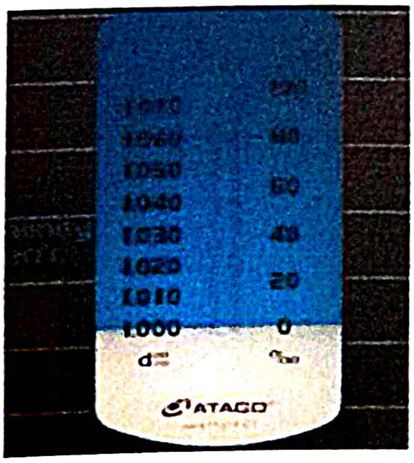
The results of the weekly variation in Physico- Chemical Parameters of Godavari canal water samples is presented in the table.

pH:.

pH is most important in determining the corrosive nature of water. Lower the pH value higher is the corrosive nature of water. The changes in pH of water is due to season, photosynthesis and respiration of aquatic plants, acid rains, increased Conc. of CO_2 , and dumping industrial range would be acceptable. In natural waters pH is governed by the equilibrium between carbon dioxide/bicarbonate/carbonate ions and ranges between 4.5 and 8.5 although mostly basic. It tends to increase during the day largely due to the photosynthetic activity (consumption of carbon-di-oxide) and decreases during night due to respiratory activity. Wastewater and polluted natural waters have pH values lower or higher than 7 based on the nature of the pollutant. In the present study pH varied between 7.34-7.87. The variation of pH in surface water samples shows that samples are alkaline in nature.

Salinity:

Freshwater from rivers has Salinity value of 0.5ppt or less. It is best to maintain Salinity of 1.026 for freshwater fishes. The marine water Salinity is about 35ppt. Evaporation of ocean water and formation of season ice both increase the Salinity of the ocean.



Electrical conductivity (EC):

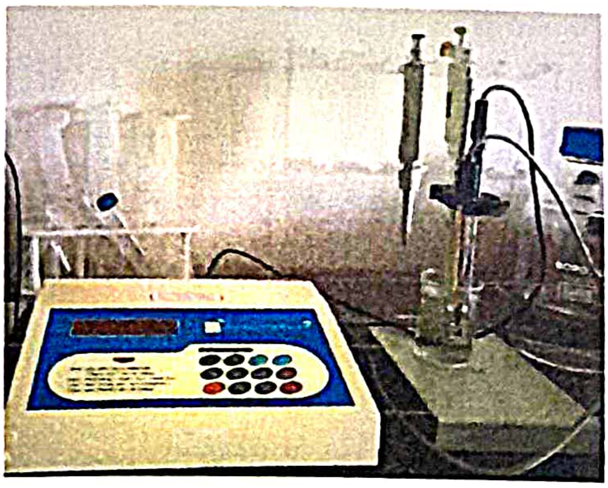
Electrical Conductance of water is a measure of its ability to carry Electric current as a Results of dissolved salts in water. The conductivity measurements provide an indication of ionic concentrations. The electrical conductivity values ranged from 874.6µS/ppm - 986.7µS/ppm. By introducing salts, chlorides, sulfides, carbonates, and other ions, the conductivity of water will increase as the concentrations of ions increase. Fresh water is usually between 0and 1,500µS/cm and typically season water has a conductivity value of about 5000µS/cm.

Total Dissolved Solids (TDS):

TDS values are also considered as important parameters in determining the usage of water. TDS is composed mainly of carbonates, bicarbonates, chlorides, phosphates and nitrates, calcium, magnesium, sodium, potassium, manganese, organic matter salts and other particles. High TDS values are not suitable for irrigation and drinking water is 600ms/ppm. The TDS value in present study ranged between 269.5 - 466.7mS/ppm.

Water can be classified by the level of total dissolved solids (TDS) in the water:
Fresh water: TDS is less than 1,000 ppm
Brackish water: TDS = 1,000 to 10,000 ppm
Saline water: TDS = 10,000 to 35,000 ppm
Hypersaline: TDS greater than 35,000 ppm

Drinking water generally has a TDS below 500 ppm. Higher TDS Fresh Water is drinkable but taste may be objectionable.



Total Alkalinity (TA):

Alkalinity is a measure of ability to neutralize acids. The value of total Alkalinity in water provides an idea of natural salts present in water. Total alkalinity (TA) is the measure of water's ability to neutralize acids. Alkaline compounds that are present in water, like hydroxides and carbonates, eliminate H+ ions from the water, which lowers the acidity of the water and results in a higher pH. Excess alkalinity gives a bitter taste to water and reacts with cations farming precipitates, which can damage the pipes, values etc., A total Alkalinity of at least 20 mg/ L is necessary for good pond productivity. For drinking water the alkalinity should be 20-200 mg/L. The variations of alkalinity in sample water varied between 90-260 mg/ L.

Total Hardness (TH):

Water hardness is a measure of the capacity of water to react with soap. Total Hardness of water is characterized by the content of calcium and magnesium salts. The carbonate hardness of pond or Take should ideally fall between 50 to 200ppm. The variation of hardness in sample water varied between 130-280 mg/L.

Dissolved Oxygen (DO):

Healthy water should generally have dissolved oxygen concentrations above 6.5-8 mg/L and between about 80-120 %. DO present in drinking water adds waste and it is a highly fluctuating factor in water. The variation of dissolved oxygen in sample water is 3.6 to 17.6mg/L.

Ammonia and Nitrate:

Nitrates are essential plant nutrients but in excess amounts they can cause significant water quality problems. Together with phosphorus, nitrates in excess amounts can accelerate eutrophication, causing the types of plants and animals that live in the stream. The safe level for nitrate in drinking water is <10ppm and Ammonia is 0.25 to 32.5mg/L. The NIOSH Recommended Exposure Limit (REL) for ammonia is 25 ppm averaged over an eight-hour work day. NIOSH also says that there should be a Short Term Exposure Limit (STEL) of 35 ppm during any 15 minute period in the day. No worker should be exposed to more than that amount over any 15 minute period.

Calcium and magnesium:

The presence of calcium (fifth most abundant) in water results from passage through or over deposits of limestone, dolomite, gypsum and such other calcium bearing rocks. Calcium contributes to the total hardness of water and is an important micro-nutrient in aquatic environments and is especially needed in large quantities by molluscs and vertebrates. It is measured by the EDTA titrimetric method. Small concentration of calcium carbonate prevents corrosion of metal pipes by laying down a protective coating. But increased amounts of calcium precipitate on heating to form harmful scales in boilers, pipes and utensils.

Magnesium is a relatively abundant element in the earth's crust, ranking eighth in abundance among the elements. It is found in all natural waters and its source lies in rocks, generally present in lower concentration than calcium. It is also an important element contributing to hardness and a necessary constituent of chlorophyll. Its concentration greater than 125 mg/L can influence cathartic and diuretic actions.

Total Dissolved Solids (TDS)

Electrical, or specific, conductivity of water is directly related to the concentration of dissolved ionized solids in the water. Ions from the dissolved solids in water create the ability for that water to conduct an electric current, which can be measured using a conventional conductivity meter or TDS meter. When correlated with laboratory TDS measurements, conductivity provides an approximate value for the TDS concentration, usually within ten-percent accuracy.

Electrical conductivity (EC)

Electrical conductivity is the measure of the amount of electrical current a material can carry or its ability to carry a current. Electrical conductivity is also known as specific conductance. Conductivity is an intrinsic property of a material.

Water Type	Conductivity (µS/cm)
totally pure water	0.055
typical deionized water	0.1
distilled water	0.5-3.0
reverse osmosis water	50-100
domestic "tap" water	500-800
potable water	1,055 max
sea water	56,000
brackish water	100,000

Biological oxygen Demand (BOD):

Biochemical oxygen demand, or BOD, measures the amount of oxygen consumed by microorganisms in decomposing organic matter in stream water. BOD also measures the chemical oxidation of inorganic matter (i.e., the extraction of oxygen from water via chemical reaction). A test is used to measure the amount of oxygen consumed by these organisms during a specified period of time (usually 5 days at 20 C). The rate of oxygen consumption in a stream is affected by a number of variables: temperature, pH, the presence of certain kinds of microorganisms, and the type of organic and inorganic material in the water.

BOD directly affects the amount of dissolved oxygen in rivers and streams. The greater the BOD, the more rapidly oxygen is depleted in the stream. This means less oxygen is available to higher forms of aquatic life. The consequences of high BOD are the same as those for low dissolved oxygen: aquatic organisms become stressed, suffocate, and die.

Sources of BOD include leaves and woody debris; dead plants and animals; animal manure; effluents from pulp and paper mills, wastewater treatment plants, feedlots, and food-processing plants; failing septic systems; and urban stormwater runoff.

Chemical Oxygen Demand (COD):

Chemical Oxygen Demand (COD) is a test that measures the amount of oxygen required to chemically oxidize the organic material and inorganic nutrients, such as Ammonia or Nitrate, present in water. The earliest methods for quantification of COD were developed ~150 years ago and involved recording color changes of a permanganate solution mixed with water samples. There was, however, significant variability between samples using this compound. The use of the dichromate procedure was pioneered and perfected for wastewater in 1949. COD is measured via a laboratory assay in which a sample is incubated with a strong chemical oxidant for a specified time interval and at constant temperature (usually 2 h at 150°C).

The most commonly used oxidant is potassium dichromate, which is used in combination with boiling sulphuric acid. It is important to note that the chemical oxidant is not specific to organic or inorganic compounds, hence both these sources of oxygen demand are measured in a COD assay. Furthermore, it does not measure the oxygen-consuming potential associated with certain dissolved organic compounds such as acetate. Thus, measurements are not directly comparable to Biochemical Oxygen Demand (BOD) but can be used to complement (though it is sometimes used as a surrogate measure).

RESULTS

Table: 1 Variations in the pH of Sample Water

Dates	pH	
	upstream	downstream
19-03-2022	7.93	7.49
21-03-2022	7.49	7.93
22-03-2022	7.63	7.4
23-03-2022	7.87	7.34
24-03-2022	7.87	7.31
25-03-2022	7.87	7.39
26-03-2022	7.87	7.58
29-03-2022	7.87	7.25
31-03-2022	7.87	7.49
01-04-2022	7.87	7.37
04-04-2022	7.87	7.48
05-04-2022	7.87	7.36
06-04-2022	7.87	7.44
07-04-2022	7.36	7.49
08-04-2022	7.36	7.49
11-04-2022	7.63	7.39
12-04-2022	7.43	7.39
13-04-2022	7.36	7.39
18-04-2022	7.53	7.39
19-04-2022	7.09	7.59
Maximum value		7.93
Minimum value		7.09

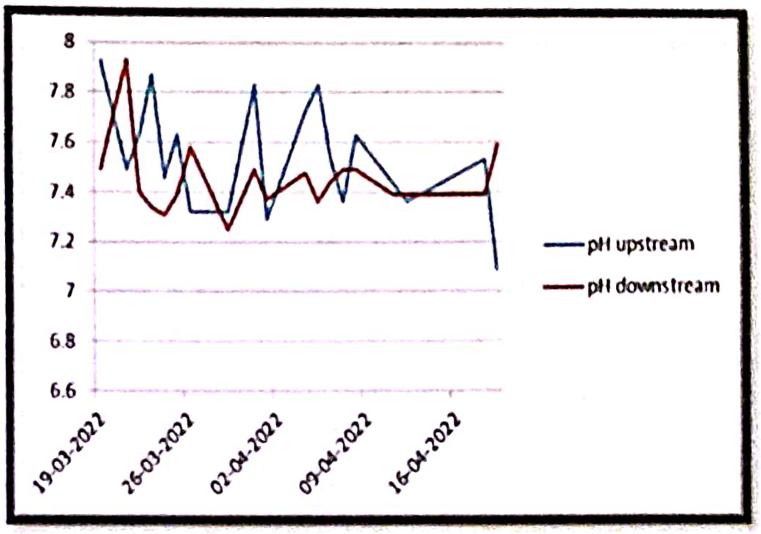


Table: 2 Variations in the Salinity of Sample Water

Dates	salinity	
	upstream	downstream
19-03-2022	0	0
21-03-2022	0	0
22-03-2022	0	0
23-03-2022	0	0
24-03-2022	0	0
25-03-2022	0	0
26-03-2022	0	0
29-03-2022	0	0
31-03-2022	0	0
01-04-2022	0	0
04-04-2022	0	0
05-04-2022	0	0
06-04-2022	0	0
07-04-2022	0	0
08-04-2022	0	0
11-04-2022	0	0
12-04-2022	0	0
13-04-2022	0	0
18-04-2022	0	0
19-04-2022	0	0

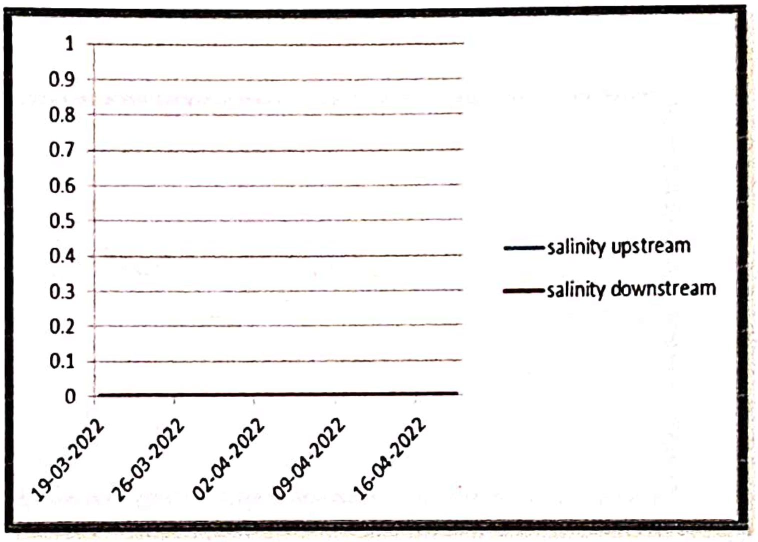


Table: 3 Variations in the Alkalinity of Sample Water

Dates	Alkalinity	
	upstream	downstream
19-03-2022	230	260
21-03-2022	160	160
22-03-2022	150	180
23-03-2022	160	150
24-03-2022	160	160
25-03-2022	100	190
26-03-2022	90	140
29-03-2022	100	100
31-03-2022	150	90
01-04-2022	220	150
04-04-2022	120	220
05-04-2022	219	120
06-04-2022	103	150
07-04-2022	291	160
08-04-2022	106	180
11-04-2022	155	160
12-04-2022	155	160
13-04-2022	105	140
18-04-2022	140	150
19-04-2022	106	120
Maximum value		291
Minimum value		90

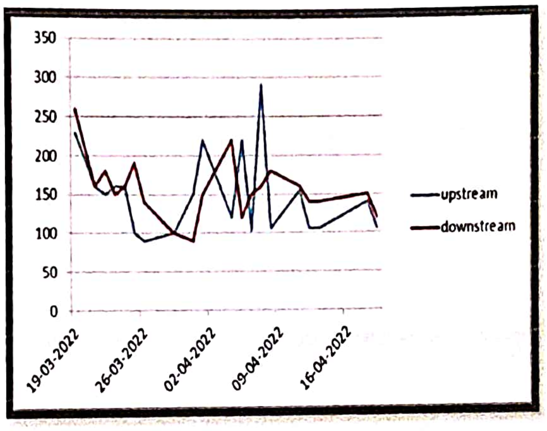


Table: 4 Variations in the Hardness of Sample Water

Dates	Hardness	
	upstream	downstream
19-03-2022	220	260
21-03-2022	260	160
22-03-2022	350	180
23-03-2022	230	150
24-03-2022	250	160
25-03-2022	230	190
26-03-2022	240	140
29-03-2022	130	100
31-03-2022	140	90
01-04-2022	220	150
04-04-2022	120	220
05-04-2022	219	120
06-04-2022	103	150
07-04-2022	291	160
08-04-2022	106	180
11-04-2022	155	160
12-04-2022	105	140
13-04-2022	105	140
18-04-2022	140	150
19-04-2022	106	120
Maximum value		350
Minimum value		90

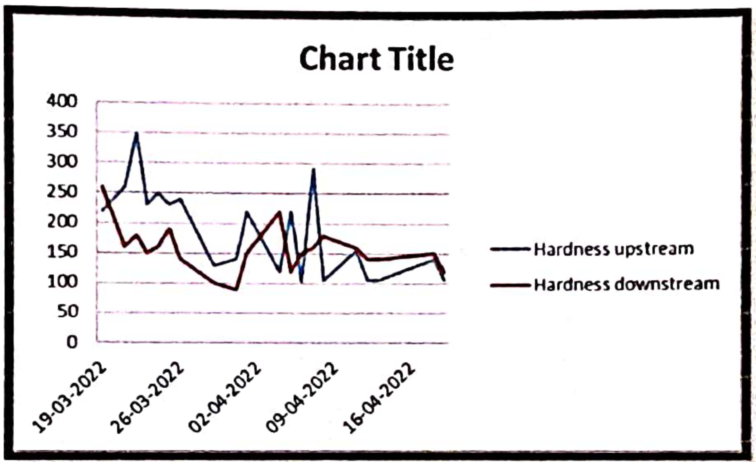


Table: 5 Variations in the Ammonia of Sample Water

Dates	Ammonia	
	upstream	downstream
19-03-2022	nill	nill
21-03-2022	nill	nill
22-03-2022	nill	nill
23-03-2022	0.5	nill
24-03-2022	0.02	0.5
25-03-2022	nill	0.05
26-03-2022	nill	nill
29-03-2022	nill	nill
31-03-2022	0.25	0.1
01-04-2022	0.02	0.01
04-04-2022	0.01	nill
05-04-2022	nill	nill
06-04-2022	nill	nill
07-04-2022	nill	nill
08-04-2022	nill	nill
11-04-2022	0.01	0.1
12-04-2022	0.25	0.1
13-04-2022	0.02	0.1
18-04-2022	0.5	0.05
19-04-2022	nill	nill
Maximum value		0.5
Minimum value		0.05

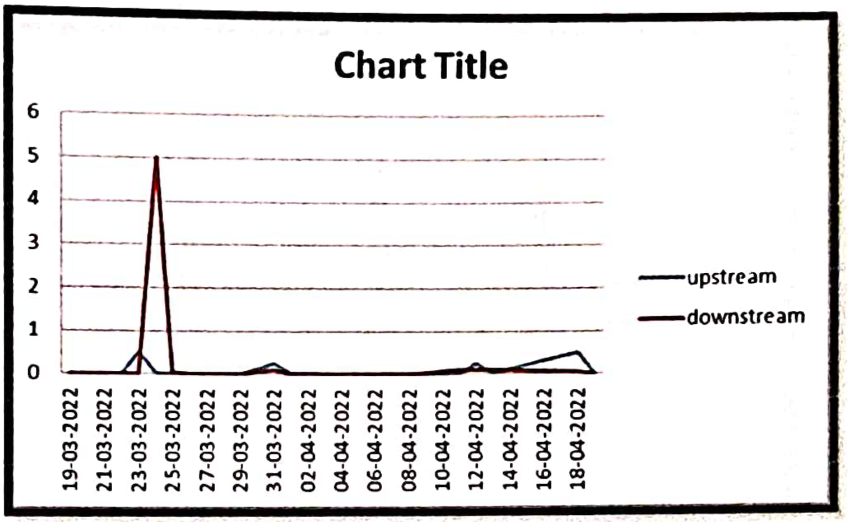


Table: 6 Variations in the Alkalinity of Sample Water

Dates	Nitrate	
	upstream	downstream
19-03-2022	nill	nill
21-03-2022	nill	nill
22-03-2022	nill	nill
23-03-2022	nill	nill
24-03-2022	0.05	nill
25-03-2022	0.28	0.38
26-03-2022	0.05	nill
29-03-2022	nill	nill
31-03-2022	nill	nill
01-04-2022	nill	nill
04-04-2022	nill	nill
05-04-2022	nill	nill
06-04-2022	0.05	nill
07-04-2022	0.38	0.05
08-04-2022	nill	nill
11-04-2022	nill	nill
12-04-2022	nill	nill
13-04-2022	0.05	nill
18-04-2022	0.28	0.38
19-04-2022	nill	nill
Maximum value		0.38
Minimum value		Nill

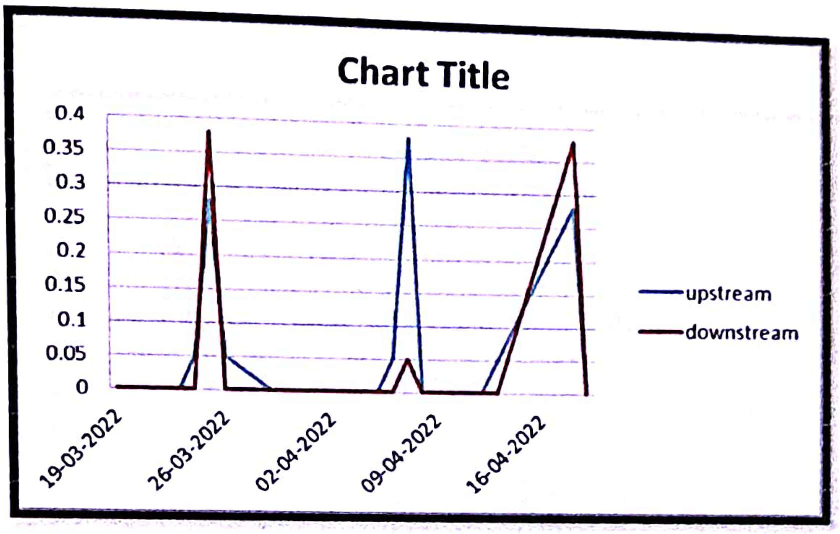


Table: 7 Variations in the Calcium of Sample Water

Dates	Calcium	
	upstream	downstream
19-03-2022	38	36
21-03-2022	32	36
22-03-2022	40	80
23-03-2022	56	56
24-03-2022	28	24
25-03-2022	20	32
26-03-2022	32	40
29-03-2022	53	27
31-03-2022	49	32
01-04-2022	47	27
04-04-2022	43	53
05-04-2022	49	28
06-04-2022	39	43
07-04-2022	38	25
08-04-2022	21	38
11-04-2022	37	28
12-04-2022	28	33
13-04-2022	37	29
18-04-2022	38	53
19-04-2022	35	43
Maximum value		80
Minimum value		24

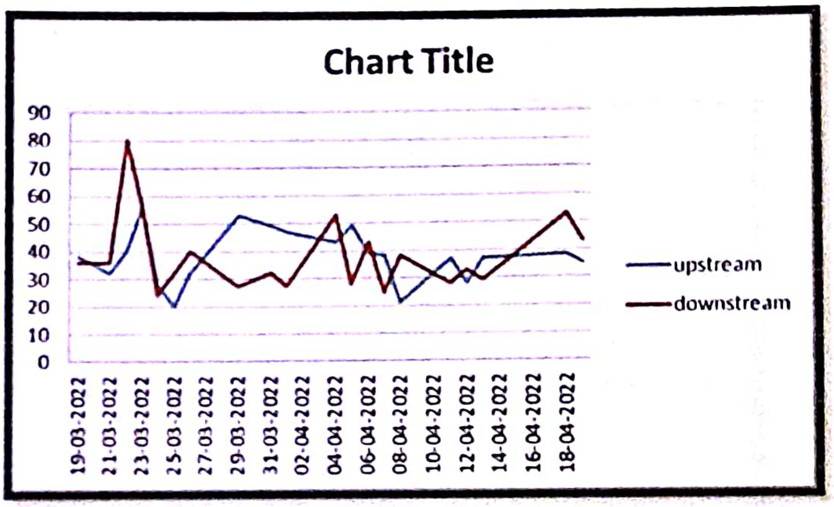


Table: 8 Variations in the Alkalinity of Sample Water

Dates	Magnesium	
	upstream	downstream
19-03-2022	27	31.2
21-03-2022	32	36
22-03-2022	36	40
23-03-2022	80	56
24-03-2022	56	28
25-03-2022	24	20
26-03-2022	20	32
29-03-2022	32	40
31-03-2022	36	29
01-04-2022	27	20
04-04-2022	27	37
05-04-2022	25	42
06-04-2022	32	42
07-04-2022	28	31
08-04-2022	27	36
11-04-2022	32	36
12-04-2022	24	42
13-04-2022	32	48
18-04-2022	29	42
19-04-2022	34	40
Maximum value		80
Minimum value		20

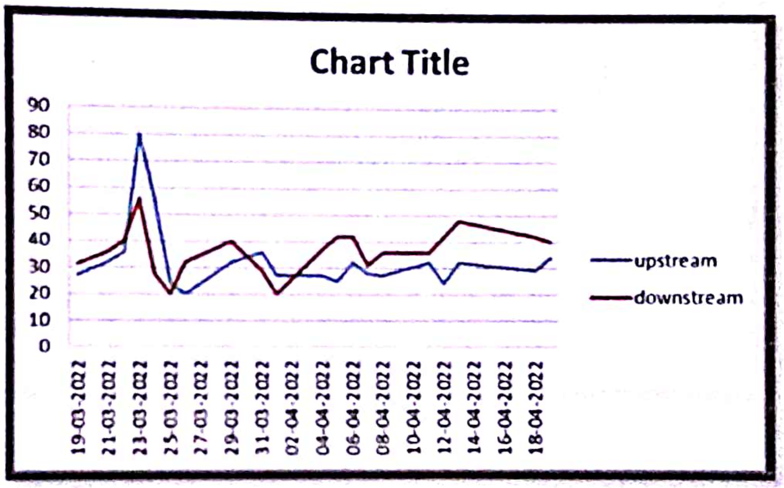


Table: 9 Variations in the DO of Sample Water

Dates	DO	
	upstream	downstream
19-03-2022	2	1
21-03-2022	6	3
22-03-2022	8	5
23-03-2022	3	3
24-03-2022	7	2
25-03-2022	2	2
26-03-2022	6	3
29-03-2022	3	3
31-03-2022	6	2
01-04-2022	6	4
04-04-2022	4	8
05-04-2022	3	8
06-04-2022	3.6	6
07-04-2022	8	4
08-04-2022	5	3
11-04-2022	9	3
12-04-2022	4	3
13-04-2022	4	2
18-04-2022	4	8
19-04-2022	2	3
Maximum value		8
Minimum value		1

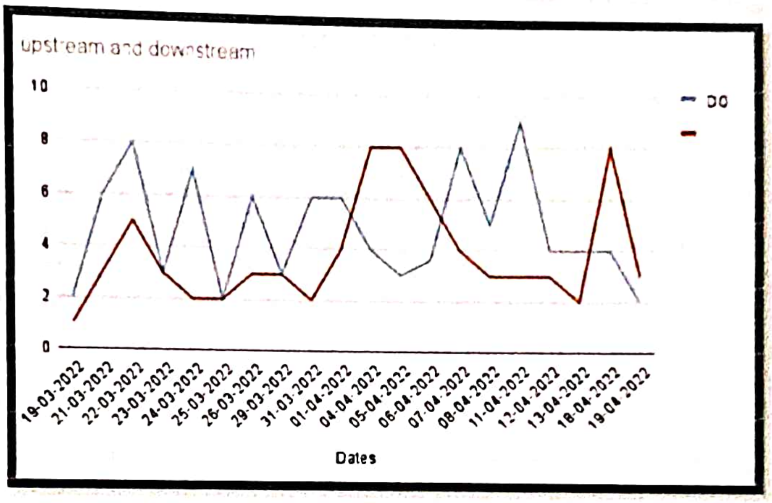


Table: 10 Variations in the Alkalinity of Sample Water

Dates	TDS	
	upstream	downstream
19-03-2022	296	295
21-03-2022	332	392
22-03-2022	334	335
23-03-2022	422	489
24-03-2022	466	382
25-03-2022	423	492
26-03-2022	376	204
29-03-2022	392	402
31-03-2022	284	339
01-04-2022	392	209
04-04-2022	402	209
05-04-2022	389	329
06-04-2022	382	303
07-04-2022	285	403
08-04-2022	246	309
11-04-2022	346	543
12-04-2022	346	305
13-04-2022	574	357
18-04-2022	356	497
19-04-2022	353	402
Maximum value		574
Minimum value		295

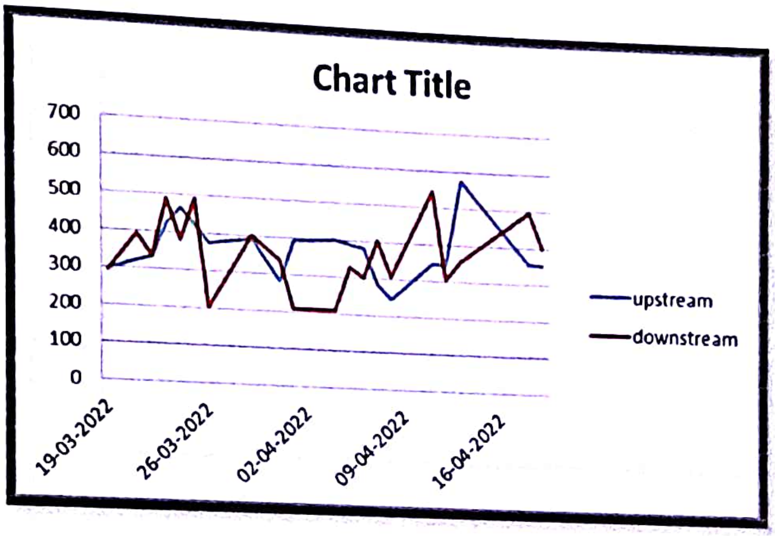


Table: 11 Variations in the Alkalinity of Sample Water

Dates	EC	
	upstream	downstream
19-03-2022	934	734
21-03-2022	620	835
22-03-2022	733	836
23-03-2022	726	698
24-03-2022	648	754
25-03-2022	489	865
26-03-2022	876	997
29-03-2022	945	678
31-03-2022	575	943
01-04-2022	554	864
04-04-2022	456	367
05-04-2022	755	457
06-04-2022	555	447
07-04-2022	484	478
08-04-2022	633	344
11-04-2022	944	667
12-04-2022	854	645
13-04-2022	588	767
18-04-2022	976	876
19-04-2022	785	765
Maximum value		934
Minimum value		367

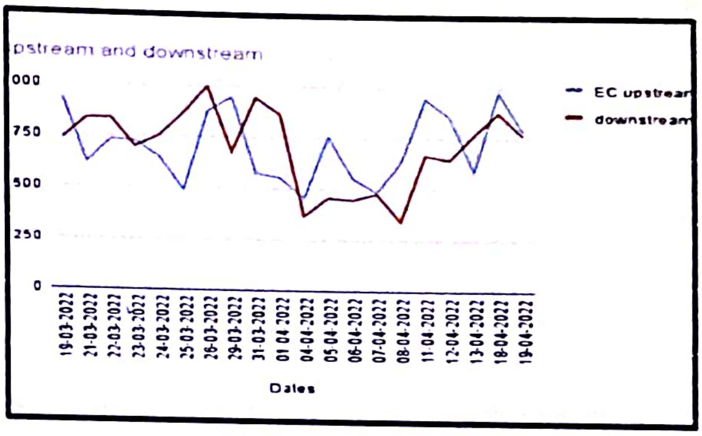


Table: 12 Variations in the BOD of Sample Water

Dates	BOD	
	upstream	downstream
19-03-2022	3.4	4.6
21-03-2022	2.7	3.5
22-03-2022	3.2	3.5
23-03-2022	3.6	3.4
24-03-2022	2.8	3.4
25-03-2022	3.7	2.9
26-03-2022	3.7	3.5
29-03-2022	3.7	3.6
31-03-2022	3.8	2.5
01-04-2022	2.4	2.4
04-04-2022	2.56	2.7
05-04-2022	1.8	1.62
06-04-2022	1.78	1.4
07-04-2022	2.4	2.4
08-04-2022	2.56	2.7
11-04-2022	1.8	1.62
12-04-2022	1.78	1.4
13-04-2022	2.4	2.4
18-04-2022	1.8	1.48
19-04-2022	1	1
Maximum value		4.6
Minimum value		1

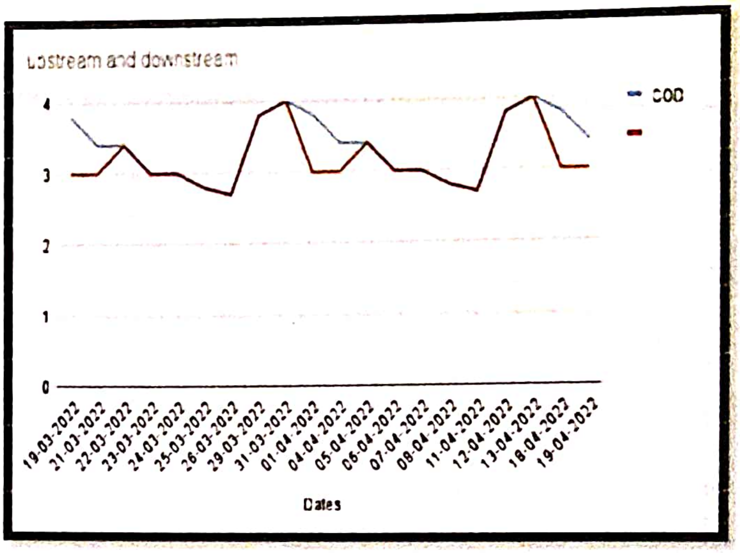
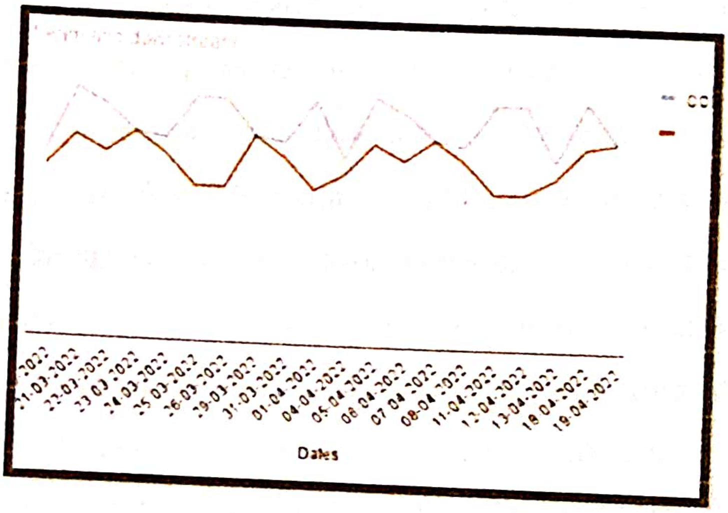


Table: 13 Variations in the Alkalinity of Sample Water

Dates	COD	
	upstream	downstream
19-03-2022	36	33
21-03-2022	48	39
22-03-2022	45	36
23-03-2022	40	40
24-03-2022	39	36
25-03-2022	47	30
26-03-2022	47	30
29-03-2022	40	40
31-03-2022	39	36
01-04-2022	47	30
04-04-2022	36	33
05-04-2022	48	39
06-04-2022	45	36
07-04-2022	40	40
08-04-2022	39	36
11-04-2022	47	30
12-04-2022	47	30
13-04-2022	36	33
18-04-2022	48	39
19-04-2022	40	40
Maximum value		48
Minimum value		33



CONCLUSION

The Physico-chemical parameters showed significant weekly variations. In this Godavari water the pH is neutralized and varies between 7.3 to 7.9 due to it being a pure water. The Salinity is 0 due to the freshwater. The Alkalinity of Godavari water is about 100 to 200 due to Soil or bedrock around water sources including carbonate, bicarbonate, or hydroxide compounds; those materials get dissolved and travel with the water. These mineral deposits also increase the alkalinity of the water. The hardness of water is due to the dissolved minerals like calcium and magnesium in water which varies between 180 to 260. The ammonia and nitrate is almost nil due to there is no contamination of water or any industrial effluents are not released into the canal. The TDS and EC value is high due to leaching of salts from soil and also domestic sewage may percolate into the groundwater, which may lead to an increase in TDS values. BOD and COD values are variable due to phytoplanktons. This canal water is suitable for fish production and for agriculture. Since the water quality parameters are determined generally within the desirable limit.

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