iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 2017 **Issue:** Conference **Month of publication:** September 15, 2017

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887
Volume 5 Issue X, October 2017- Available at www.ijraset.com

Water Quality & Pollution Status Of Ulhas River, Thane District, Maharashtra

Vihang G. Pathare[1], Dr. Seema A. Jagtap[2]
[1]*Student, M.E Civil (WRE), Yadavrao Tasgaonkar College of Engineering & Management, Bhivpuri, Indi*
[2]*Head of Department of Civil Engineering, Thakur College of Engineering & Technology, Mumbai, India*

Abstract: ***Water is the prime necessity for the existence of life and hence it have been human being's exertion since time immerorial to harness the available water resources. Water is the prinicipal need of life on earth and is essential component for all forms of life.In the present study, physico-chemical and bacteriological water pollution parameters viz., pH, Turbidity, Dissolved Oxygen, Biochemical Oxygen Demand, Chemical Oxygen Demand, Total Coliform and Escherichia Coli for five locations across the Ulhas River were analysed. Ulhas river water is slightly polluted in terms of physicochemical parameters and moderately polluted in terms of microbiological parameters.***
Index Terms— water quality, physico-chemical, biological.

I. INTRODUCTION

River pollution imposes geographically widespread costs. The burden of reduced water quality is borned by the community in the proximate section of its fecundity, and also by a quantum of downstream communities. The socially efficient level of water quality at a given point along a river depends on the related welfare impacts at both that point and all affected points downstream.
High rates of mortality and morbidity due to water borne diseases are well known in India. Serious degradation of water quality in urban India has often been attributed to indiscriminate disposal of sewage and industrial effluents into surface water bodies. It is estimated that about 21 % of communicable diseases in India is water related.

II. THEORY

Water quality is one of the main challenges that societies will face during the 21st century, threatening human health, limiting food production, reducing ecosystem functions and hindering economic growth. Water quality degradation translates directly into environmental, social and economic problems. Water quality is affected by both point and non-point sources of pollution.
The provision of clean drinking water has been given priority in the Constitution of India, with Article 47 conferring the duty of providing clean drinking water and improving public health standards to the State.
The Ulhas River is a perennial river and originates in a valley north of the Rajmachi hills formed by mountains streams draining the north slope of these hills which are part of the Sahyadri range of the Western Ghats in the Raigad district of Maharashtra. Ulhas River is an important westbound river flowing mainly through Thane district of Maharashtra. The Ulhas basin lies between North latitudes of 18º 44' to 19º 42' and East longitudes of 72º 45' to 73º 48'. The river has a draining area of 4637 sq. km in size and the average annual rainfall in the basin is 2934 mm. From the point of origin, the river flows north turning left where it is joined by river Salpe, its right bank tributary. As the river bypasses the Palasdhari village, it receives the discharge from the Palasdhari Dam. Further north, it is met by the river Peg and river Poshir near Neral. At Badlapur, it receives the run-off from Chikloli dam and river Barvi.

III. LITERATURE REVIEW

An overview of some research papers is presented here.
S. K. Pathak et al. (2015) determined the water quality index of the River Bhagiarthi in Uttarkashi, Uttarakhand, India for public use, recreation and other purposes. Eleven parameters like pH, EC, TDS, Chlorides, Nitrates, BOD, Total alkalinity, Sulphate, DO, TSS, TH were analysed. Their finding show that the river water is not suitable for drinking and pollution load is comparatively high during rainy and summer seasons. They suggested highest priority to be given for water quality monitoring and indigenous technologies used for water treatment before consumption.
An indicator system for surface water quality in river basins was reviewed by R. E. S Olivera et al. (2005). They stated the need for developing a surface water quality indicator system as a tool for assessment of human activities on natural water. Their study briefly

©IJRASET (UGC Approved Journal): All Rights are Reserved

described the various factors to be considered, procedures to be adopted, problems iin formulation and the intended use of the parameters identified.

Water quality management plan for Patalganga River for drinking purpose and human health safety was given by Asheesh Shrivastava et al. (2015). A total of fourteen water samples were collected and analysed for physicochemical and microbiological parameters of water quality. The river was found to be unfit for drinking and WQI was found to be medium to bad..

Gadekar M. R et al. (2012) carried a review of seven research papers. From his review it can be inferred that seasonal river water quality monitoring by analysing various physicochemical should be integrated to maintain good water quality.

Water Quality Index of Mahi River Vadodara, Gujarat was studied by Ms. Ami Gor et al. (2014). The WQI based on seven parameters viz., pH, DO, COD, BOD, Turbidity, TDS, MPN were analysed. Their study revealed that the overall WQI of Mahi River falls under medium to bad category. WQI suggested corrective measures for the water to be used for drinking and recreational purposes. From the referred literature it can be inferred that the most commonly used water quality parameters are pH, Temperature, DO, BOD, COD, Turbidity, TH, TSS, TDS, alkalinity, Total Coliform, E-Coli, Nitrates, Magnesia etc.

A. Case Study

The Ulhas River water samples for five locations were collected for analysis in the month of July 2017 (Monsoon period). The water samples were tested and analysed for seven critical water quality parameters viz., pH, Turbidity, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Coliform (TC) and Escherichia Coli (E. coli). The analysis and evaluation of the collected Ulhas River water samples was done in “Water Quality Laboratory”, Level-II, Government of Maharashtra, Water Resources Department, Kalwa (Thane). Total five locations in Thane district on the 122 km long Ulhas River were collected and analysed for the above mentioned seven critical water quality parameters. The location details are as follows:

B. Location A

Ulhas River at the upstream (u/s) of Badlapur Water Works, village Kulgaon, Taluka Ambernath, District Thane.
Latitude- 19º 08.969’
Longitude- 73º 15.205’

C. Location B

Ulhas River at the downstream (d/s) of Badlapur Water Works, village Valivali, Taluka Ambernath, District Thane.
Latitude- 19º 11’
Longitude- 73º 14’

D. Location C

Ulhas River at Jambhul Water Works, village Jambhul, Taluka Ambernath, District Thane.
Latitude- 19º 12.012’
Longitude- 73º 13.612’

E. Location D

Ulhas River at the upstream (u/s) of National Century Rayon Bund, village Mohne, Taluka Kalyan, District Thane.
Latitude- 19º 15’
Longitude- 73º 15’

F. Location E

Ulhas River at the upstream (u/s) of Gandhari Bridge, Near Aadharwadi, Taluka Kalyan, District Thane.
Latitude- 19º 15.512’
Longitude- 73º 15’

G. Methodolgy

The Ulhas River water samples were analysed for seven water quality parameters viz., pH, Turbidity, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chmeical Oxygen Demand (COD), Total Coliform and Escherichia Coli.

©IJRASET (UGC Approved Journal): All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887
Volume 5 Issue X, October 2017- Available at www.ijraset.com

IV. RESULT AND DISCUSSION

Tabular & Graphical Representation of Physico-chemical & Bacteriological Parameters

Table 1 pH of Water Sample

Sr. No	Location	pH Value (No.)
1	A	6.55
2	B	6.84
3	C	6.65
4	D	6.88
5	E	7.56

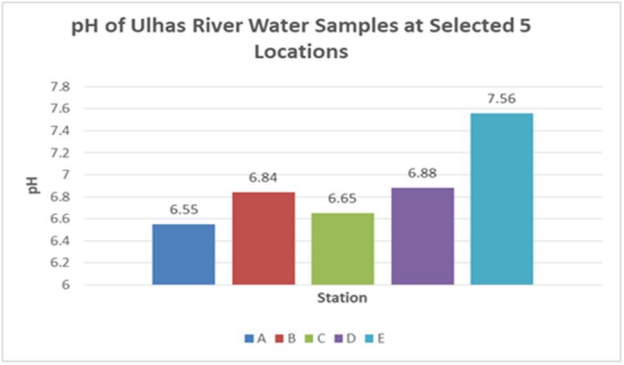


Figure 1. pH of the water sample at selected 5 Locations

Table 2 Turbidity of Water Sample

Sr. No	Location	Turbidity (NTU)
1	A	13
2	B	11
3	C	2
4	D	3
5	E	15

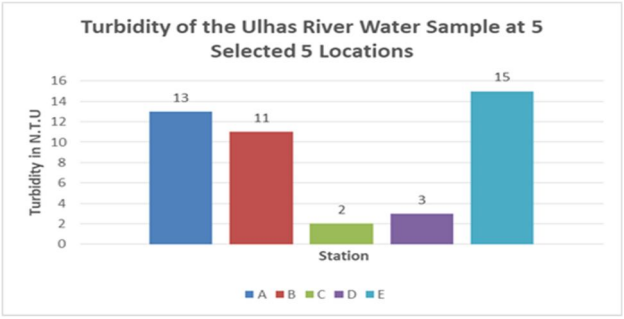


Figure 2. Turbidity of the water sample at selected 5 Locations

Table 3 Dissolved Oxygen of Water Sample

Sr. No	Location	Dissolved Oxygen (mg/L)
1	A	7
2	B	5.9
3	C	7.7
4	D	4.6
5	E	6.2

©IJRASET (UGC Approved Journal): All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887
Volume 5 Issue X, October 2017- Available at www.ijraset.com

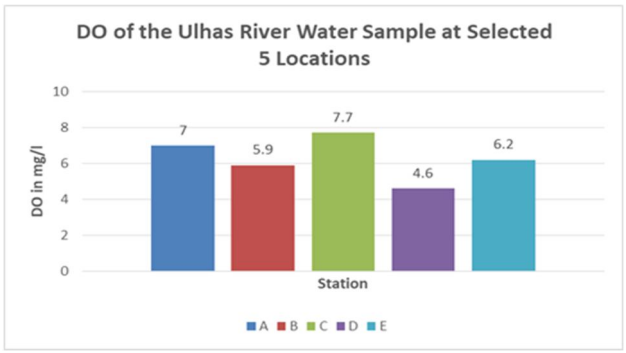


Figure 3. DO of the water sample at selected 5 Locations

Table 4 Biochemical Oxygen Demand of Water Sample

Sr. No	Location	Biochemical Oxygen Demand (mg/L)
1	A	6
2	B	16
3	C	20
4	D	24
5	E	14

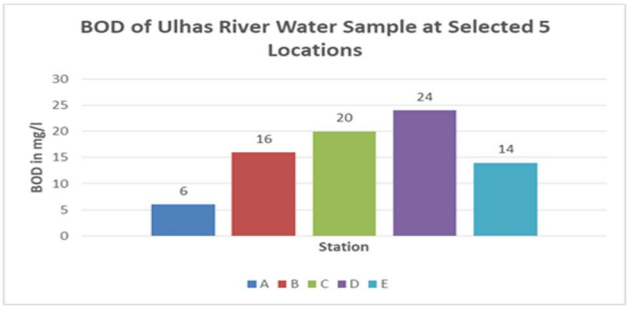


Figure 4. BOD of the water sample at selected 5 Locations

Table 5 Chemical Oxygen Demand of Water Sample

Sr. No	Location	Chemical Oxygen Demand (mg/L)
1	A	20
2	B	60
3	C	69
4	D	79
5	E	50

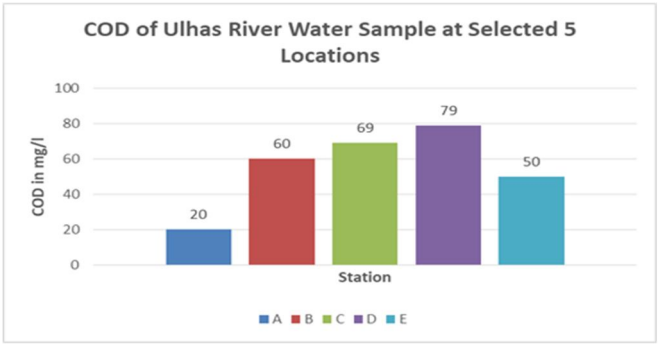


Figure 5. COD of the water sample at selected 5 Locations

©IJRASET (UGC Approved Journal): All Rights are Reserved

Table 6 Total Coliform of Water Sample

Sr. No	Location	MPN Index/ 100 mL
1	A	49
2	B	70
3	C	33
4	D	94
5	E	46

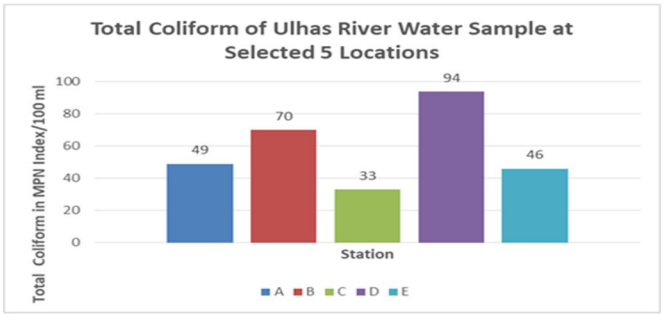


Figure 6. Total Coliform of the water sample at selected 5 Locations

Table 7 Escherichia Coli of Water Sample

Sr. No	Location	MPN Index/ 100 mL
1	A	0
2	B	2
3	C	0
4	D	10
5	E	20

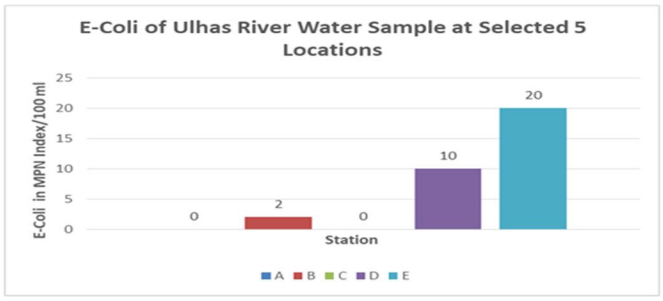


Figure 7. Escherichia Coliform of the water sample at selected 5 Locations

III. DISCUSSION

A. pH

Comparing the obtained results with the standard desired limit range of 6.5-8.5 for “A” class quality water the obtained results of the water sample analysed are well within the desired standard limits.

B. Turbidity

Comparing the obtained results with the standard desired limit range of 5 N.T.U for “A” class quality water the obtained results of the water sample analysed are marginally above the desired standard limits, except at station 3 and station 4. The drop in the turbidly at these the locations may

©IJRASET (UGC Approved Journal): All Rights are Reserved

be attributed to the drastic change in direction of the river flow.

C. Dissolved Oxygen

Confronting the obtained results with the standard desired limit range of 5 mg/L the obtained results of the water sample analysed are within the desired standard limits. These can be due to the mixing of the atmospheric oxygen in to the river water due to its characteristics flow pattern of twists and turn with change in altitude.

D. Biochemical Oxygen Demand

The BOD is slightly above the standard limit at station "A", which is the source of Water Intake for Badlapur city. At all other locations the BOD value is marginally above the desired limits indicating organic pollution of the river water. With proper chlorination and treatment water can be used for drinking and other domestic purposes.

E. Chemical Oxygen Demand

The COD is moderately above the desired limits indicating organic and chemical pollution of the river water. At station "A" which is the Drinking Water Intake for Badlapur City,
the COD value is slightly more than the standard value and the water can be used with proper water purification and treatment for drinking and other domestic purposes.

F. Total Coliform

The high values of Total Coliform indicates bacteriological contamination of the river water. The obtained results are well above the desired limits except at Station "A", the source of water supply to Badlapur city and at station "E" the end point of study. The presence of bacteria can be linked with the monsoon season in addition to the pollution load. The water can be used for drinking from station "A" with disinfection and proper purification treatment.

G. Escherichia Coli

The absence of E-Coli at station "A" indicates safe water source for drinking. Also at station "C", the value of E-Coli is zero, indicating safe intake of water at Jambhul water works for Ambernath city. The zero value can be due to self-purification of stream. At all other station the presence of E-Coli indicates microbiological contamination detrimental to health. Water can be used with chlorination and allied disinfection treatment.

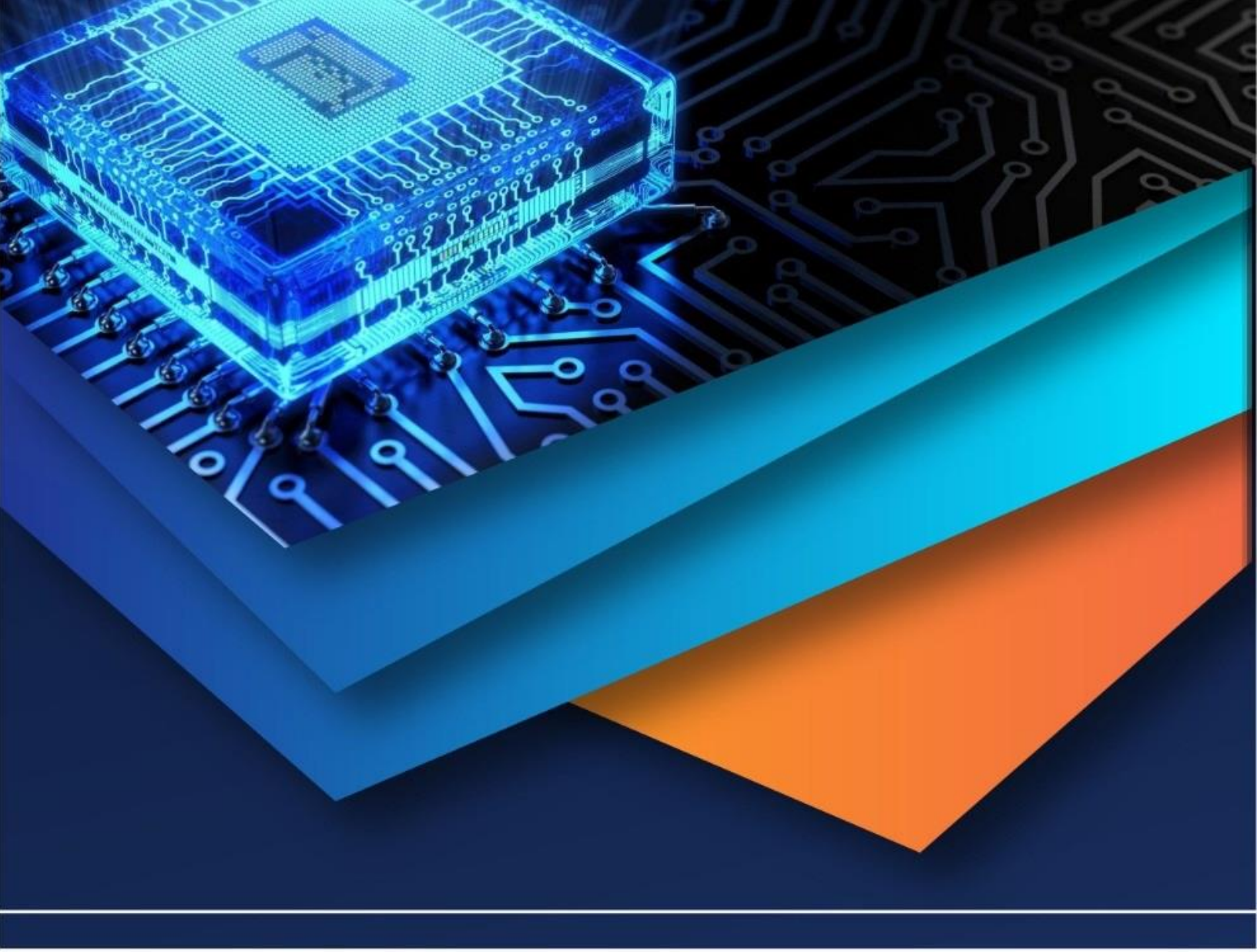
III. CONCLUSION

It can be concluded from the analysis of the seven water quality parameters viz., pH, Turbidity, Dissolved Oxygen, Biochemical Oxygen Demand, Chemical Oxygen Demand, Total Coliform, and Escherichia Coli considered in this study that Ulhas river water is slightly polluted in terms of physicochemical parameters and moderately polluted in terms of microbiological parameters.
Extensive data on water quality creates an opportune setting for a study on water quality, water pollution and health. These findings only warrant the need for continuous and regular water quality monitoring of the Ulhas river and suitable measures to be taken to protect and preserve the river water quality.

REFERENCES

[1] Asheesh Shrivastava et al.,Water Quality Management Plan for Patalganga River Drinking Purpose and Human Health Safety,Issue 3, Volume 1, 2015, pp. 0071-0087, International Journal of Scientific Research in Environmental Sciences, ISSN: 2322-4983
[2] Gadekar M. R et al., Review on /river Water Quality Designation, Issue 9, Volume 2, September 2012, International Journal of Emerging Technology & Advanced Engineering, ISSN: 2250-2459.
[3] Ms. Ami Gor et al., Water Quality Index of Mahi River, Vadodara, Gujarat, Issue 3, Volume 2, 2014, pp. 3214-3219, International Journal of Engineering Development & Research, ISSN: 2321-9939.
[4] S. K. Pathak et al., Determination of Water Quality Index, of River Bhagirathi in Uttarkashi, Uttarakhand, India, Issue 9, Volume 3, September 2015, International Journal of Research- Granthaalayah,e. ISSN: 2350-0530, p. ISSN: 2394-3629.
[5] R.E.S Olivera et al., An Indicator System for SurfaceWater Quality in River Basins, July 11-14, 2005, The Fourth Inter-Celtic Colloquium on Hydrology & Management of Water Resources.
[6] www.google.com
[7] Wikipedia

©IJRASET (UGC Approved Journal): All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)