

"Education for Knowledge, Science and Culture"
-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's
VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)
Department Of Microbiology

Value Added Course
"Waste Water Management"



Academic Year: 2019-2020

"Education for Knowledge, Science and Culture"

-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikahan Sanstha's

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Department of Microbiology

Value Added Course (2019-2020)

Name of the course – "Waste Water Management"

INDEX

Sr. No.	Content
1	Brochure
2	Notice
3	Syllabus
6	Time table
7	Student attendance
8	Theory exam question paper
9	Practical exam question paper
10	Students answer sheets
11	Results
12	Certificate

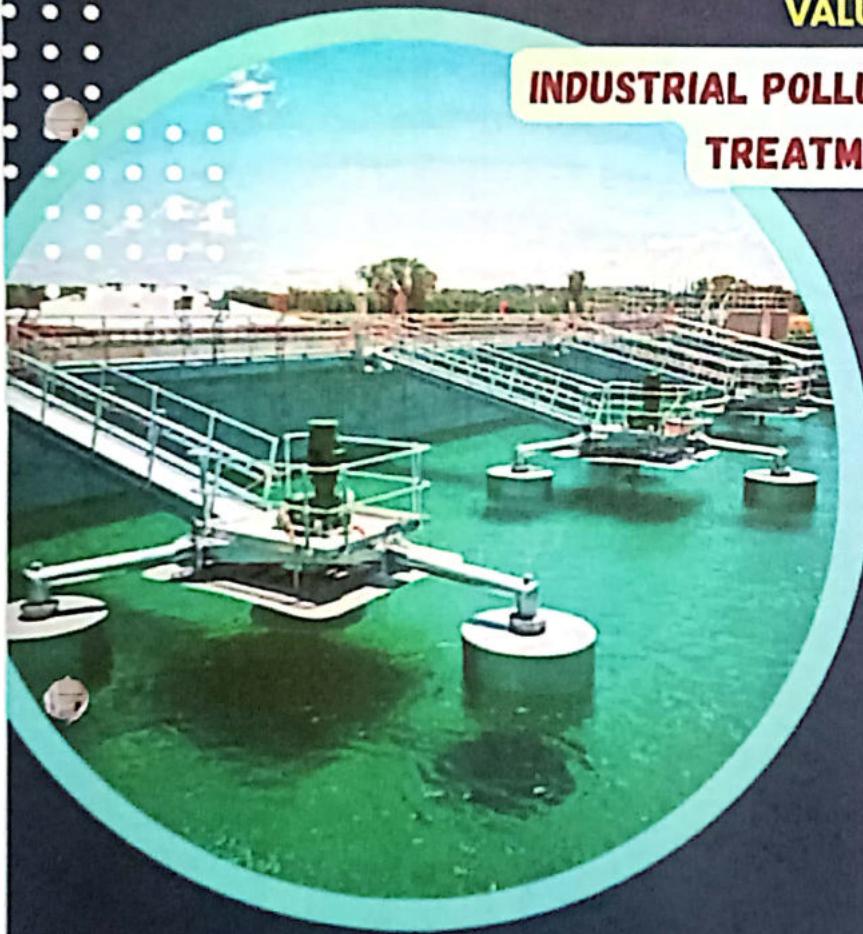


**VIVEKANAND COLLEGE, KOLHAPUR
(AUTONOMOUS)**

**DEPARTMENT OF MICROBIOLOGY
2019-2020**

VALUE ADDED COURSE

**INDUSTRIAL POLLUTION CONTROL AND WASTE
TREATMENT TECHNOLOGY**



VALUE ADDED COURSE

AFTER COMPLETION OF THIS COURSE, THE
STUDENTS WILL BE ABLE TO:
1. USE WASTE WATER TREATMENT
TECHNOLOGIES
2. UNDERSTAND THE IMPACTS OF POLLUTION
ON ENVIRONMENT

LIMITED SEATS

**Contact:
9970191188**



"Education for Knowledge, Science and Culture"

- Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

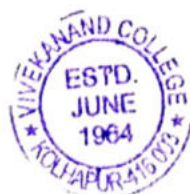
Department of Microbiology

Value Added Course 2019-2020

"Waste Water Management"

Sr. No.	Heading	Particulars
1	Title of the Course	Industrial Pollution control and waste treatment technology
2	Eligibility for Admission	Candidate who passed 10+2 examination with at least 45% marks in aggregate in Arts/ Commerce/ Science
3	Passing Marks for the course	The candidate must obtain 35 % of the total marks in theory and practical separately to pass the course.
4	Level	Add-on
5	Pattern	Trimester
6	Intake Capacity	40
7	Fees	Rs. 500/-
8	Job opportunities	Sugar industry , Dairy industry ETP, Government and Private sectors
9	To be implemented from the Academic Year	From Academic Year -June 2019-2020
10	Course Co-ordinator	Mr.S.D.Gabale (9970191188)

The present add on course is framed to give sound knowledge with understanding of industrial sector pollution problems and waste water treatment technologies to the student. The goal of the syllabus is to implement career oriented education and skills to student interested in directly entering the industrial workforce.



❖ Course outcomes:

After completion of the course, the students will be able to:

- 1) Acquire skills required in various industries, research labs and in the field of water testing laboratories.
- 2) Understand physico-chemical properties of waste water
- 3) Understand basic and advanced concepts in waste water treatment technologies.
- 4) Apply techniques for determination of characteristics of water.

Title of the course: Waste water management

Total Lectures: 40

Total Marks: 100

THEORY

UNIT-I

Lecture 10

- Physical and chemical characters of waste-
Liquid waste-pH, electrical conductivity, COD, BOD, total solid, total dissolved solids, total volatile solids, total suspended solids, chlorides, sulphates, oils & grease.
Solid waste-pH, electrical conductivity, total volatile solids ash
- Permissible limits of waste generated by-
Sugar industry, Distillery, Dairy, Paper & pulp industries, Textile industries

UNIT-II

Lecture 10

Bioremediation

- Concepts in Bioremediation
Contaminant, xenobiotic, bioaccumulation, biomagnifications, bioaugmentation, consortium, phytoaccumulation, phytoextraction, recalcitration, biotransformation.
- Xenobiotics- concepts, persistence & biomagnifications of xenobiotic molecules. Use of microbes and plants in biodegradation and biotransformation.
- Concept and types of biodegradation.
- Water pollution monitoring-
Biological methods- DO, BOD, SPC.
Chemical methods- COD, pH, TSS, TDS, TS, TVS.



Waste Water Treatment Technology

- Important terminologies in waste treatments systems- Sludge, aerobic treatment, anaerobic treatment, bioengineering, biosolids, clarifiers.
- Waste water treatment systems

Primary, secondary & tertiary treatment methods.

- management of hazardous waste .
- Use of microbial system, root zone technology, reclamation of wasteland, biogas.
- Sludge disposal-
Effect of sludge on environment, methods of sludge disposal.

Books recommended:

- 1) Advances in biotechnological Process; MMizrahi & Wezel.
- 2) Biodegradation and Bioremediation. Academic Press; 2nd edition, Martin Alexander.
- 3) Milton Wainwright. An Introduction to Environmental Biotechnology, Kluwer.

Practical's

Hours 100

Sr. No.	Particulars
1.	Study of laboratory equipments and instruments.
2.	Study of compound microscope.
3.	Cleaning & sterilization of glass wares
4.	Determination of physical parameters of waste water- Temperature, color, odor, pH
5.	Determination of total dissolved solids.
6.	Detection of E.C. of wastewater
7.	Determination of chlorides of wastewater
8.	Determination of alkalinity of wastewater
9.	Determination of DO of waste water
10.	Determination of BOD
11.	Determination of COD
12.	Determination of oil & grease from waste
13.	Determination of SPC of different waste
14.	Preparation of cultural media and its sterilization
15.	Determination of fecal contamination of water – Qualitative & Quantitative estimation.
16.	Techniques of microbial culture cultivation

Assessment:**Term End Theory Assessment –100 marks**

1. Duration - These examinations shall be of three hours duration.



2. Theory question paper pattern:-
- There shall be 20 multiple choice questions each of 1 mark. Five multiple choice questions from each unit.
 - There shall be four major questions one from each unit. All questions shall be compulsory with internal choice within the questions. Each question will be of 40 marks with options.
 - Questions may be sub divided into sub questions a, b, c & d only, each carrying 10 marks and allocation of marks depends on the weightage of the topic.

Practical Examination Pattern: Annual

Sr. No.	Particulars	Marks
1.	Laboratory work	80
2.	Journal	10
3.	Field Visit	10

Field visits-

Visit to ETP of Sugar industries

Visit to ETP of Dairy industries

Visit to ETP of distillery industries

Visit to sewage treatment plant

Books recommended for practical:

- 1) APHA (American Public Health Association) Handbook, 1998
- 2) Soil, Plant, Water analysis- P.C. Jaiswal
- 3) Chemical and biological analysis of water- Dr. R. K. Trivedi and P.K. Goel
- 4) Practical Biochemistry- J. Jayaraman



VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Department of Microbiology

Add On Course 2019-2020

Name of the course – “Industrial pollution control & waste treatment technology”

TIME-TABLE

Time	Monday	Tuesday
9.00am to 10.00am	VVM/SAP	SVJ/SDG/SAK
10.00am to 11.00am	VVM/SAP	SVJ/SDG/ SAK



VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

Department of Microbiology

Add On Course 2019-20

“Industrial Pollution Control and waste treatment technology”

Time table

All the students of Add on course “Industrial Pollution Control and waste treatment technology”, Department of Microbiology are hereby informed that the lectures and practical’s of the course will be conducted on Monday and Tuesday of every week from 09:00 am to 11:00 am from 2nd Sept., 2019.



Course Co-ordinator



Department of Microbiology
Add On Course 2019-2020
THEORY ATTENDANCE

Sr. No.	Name of Student	26/8/19	27/8/19	03/9/19	04/9/19	09/09/19	16/09/19	17/09/19	23/09/19	24/09/19	30/09/19	01/10/19
1.	Ms. Vaishnavi Milind Patil	A	P	A	A	A	A	P	A	P	P	P
2.	Ms. Sayali Shankar Chavan	P	P	A	A	A	P	P	P	P	P	P
3.	Ms. Sayali Tukaram Torase	A	P	P	A	P	P	P	P	P	P	P
4.	Ms. Anushka Dhanaji Patil	P	P	P	A	P	A	P	A	P	P	P
5.	Ms. Monica Gorakhnath Sutar	P	P	P	P	P	P	A	A	P	P	P
6.	Ms. Priyanka Vijay Humbe	P	P	P	P	A	P	A	A	A	P	P
7.	Ms. Krutika Rajendra Koli	P	P	P	P	A	P	P	A	A	P	P
8.	Ms. Sayali Bhausaheb Lad	A	P	A	A	P	P	P	A	A	P	P
9.	Ms. Shweta Bajirao Sutar	A	P	A	A	A	P	P	P	P	P	A
10.	Ms. Fiza Aftab Naikwadi	A	P	A	A	A	A	A	A	A	P	P
11.	Ms. Prajakta Chandrakant Gurav	A	A	P	A	P	A	P	A	A	P	P
12.	Ms. Ravina Kiran Powar	P	A	P	A	A	P	P	P	P	P	P
13.	Ms. Shreya Sunil Sutar	A	P	A	A	A	A	A	A	A	P	P
14.	Mr. Rohan Ramdas Jadhav	A	P	A	A	A	A	A	A	A	P	P
15.	Mr. Omkar Shashikant Chaugale	A	A	A	A	A	P	A	A	A	P	P
16.	Mr. Abhay Bajirao Patil	A	P	A	A	A	A	P	A	A	P	P
17.	Ms. Nikita Dilip More	A	P	A	A	A	A	P	A	P	P	P
18.	Mr. Rameshwar Balaji Munde	A	A	A	A	A	P	P	A	A	P	P
19.	Ms. Arundhati Avinash Kamble	P	P	P	P	P	P	P	P	P	P	P
20.	Ms. Ruchita Chandrakant Khairmode	A	A	P	A	P	A	A	A	P	P	A
21.	Ms. Manasi Anil Havale	P	P	P	P	P	A	P	A	A	P	P
22.	Ms. Akshata Kuber Patil	P	P	P	P	P	P	P	A	P	P	P
23.	Ms. Shweta Vishnu Thanekar	P	P	P	P	P	P	P	P	P	P	P
24.	Ms. Nita Tanaji Patil	A	A	P	A	P	P	P	A	P	P	P
25.	Ms. Shraddha Prakash More	P	P	P	P	P	P	P	A	A	P	P
26.	Ms. Supriya Ananda Lad	P	P	P	P	P	P	P	P	P	P	P
27.	Ms. Tejaswini Subhash Shinde	A	P	P	P	P	P	P	P	P	P	P
28.	Ms. Nilam Ananda Varute	P	P	A	P	P	P	P	P	P	P	P
29.	Ms. Srushti Pandurang Angre	A	P	P	P	A	A	A	A	A	A	P
30.	Ms. Shital Krushnat Malap	A	P	P	P	A	P	A	P	A	A	P
31.	Ms. Vaishnavi Ramdas Gurav	A	A	A	A	P	P	P	P	P	P	P
32.	Mr. Sanjyot Deepak Kadam	A	A	A	A	P	P	A	P	P	A	P
33.	Ms. Snehal Sanjay Bolaikar	A	A	A	A	P	P	A	A	A	P	P
34.	Ms. Smita Jaysing Patil	A	A	P	P	P	P	P	A	P	P	P
35.	Ms. Ketaki Jaywant Sutar	A	A	P	P	P	P	P	P	P	P	P
36.	Mr. Sumedh Suhas Bhagwan	A	A	P	P	P	P	P	P	P	P	P
37.	Ms. Saipriya Srinivas Kambalapalli	A	A	P	P	P	P	P	P	P	P	A
38.	Ms. Pradnya Shamrao Mitake	P	A	A	A	A	A	A	P	A	P	P
39.	Ms. Chaitanya Milind Rajadnya	P	P	A	P	A	P	A	A	A	P	P
40.	Ms. Pratiksha Ganesh Kamble	P	A	A	P	P	P	A	A	A	P	P
41.	Ms. Mrunal Hirdekar	A	A	P	P	P	P	A	P	P	P	A



Department of Microbiology
Add On Course 2019-2020
PRACTICAL AATENDANCE

Sr. No.	Name of Student	04/10/19	05/10/19	19/10/19	22/10/19	23/10/19	16/12/19	17/12/19
1.	Ms. Vaishnavi Milind Patil	P	P	A	P	A	P	P
2.	Ms. Sayali Shankar Chavan	P	A	P	P	P	P	P
3.	Ms. Sayali Tukaram Torase	P	P	P	P	P	P	P
4.	Ms. Anushka Dhanaji Patil	P	P	P	P	P	P	P
5.	Ms. Monica Gorakhnath Sutar	P	A	P	P	P	P	P
6.	Ms. Priyanka Vijay Humbe	P	A	P	P	P	P	P
7.	Ms. Krutika Rajendra Koli	P	P	P	P	P	A	P
8.	Ms. Sayali Bhausaheb Lad	P	P	A	P	A	A	P
9.	Ms. Shweta Bajirao Sutar	A	A	P	P	P	P	P
10.	Ms. Fiza Aftab Naikwadi	A	A	P	A	P	A	P
11.	Ms. Prajakta Chandrakant Gurav	P	P	P	P	P	P	P
12.	Ms. Ravina Kiran Powar	P	A	P	P	P	P	P
13.	Ms. Shreya Sunil Sutar	P	A	A	P	A	A	A
14.	Mr. Rohan Ramdas Jadhav	A	P	A	P	A	A	A
15.	Mr. Omkar Shashikant Chaugale	A	P	A	P	A	A	P
16.	Mr. Abhay Bajirao Patil	P	A	P	P	P	A	P
17.	Ms. Nikita Dilip More	P	A	P	P	P	A	P
18.	Mr. Rameshwar Balaji Munde	P	A	A	P	A	A	A
19.	Ms. Arundhati Avinash Kamble	P	P	A	P	A	P	P
20.	Ms. Ruchita Chandrakant Khairmode	A	P	A	P	A	A	P
21.	Ms. Manasi Anil Havale	P	P	P	P	P	A	P
22.	Ms. Akshata Kuber Patil	P	P	P	P	P	A	P
23.	Ms. Shweta Vishnu Thanekar	P	P	P	P	P	P	P
24.	Ms. Nita Tanaji Patil	P	A	P	P	P	P	P
25.	Ms. Shraddha Prakash More	P	P	P	P	P	P	P
26.	Ms. Supriya Ananda Lad	P	P	P	P	P	P	P
27.	Ms. Tejaswini Subhash Shinde	P	P	P	P	P	P	P
28.	Ms. Nilam Ananda Varute	P	P	P	P	P	P	P
29.	Ms. Srushti Pandurang Angre	A	A	P	P	A	A	A
30.	Ms. Shital Krushnat Malap	P	P	A	P	A	A	P
31.	Ms. Vaishnavi Ramdas Gurav	P	P	A	P	P	P	P
32.	Mr. Sanjyot Deepak Kadam	P	P	A	P	P	P	P
33.	Ms. Snehal Sanjay Bolaikar	P	A	A	P	P	A	A
34.	Ms. Smita Jaysing Patil	A	A	P	P	A	A	P
35.	Ms. Ketaki Jaywant Sutar	P	A	A	P	A	P	P
36.	Mr. Sumedh Suhas Bhagwan	P	P	A	P	A	A	P
37.	Ms. Saipriya Srinivas Kambalapalli	P	P	A	P	P	P	P
38.	Ms. Pradnya Shamrao Mitake	P	P	A	P	A	A	A
39.	Ms. Chaitanya Milind Rajadnya	P	A	A	P	A	A	A
40.	Ms. Pratiksha Ganesh Kamble	P	P	A	P	A	A	A
41.	Ms. Mrunal Hirdekar	P	A	A	P	P	A	P



Department of Microbiology
Add On Course 2019-2020
THEORY ATTENDANCE

Sr. No.	Name of Student	30/9/19	1/10/19	2/10/19	3/10/19	7/10/19	9/10/19	14/10/19	15/10/19	16/10/19	12/12/19	19/12/19
1.	Ms. Vaishnavi Milind Patil	A	P	P	P	P	A	A	P	P	P	P
2.	Ms. Sayali Shankar Chavan	P	P	P	P	P	A	P	P	A	P	P
3.	Ms. Sayali Tukaram Torase	P	P	P	P	P	P	P	P	A	P	A
4.	Ms. Anushka Dhanaji Patil	P	P	A	P	P	A	P	P	P	P	A
5.	Ms. Monica Gorakhnath Sutar	P	P	P	P	P	P	P	P	P	P	P
6.	Ms. Priyanka Vijay Humbe	P	P	A	P	P	A	P	P	P	P	A
7.	Ms. Krutika Rajendra Koli	P	P	P	P	P	A	P	P	P	P	A
8.	Ms. Sayali Bhausaheb Lad	P	P	A	P	P	P	P	P	P	P	A
9.	Ms. Shweta Bajirao Sutar	P	P	P	P	P	A	P	P	P	P	P
10.	Ms. Fiza Aftab Naikwadi	P	P	A	P	P	A	P	A	A	A	P
11.	Ms. Prajakta Chandrakant Gurav	P	P	A	P	P	P	A	P	P	P	P
12.	Ms. Ravina Kiran Powar	P	P	P	P	P	A	P	P	A	P	P
13.	Ms. Shreya Sunil Sutar	P	A	A	P	P	A	P	P	A	P	P
14.	Mr. Rohan Ramdas Jadhav	P	P	A	P	P	A	P	P	A	P	A
15.	Mr. Omkar Shashikant Chaugale	P	P	A	P	P	A	P	P	A	P	A
16.	Mr. Abhay Bajirao Patil	P	P	A	P	P	A	P	P	A	P	A
17.	Ms. Nikita Dilip More	P	P	A	P	A	A	P	P	A	P	A
18.	Mr. Rameshwar Balaji Munde	P	P	A	P	P	A	P	P	A	P	P
19.	Ms. Arundhati Avinash Kamble	P	P	P	A	P	P	P	P	P	P	P
20.	Ms. Ruchita Chandrakant Khairmode	A	P	A	P	P	A	P	P	A	P	A
21.	Ms. Manasi Anil Havale	P	P	P	P	P	P	P	A	A	P	P
22.	Ms. Akshata Kuber Patil	P	P	P	P	P	P	P	A	P	P	P
23.	Ms. Shweta Vishnu Thanekar	P	A	P	P	P	P	P	A	P	P	A
24.	Ms. Nita Tanaji Patil	P	P	A	P	P	A	P	P	A	P	P
25.	Ms. Shraddha Prakash More	P	P	P	P	P	P	P	P	P	P	P
26.	Ms. Supriya Ananda Lad	P	P	A	P	P	P	A	P	P	P	P
27.	Ms. Tejaswini Subhash Shinde	P	P	P	P	P	P	P	P	A	P	A
28.	Ms. Nilam Ananda Varute	P	P	A	P	P	P	P	P	A	P	P
29.	Ms. Srushti Pandurang Angre	A	A	P	P	A	A	P	P	A	P	P
30.	Ms. Shital Krushnat Malap	P	P	P	P	A	A	P	P	A	P	A
31.	Ms. Vaishnavi Ramdas Gurav	P	P	P	A	P	A	P	P	A	P	A
32.	Mr. Sanjyot Deepak Kadam	P	P	P	P	P	P	P	P	A	P	A
33.	Ms. Snehal Sanjay Bolaikar	A	P	A	P	P	P	P	P	A	P	A
34.	Ms. Smita Jaysing Patil	P	P	P	P	P	A	P	P	P	P	A
35.	Ms. Ketaki Jaywant Sutar	P	P	P	P	P	P	P	P	P	P	P
36.	Mr. Sumedh Suhas Bhagwan	P	P	P	P	P	P	P	A	P	P	P
37.	Ms. Saipriya Srinivas Kambalapalli	P	P	P	P	P	P	P	P	A	P	A
38.	Ms. Pradnya Shamrao Mitake	P	P	A	P	P	P	P	P	P	A	A
39.	Ms. Chaitanya Milind Rajadnya	P	P	A	P	P	A	P	P	A	P	A
40.	Ms. Pratiksha Ganesh Kamble	P	P	A	P	P	A	A	P	A	A	A
41.	Ms. Mrunl Hirdekar	P	P	A	A	P	A	P	P	A	P	P



Department of Microbiology
Add On Course
“Industrial Pollution control and waste treatment technology”
Theory Examination 2019-2020

Date: 2nd Jan., 2020

Total marks- 100

Time- 9.00am to 12.00pm

- Instructions:** 1) All questions are compulsory
2) Draw neat labeled diagram wherever necessary.
3) Figures to the right indicates full marks

Q.1 Rewrite the sentence by choosing most correct alternative from the given alternatives. 20

i. In Air pollution act no. of sections are involved.

- a) 54 b) 26 c) 34 d) 56

ii. The amount of oxygen required for oxidation of organic matter by Microorganisms is known as.....

- a) Dissolved Oxygen b) BOD c) COD d) Total organic count

iii. The complete description of environment is involved in.....

- a) Baseline studies b) Identification of impacts c) Prediction of impacts d) Evaluation of impacts

iv. Total viable microbial count can be determined by using..... method.

- a) DMC b) SPC c) COD d) BOD

v. The process of removal of environmental pollutants from soil, air, water using micro-organisms is called.....

- a) Bioaccumulation b) Bioremediation c) Phyto-extraction d) Biotransformation

vi. Environment protection act was enacted in the year.....

- a) 1974 b) 1981 c) 1986 d) 1996

vii. To determine COD is used as oxidising agent.

- a) Pottasium sulfate b) Pottassium iodide c) Pottasium dichromate d) Sodium dichromate

viii. Consortium is known as.....

- a) Contaminant b) Xenobiotics c) Cocktail of Microorganisms d) Bioconcentration

ix. Dissolved oxygen can be measured by using.....device.

- a) Online DO meter b) Spectrophotometer c) pH meter d) Colorimeter

x. is used to increase rate of sedimentation in water.

- a) Calcium sulfate b) MgSO₄ c) Alum d) Sodium sulfate

xi. is a physical characteristic of waste water.

- a) pH b) COD c) Total alkalinity d) Temperature



VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR
Department of Microbiology
Add-on Course 2019-2020
“Industrial Pollution control and waste treatment technology”
Practical Examination

Date: 1st Jan., 2020

Time: 9 am. To 11.30am.

Total Marks: 50

Q.1 Determine the potability of given water sample by MPN method.
15

OR

Enumerate the bacteria in the given water sample by SPC method.

OR

Determine BOD of the given sewage sample.

OR

Determine COD of the given sewage sample.

Q. 2 Determine alkalinity of given water sample by using suitable technique. 10

Q. 3 Journals 10

Q. 4 Answer the spots A, B, C, D, and E 10

Q. 5 Tour report 05



Department Of Microbiology
Add-on Course 2019-20
RESULT

Sr. No.	Name of Student	Roll No.	Theory marks (Out of 100)	Practical marks (Out of 50)	Total (Out of 150)
1	Ms. Snehal Sanjay Bolaikar	201	37	40	77
2	Mr. Omkar Shashikant Chougale	202	42	32	74
3	Ms. Sayali Shankar Chavan	203	41	38	79
4	Ms. Prajakta Chandrakant Gurav	204	40	35	75
5	Ms. Manasi Anil Havale	205	37	35	72
6	Ms. Priyanka Vijay Humbe	206	43	38	81
7	Mr. Rohan Ramdas Jadhav	207	36	32	68
8	Ms. Krutika Rajendra Koli	208	48	45	93
9	Ms. Sayali Bhausahab Lad	209	41	38	79
10	Ms. Supriya Ananda Lad	210	49	40	89
11	Ms. Shital Krushnat Malap	211	55	38	93
12	Ms. Nikita Dilip More	212	45	39	84
13	Ms. Shraddha Prakash More	213	35	44	79
14	Mr. Rameshwar Balaji Munde	214	39	32	71
15	Ms. Fiza Aftab Naikwadi	215	42	31	73
16	Mr. Abhay Bajirao Patil	216	55	32	87
17	Ms. Akshata Kuber Patil	217	53	42	95
18	Ms. Anushka Dhanaji Patil	218	47	41	88
19	Ms. Nita Tanaji Powar	219	66	39	105
20	Ms. Smita Jaysing Patil	220	39	44	83
21	Ms. Vaishnavi Milind Patil	221	69	42	111
22	Ms. Ravina Kiran Powar	222	49	40	89
23	Ms. Chaitanya Milind Rajadnya	223	50	30	80
24	Ms. Ketaki Jaywant Sutar	224	61	42	103
25	Ms. Monica Gorakhnath Sutar	225	55	42	97
26	Ms. Shreya Sunil Sutar	226	35	30	65
27	Ms. Shweta Bajirao Sutar	227	37	40	77
28	Ms. Shweta Vishnu Thanekar	228	50	44	94
29	Ms. Sayali Tukaram Torase	229	45	41	86
30	Ms. Srushti Pandurang Angre	230	39	35	74
31	Mr. Sumedh Suhas Bhagwan	231	44	42	86
32	Ms. Vaishnavi Ramdas Gurav	232	48	44	92
33	Ms. Mrunal Rangrao Hirdekar	233	42	32	74
34	Mr. Sanjyot Deepak Kadam	234	70	40	110
35	Ms. Saipriya Srinivas Kambalapalli	235	35	41	76
36	Ms. Arundhati Avinash Kamble	236	53	43	96
37	Ms. Pratiksha Ganesh Kamble	237	47	40	87
38	Ms. Ruchitha Chandrakanth Khairmode	238	40	35	75
39	Ms. Pradnya Shamrao Mitake	239	71	38	109
40	Ms. Tejaswini Subhash Shinde	240	45	43	88
41	Ms. Nilam Ananda Varute	241	47	43	90





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Class B.Sc. II Div. _____ Roll No. 224 61
100

Suppliment No. _____ Subject Microbiology

Test / Tutorial No. _____

1. In air pollution act 26 no. of selection are involved.
2. The amount of oxygen required for oxidation of organic matter by micro-organisms is known as BOD.
3. The complete description of environment is involved in Evaluation of impacts.
4. Total viable microbial count can be determined by using SPC method.
5. The process of removal of environmental pollutants from soil, air, water using micro-organisms is called Bioremediation.
6. Environment protection act was enacted in the year 1986.
7. To determine COD Potassium dichromate is used as oxidising agent.
8. Consortium is known as cocktail of micro-organisms.



9. Dissolved oxygen can be measured by using online DO meter.

10. MgSO₄ is used to increase rate of sedimentation in water.

11. Total alkalinity is a physical characteristic of waste water.

12. Any solid, liquid or gaseous substance present in such a concentration which may be injurious to environment is called environmental pollutant.

13. All of above method indirectly measured concentration of organic compounds in water.

14. In anaerobic digestion treatment process CH₄ gas is generated.

15. Trickling filter is an example of secondary treatment process.

16. Mulching process is used to reduce evaporation of soil by covering soil surface.

17. Quaternary treatment removes total solids present in sewage.

18. SO₂ gas is responsible for acid rain.



19. Noise pollution is measured in terms of Decibel

20. In methanogenesis process micro-organisms produce methane. 16

Q 2 (3) Environmental impact assessment:-

Environmental impact assessment is analysing or assessing with the pre planning of project, ~~that~~ industries and its positive & negative impact on environment.

Environmental impact assessment is divided in four types:-

1) Baseline Studies:-

Here the study of project deals, land, infrastructure, archaeological history of place/area is taken in consideration.

2) Identification of Impact:-

Here the resources, availability of raw material, temperature climate environment are studied.

The impacts identified may be positive or may be negative.

3) Prediction of Impact:-

Here prediction of impact means guessing are done in which some will give positive impact some may give negative impact it depends on environmental condition & type of industries or project put forth.

4) Evaluation of Impacts:-

Here the total over all studies are



taken in consideration. The impacts are evaluated and solution and precaution are also discussed to overcome or to cure the impact.

There are 4 types of impact :-

1) temporary impact :-

It is short term and can be reversed back to normal.

2) permanant impact :-

It is long lasting and cannot be reversed back to normal.

3) cumulative impact

It is combination of both may be reversed back may be not.

Evaluation is done in 3 way

1) Mathematical

2) lygraphical

3) statastical

1) Mathematical :- the cost of raw material, useful material, profit, loss, income is considered here.

2) lygraphical :- the mapping of project, geographical area, acceological history is analysed

3) Statasticals :- the over all project cost

Public participation :- Public participation of certain can give opinion about place, climate and other things.

Advantages :-

1) get information

2) can get employment.



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VIVEKANAND COLLEGE (Autonomous), KOLHAPUR

Class _____ Div _____ Roll No. 224

Suppliment No. 1 Subject Microbiology

Test / Tutorial No. _____

3) Can get raw material

Disadvantage:-

1) It may be messy.

2) It may lead to great cost.

There is also another concept in public participation i.e. feed forward and feed backward.

1) feed forward is public opinion towards the project impact.

- it may be positive or negative.

2) feed backward is project owner or government officer giving feedback to public.

32. (2) Reclamation of soil:-

Reclamation of soil means making infertile barren land in fertile condition.

There are many ways to do reclamation of soil to make soil again fertile and nutritious.

Those are:-

1) strip farming: In this method the crop farming is done in the form of strip means in horizontal form to re-nutritize the soil. By this method



forest.

3.3. Water pollution is release of unwanted pollutants in water bodies. To cure that pollution water pollution monitoring is necessary.

There are three types of biological methods.

1) dissolved oxygen

2) BOD (biological oxygen demand)

3) dSPC (standard plate count)

1) dissolved oxygen:- In the water oxygen is in dissolved form. The oxygen is used by all living entities for respiration. In oceans all aquatic animals used dissolved oxygen for metabolic processes. So if the waste from industries is released in water then there is formation of algae bloom i.e. eutrophication by which oxygen can't penetrate in water and there is oxygen depletion in water. The dissolved oxygen is measured by online DO meter. If the oxygen level is low in water then it's hard for aquatic life to survive.

2) BOD:- [Biological oxygen demand]

The oxygen amount used for biological, biochemical metabolic processes by living organism is BOD.

The BOD is counted by experimental way.



The water sample is filled in BOD bottle and incubated for 3-5 days. Because biological living organisms take more time to degrade the organic matter. After 3-5 day the sample was titrate and results were observed.

$$\text{BOD} = \frac{(A-B) \times N \times 0.025}{1000}$$

The formula is used to determine the oxygen amount used by organism.

8) SPC - standard plate count.

In this method the number of bacteria is counted. The count of viable organism is enumerated. The main principle is "one cell give rise to one colony".

Take a water sample. Dilute it with ten fold dilution. Take 1 ml sample and streak it/spread it on sterile nutrient agar plate. Incubate the plate for 24 hrs at 37°C. Observe the results, the growth of colonies is visible. The colonies can be counted & the number of bacteria can be enumerated. The bacteria is measured in cell forming unit [CFU's/ml].

$$\text{SPC} = \frac{\text{No. of colonies} \times \text{dilution factor} \times 1000}{\text{Amount of sample taken}}$$





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Signature of Supervisor

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Class _____ Div _____ Roll No. 224

Suppliment No. 2 Subject Micro.

Test / Tutorial No. _____

Q3 3) Physico chemical characteristics of water
1) pH :- pH of water should be neutral from 6.5 - 8.5.

The waste from industries may contain chemical, dyes, organic matter which may change pH of water.

If the bicarbonate rate is high then the pH of water is alkaline.

2) coloure :-

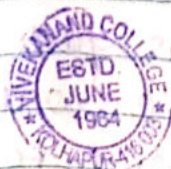
The coloure of water can also change when the waste is released in water bodies.

3) odour :-

The odour of water also change as water get polluted. The algae growth ~~too~~ may also lead to hard odour.

4) taste :-

The taste of water also changes if the water is polluted and not treated properly.



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VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Department of Microbiology

Add-on Course (2019-2020)

Name of the course – “Industrial Pollution Control and Waste Treatment Technology”

Name of Student: Miss. Snehal Sanjay Bolaikar

Exam Seat No.– 201

	Theory	Practical	Grand Total	Percentage (%)	Remark
Max. Marks	100	50	150	51.33	Pass with Second Class
Min. Marks for passing	35	18	-		
Marks Obtained	40	37	77		


Co-ordinator


Principal
PRINCIPAL
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Department of Microbiology

Add-on Course (2019-2020)

Name of the course – “Industrial Pollution Control and Waste Treatment Technology”

Name of Student: Mr. Omkar Shashikant Chaugale

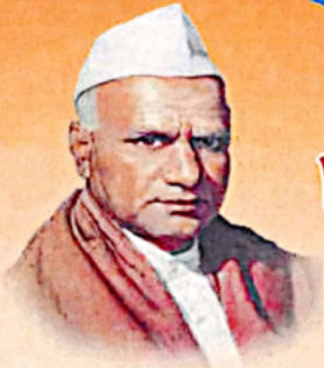
Exam Seat No.– 202

	Theory	Practical	Grand Total	Percentage (%)	Remark
Max. Marks	100	50	150	49.33	Pass with Second Class
Min. Marks for passing	35	18	-		
Marks Obtained	42	32	74		


Co-ordinator




Principal
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Department of
Microbiology
Certificate

This is to certify that Ms. Sayali Bhausahab Lad of B.Sc. I/II/III
Roll No. 209 has successfully completed the value added course on
"Waste water management" carried out in the Department of Microbiology,
Vivekanand College, Kolhapur during 26th Aug. 2019 to 1st Jan 2020
This certificate is awarded to him/her after passing theory and practical examination.


Mr. S. D. Gabale
Course co-ordinator




Dr. S. Y. Hongekar
Principal
PRINCIPAL
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