

"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: 2021-2022



"Education for Knowledge, Science and Culture"

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VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Department of Microbiology

Value Added Course (2021-22)

Name of the course – "Waste Water Management"

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"Education for Knowledge, Science and Culture"

Dr. Bapuji Salunkhe.

कोल्हापूर

Shri Swami Vivekanand Shikshan Sanstha's



Vivekanand College Kolhapur (Autonomous)

DEPARTMENT OF MICROBIOLOGY

Value Added Course

"Industrial Waste Water Management"

Registration Fee

Rs. 500 /-

Limited seats

Hurry up..

First come, first serve

**ADMISSION
OPEN**

Contact :

Ms. V.V. Misal

- 9822376171

Mr. S.D. Gabale

- 9970191188

Ms. S.A. Pise

- 7507611308

Ms. S.V. Jadhav

- 7798087460



मायक्रोबायोलॉजी विभाग
विवेकानंद कॉलेज (श्रवस्त)
दिनांक : 02/12/2021

प्रति,
भा. प्राचार्यसो,
विवेकानंद कॉलेज,
कोल्हापूर.

विषय : Value added course शुरू करणेबाबत
मा. महोदय,
वरील विषयानुसार शैक्षणिक वर्ष 2021-22 मध्ये
मायक्रोबायोलॉजी विभागात " Industrial Waste water management"
हा Value added course शुरू करण्यात येत आहे. या कोर्ससाठी
एकूण 42 विद्यार्थ्यांनी प्रवेश घेतला आहे. तरी शहरचा कोर्स शुरू
करण्यासाठी परवानगी द्यावी, अशी आपणांस नम्र विनंती.
कळवे,

Allowed
PR
04-12-2021

डॉ. ~~सोनकर~~ सोनकर
PR
4.12.21



पिता,
Head/Co-ordinator
Department of Microbiology
Vivekanand College, Kolhapur

आपला विश्वासू

Slabak

[सुरज दि. गळोके]

Course Co-ordinator

श्री स्वामी विवेकानंद शिक्षण संस्थचे
विवेकानंद कॉलेज ,कोल्हापूर (स्वायत्त)
मायक्रोबायोलॉजी विभाग
Add On Course 2021-22
“Industrial waste water management”

दि. १६.११.२०२१

नोटीस

बी.एस्सी. भाग २ आणि ३ मधील सर्व विद्यार्थ्यांना सुचित करण्यात येते की मायक्रोबायोलॉजी विभागामध्ये “Industrial waste water management” हा कोर्स सुरू करण्यात येत आहे. तरी इच्छुक विद्यार्थ्यांनी प्रवेशासाठी मायक्रोबायोलॉजी विभागाशी (रूम.६६) दि.२३.११.२०२१ पर्यंत संपर्क साधावा.

[Signature]

Head/Co-ordinator
Department of Microbiology
Vivekanand College Kolhapur



[Handwritten signature]

B.Sc II (Pm) *[Signature]*

B.Sc IV CP.P *[Signature]*

B.Sc. III (Chem) *[Signature]*

B.Sc. III (Chem) *[Signature]*

B.Sc - III Entire Biotech *[Signature]*

B.Sc - II & I Entire Biotech *[Signature]*

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VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

Department of Microbiology

Value Added Course 2021-2022

"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 2021-2022
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:-

- a. There shall be 20 multiple choice questions each of 1 mark. Five multiple choice question from each unit.
- b. 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.
- c. 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 2021-2022

Name of the course – “Industrial waste water management”

LIST OF STUDENTS

Sr. No.	Name of Student	Class
1	Ms. Aarohi Anil Tadwale	B.Sc. II
2	Ms. Manasi Suresh Ghosalkar	B.Sc. II
3	Ms. Gayatri Pramod Basare	B.Sc. II
4	Ms. Pavanashwari Mallappa Kamble	B.Sc. II
5	Ms. Kishori Narayan Padwal	B.Sc. II
6	Ms. Shrutika Sambhaji Powar	B.Sc. II
7	Ms. Manasi Shekhar Killedar	B.Sc. II
8	Ms. Nisha Shashikant Jadhav	B.Sc. II
9	Ms. Madhura Buddhiraj Patil	B.Sc. II
10	Ms. Diptee Bajirao Shirolkar	B.Sc. II
11	Ms. Shital Ekanath Powar	B.Sc. II
12	Ms. Vaishnavi Mahesh Baganikar	B.Sc. II
13	Ms. Shweta Santosh Patil	B.Sc. III
14	Ms. Divya Vitthal Wakrushe	B.Sc. III
15	Ms. Sakshi Krishna Kurdekar	B.Sc. III (Biotech)
16	Ms. Karina Suraj Bagade	B.Sc. III
17	Ms. Siddhi Dhananjay Salwankar	B.Sc. III
18	Mr. Prasad Ashok Bandivadekar	B.Sc. III
19	Mr. Yash Sandesh Barapatre	B.Sc. III
20	Mr. Pranav Shriram Datar	B.Sc. III
21	Mr. Mayur Manohar Katala	B.Sc. III
22	Ms. Saniya Rajvardhan Sawant	B.Sc. III
23	Ms. Shamita Shital Patil	B.Sc. III
24	Ms. Veda Sunil Sakhalkar	B.Sc. III
25	Ms. Pratiksha Prabhakar Pange	B.Sc. III
26	Ms. Roma Baramdin Kesarwani	B.Sc. III
27	Ms. Ashwini Shivaji Khot	B.Sc. III



28	Ms. Phulabai Prakash Powar	B.Sc. III
29	Ms. Aditi Ajay Jadhav	B.Sc. III
30	Ms. Shraddha Adinath Davang	B.Sc. III
31	Ms. Sana Chand Mullani	B.Sc. III
32	Ms. Saniya Shakil Shaikh	B.Sc. III
33	Ms. Shagufta Rizwan Moulavi	B.Sc. III
34	Ms. Sujata Ramashish Dixit	B.Sc. III
35	Ms. Vaishanavi Vinayak Ghadage	B.Sc. III
36	Ms. Abhilasha Yadav	B.Sc. III (Zoology)
37	Ms. Divya Ashok Kulkarni	B.Sc. III
38	Ms. Ruth More	B.Sc. III



27	Ms. Abhilasha Yadav	127
28	Ms. Phulabai Prakash Powar	128
29	Ms. Pavanashwari Mallappa Kamble	129
30	Ms. Shraddha Adinath Davang	130
31	Ms. Sana Chand Mullani	131
32	Ms. Saniya Shakil Shaikh	132
33	Ms. Shagufta Rizwan Moulavi	133
34	Ms. Sujata Ramashish Dixit	134
35	Ms. Vaishanavi Vinayak Ghadage	135
36	Ms. Ashwini Shivaji Khot	136
37	Ms. Divya Ashok Kulkarni	137
38	Ms. Ruth More	138



VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

Department of Microbiology

Value added course 2021-22

“Industrial Waste Water Management”

Time table

Date: 02/12/2021

All the students of value added course “Industrial waste water management” of Microbiology department are hereby informed that, the lectures and practical’s of the course will be conducted on Monday and Tuesday of every week from 10:00 am to 11:30 am from 6th Dec., 2021.



Course Co-ordinator



VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Department of Microbiology

Add On Course 2021-2022

Name of the course – “Waste water management”

TIME-TABLE

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



Vivekanand college (Autonomous), Kolhapur

Department of Microbiology

Value added course 2021-2022

Practical attendance

Sr. No.	Name of student	2/1/22	8/1/22	8/1/22	8/1/22	10/1/22	10/1/22	10/1/22
1	Ms. Piyanka S. Koli	A	A	A	A	A	A	A
2	Ms. Vaishnavi M. Baganikar	A	A	A	A	A	A	A
3	Ms. Kishori N. Padwal	A	A	A	A	A	A	A
4	Ms. Shrutika S. Powar	A	A	A	A	A	A	A
5	Ms. Manasi S. Killedar	A	A	A	A	A	A	A
6	Ms. Nisha S. Jadhav	A	A	A	A	A	A	A
7	Ms. Sayma S. Aga	A	A	A	A	A	A	A
8	Ms. Tanjila B. Mokashi	A	A	A	A	A	A	A
9	Ms. Madhura B. Patil	A	A	A	A	A	A	A
10	Ms. Shivani R. Patil	A	A	A	A	A	A	A
11	Ms. Gayatri P. Basare	A	A	A	A	A	A	A
12	Ms. Aarohi A. Tadwale	A	A	A	A	A	A	A
13	Ms. Pavanashwari M. Kamble	A	A	A	A	A	A	A
14	Ms. Diptee B. Shirolkar	A	A	A	A	A	A	A
15	Ms. Shital E. Powar	A	A	A	A	A	A	A
16	Ms. Shweta S. Patil	A	A	A	A	A	A	A
17	Ms. Divya A. Kulkarni	A	A	A	A	A	A	A
18	Mr. Mayur M Katala	A	A	A	A	A	A	A
19	Ms. Divya V. Wakrushe	A	A	A	A	A	A	A
20	Ms. Sakshi K. Kurdekar	A	A	A	A	A	A	A
21	Ms. Veda S. Sakhalkar	A	A	A	A	A	A	A
22	Ms. Karina S. Bagade	A	A	A	A	A	A	A
23	Ms. Siddhi D. Salwankar	A	A	A	A	A	A	A
24	Ms. Saniya R. Sawant	A	A	A	A	A	A	A
25	Ms. Shamita A. Patil	A	A	A	A	A	A	A
26	Mr. Prasad A. Bandivadekar	A	A	A	A	A	A	A
27	Mr. Pranav S. Datar	A	A	A	A	A	A	A
28	Mr. Yash S. Barapatre	A	A	A	A	A	A	A
29	Ms. Pratiksha P. Pange	A	A	A	A	A	A	A
30	Ms. Roma B. Kesarwani	A	A	A	A	A	A	A
31	Ms. Ashwini S. Khot	A	A	A	A	A	A	A
32	Ms. Phulabai P. Powar	A	A	A	A	A	A	A
33	Ms. Aditi A. Jadhav	A	A	A	A	A	A	A
34	Ms. Shradha A. Daryang	A	A	A	A	A	A	A
35	Ms. Sarā C. Mullāni	A	A	A	A	A	A	A
36	Ms. Saniya S. Shaikh	A	A	A	A	A	A	A
37	Ms. Shagufta R. Moulavi	A	A	A	A	A	A	A
38	Ms. Sujata R. Dixit	A	A	A	A	A	A	A
39	Ms. Vaishnavi V Ghatage	A	A	A	A	A	A	A
40	Ms. Manasi S. Ghosalkar	A	A	A	A	A	A	A
41	Abhijasha Yadav	A	A	A	A	A	A	A
42	Ruth more	A	A	A	A	A	A	A



VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

Department of Microbiology

Value Added Course 2021-2022

“Waste Water Management”

EXAM NOTICE

All the students of Value added course “**Waste water management**” are hereby informed that the theory and practical examination of the course are scheduled on **27th and 28th April, 2022** respectively. The certificates will be given only after passing the examination.



Course Co-ordinator



VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Department of Microbiology

Value Added Course

“Waste Water Management”

Theory Examination 2021-2022

Date: 27th April, 2022

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. treatment removes total solids present in sewage.
a) Primary b) Secondary c) Tertiary d) Quaternary
- ii. of the following is a tertiary treatment process.
a) Oxidation pond b) Trickling filter c) Chlorination d) Anaerobic sludge digestion
- iii. In..... stage of anaerobic sludge digestion methane is formed..
a) Hydrolysis b) Methanogenesis c) Acetogenesis d) Acetogenesis
- iv. The natural place of an organism or community is known as
a) Niche b) Biome c) Habitat d) Habit
- v. Pesticide fertilizer causes pollution of.....
a) Air b) Water c) Soil d) Oil
- vi. is a residue left after burning.
a) TDS b) TSS c) Ash d) TVS
- vii. process use plant or algae to remove contaminant from environment.
a) Bioaccumulation b) Bioextraction c) Phytoextraction d) Biotransformation
- viii. As per BIS, the BOD value of water should be less than mg/litre
a) 300 b) 200 c) 100 d) 1000
- ix. SPC is
a) Simple plate count b) Sequence plate count c) Standard plate count d) Standard plaque count
- x. 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
- xi. The complete description of environment is involved in.....
a) Baseline studies b) Identification of impacts c) Prediction of impacts d) Evaluation of impacts
- xii. Total viable microbial count can be determined by using..... method.
a) DMC b) SPC c) COD d) BOD



- xiii. To determine COD is used as oxidising agent.
 a) Pottasium sulfate b) Pottassium iodide c) Pottasium dichromate d) Sodium dichromate
- xiv. is a physical characteristic of waste water.
 a) pH b) Total dissolved solids c) Total alkalinity d) Temperature
- xv. COD value is always than BOD.
 a) Lower b) Higher c) Equals to d) None of the above
- xvi. is used to increase rate of sedimentation in water.
 a) Calcium sulfate b) MgSO₄ c) Alum d) Sodium sulfate
- xvii. Trickling filter is an example of treatment process.
 a) Primary b) Secondary c) Tertiary d) Pretreatment
- xviii. is economically beneficial biological treatment process, as it produces biogas.
 a) Aerobic digestion b) Trickling filter c) Oxidation ponds d) Anaerobic sludge digestion
- xix. method indirectly measures concentration of organic compounds in water.
 a) Dissolved oxygen b) Total organic count c) Chemical oxygen demand d) All of above
- xx. In anaerobic digestion treatment process..... gas is generated.
 a) NO₂ b) CO c) CH₄ d) SO₂

Q.2 Attempt any two-

40

- ii) Explain physical & chemical methods of water pollution monitoring.
 iii) Describe Environmental impact assessment
 ii) Explain in detail reclamation of waste land
 iii) Explain various Physico-chemical characteristics of water.

Q.4 Attempt any four-

40

- i) Root zone technology
 ii) Characters of Solid waste
 iii) Biomagnification of Xenobiotic molecules
 iv) Factors affecting biodegradation and enzymes system for biodegradation
 v) Primary treatment of waste water
 vi) Trickling filter

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

**Department of Microbiology
Value Added Course
"Waste Water Management"
Practical Examination 2021-2022**

Date: 28th April, 2022

Total marks- 50

Time- 9.00am to 12.00pm

-
- Q. 1. Determine the potability of the given water sample by MPN method. 15
OR
Enumerate the bacteria in the given 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
OR
Determine total dissolved solid content of water by using suitable technique

-
- Q.3 Journals 10
Q.4. Answer the spots A, B, C, D and E. 10
Q.5. Viva Voce 05



SU/4 - G - NO.

447316

49
100

1

Signature of Jr. Super.

For University exam only

शिवाजी विद्यापीठ, कोल्हापूर

परीक्षेच्या

या विषयाच्या प्रयोग परीक्षा

Practical Examination in value added course (microbiology)
at the _____ Examinationउमेदवाराचा आसन क्रमांक 132 विभाग _____
(Candidate's Seat No.) (Section)

उमेदवारांना सूचना

- प्रश्न काळजीपूर्वक वाचा आणि त्याप्रमाणे विचारलेला प्रयोग करा.
- उपकरणांच्या वापराबाबत तुम्हांला काही माहीत नसेल तर परीक्षक किंवा प्रयोगशाळा साहाय्यक यांना तुम्हाला मदत करण्याविषयी विनंती करा.
- कोणताही विद्युत्प्रयोग करण्यापूर्वी, प्रत्यक्ष पुरविलेली सर्व उपकरणे आणि सर्व 'कनेक्शन' नीट पाहून घेऊन संबंधित कामाची नीटनेटकी कार्ययोजना करण्याची नितांत आवश्यकता आहे आणि ह्या नंतर, पुढे काम चालू करण्याविषयी परीक्षकांची परवानगी मिळविणे आवश्यक आहे.
- सर्व निरीक्षणे कोष्टकवजा तक्त्यात भरावी. मधल्या सर्व गणना आणि निर्णय हे शक्य तितक्या सुवाच्यपणे आणि स्पष्टपणे नोंदविलेले असणे हे हितावह आहे.
- प्रारंभिक किंवा अंतिम निरीक्षणात संख्यावाचक आकडे एकावर एक लिहू नयेत. जर लिहिलेला कोणताही आकडा नको असेल तर त्यावर एक रेष ओढून पाहिजे असलेला आकडा त्याच्याजवळ लिहा.
- प्रयोगशाळेतून बाहेर पडण्यापूर्वी आपले टेबल चांगल्या स्थितीत आहे याची खात्री करा.

INSTRUCTIONS TO CANDIDATES

- Read the question carefully and perform the experiment as required.
 - If there be anything the apparatus that you do not know, ask the examiner or the laboratory assistant to help you.
 - Before doing any electrical experiment, it is absolutely essential that you make a neat working sketch of all apparatus actually provided and of the necessary connection, and obtain the examiner's permission to proceed.
 - Express all observations in a tabular form.
- It is also desirable that all intermediate calculations and results should be entered as neatly and clearly as possible.
- No numerical figures should be written over either in the preliminary or final observations. If any figure is thought to be discarded it should be run through and the desired figure written near to it.
 - Please see that your table is in good order before you leave the laboratory.

(येथून लेखनास सुरवात करा.) (Begin writing here.)

i)	----- Treatment removes total solids present in sewage c) Tertiary
ii)	----- of following is a tertiary treatment process c) chlorination
iii)	In ----- stage of anaerobic sludge digestion methane is formed b) Methanogenesis





iv) ----- organism occupy special place on biodegradation process

a) pseudomonas

v) ----- is secondary air pollution

b) ozone

vi) ----- is a residue left after burning

d) TUS

vii) ----- process use plants or algae to remove contaminant from environment

c) phytoextraction

viii) As per BIS the BOD value of water should be less than ----- mg/litre

c) 100

ix) spc is -----

c) standard plate count

x) The amount of oxygen required for oxidation of organic matter by microorganism is known as -----

b) BOD

xi) Nitrocellulose is degraded by -----

c) Rhizopus





xii) Total viable microbical count can be determined by using method
b) spc

xiii) To determine COD used as oxidising agent
c) potassium dichormate

xiv) is not major green house gas
b) water vapour

xv) COD value is always than BOD
b) Higher

xvi) is used to increase rate of sedimentation in water.
c) Alum

xvii) In arrangement the earth is shaped in the form of leveled terraces to hold soil & water.
a) Teracing

xviii) is economically beneficial biological tretment process, as it produce biogas
c) oxidation ponds





xix)

----- method indirectly measure
concentration of organic compound in
water

d) All of above

xx)

In anaerobic digestion treatment process
gas is generated.

c) CH₄

12)



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शिवाजी विद्यापीठ, कोल्हापूर

परीक्षेच्या

या विषयाच्या प्रयोग परीक्षा

Practical Examination in value added course (microbiology)

Examination

at the

उमेदवाराचा आसन क्रमांक
(Candidate's Seat No.)

132

विभाग
(Section)

उमेदवारांना सूचना

- प्रश्न काळजीपूर्वक वाचा आणि त्याप्रमाणे विचारलेला प्रयोग करा.
- उपकरणांच्या वापराबाबत तुम्हांला काही माहीत नसेल तर परीक्षक किंवा प्रयोगशाळा साहाय्यक यांना तुम्हाला मदत करण्याविषयी विनंती करा.
- कोणताही विद्युत्प्रयोग करण्यापूर्वी, प्रत्यक्ष पुरविलेली सर्व उपकरणे आणि सर्व 'कनेक्शन' नीट पाहून घेऊन संबंधित कामाची नीटनेटकी कार्ययोजना करण्याची नितांत आवश्यकता आहे आणि ह्या नंतर, पुढे काम चालू करण्याविषयी परीक्षकांची परवानगी मिळविणे आवश्यक आहे.
- सर्व निरीक्षणे कोष्टकवजा तक्त्यात भरावी. मधल्या सर्व गणना आणि निर्णय हे शक्य तितक्या सुवाच्यपणे आणि स्पष्टपणे नोंदविलेले असणे हे हितावह आहे.
- प्रारंभिक किंवा अंतिम निरीक्षणात संख्यावाचक आकडे एकावर एक लिहू नयेत. जर लिहिलेला कोणताही आकडा नको असेल तर त्यावर एक रेष ओढून पाहिजे असलेला आकडा त्याच्याजवळ लिहा.
- प्रयोगशाळेतून बाहेर पडण्यापूर्वी आपले टेबल चांगल्या स्थितीत आहे याची खात्री करा.

INSTRUCTIONS TO CANDIDATES

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(येथून लेखनास सुरवात करा.) (Begin writing here.)

Q.2	
i)	
-	The water carries out the waste water in the various industries or institutions
-	The water are not any treatment & passed through the natural water bodies they cause disease
-	This water are not suitable for drinking





- II) In the TDS slits of the plants and the animals.
- III) The high concentration of the TSS They are affect on the aquatic life.
- IV) The decaying parts of plants & animals in the form TSS

total dissolved solid (TDS)

- I) In the TDS the total amount of the charged ions including in the minerals, salts heavy metal ~~is~~ the present in the water.
- II) They are expressed in the mg/liter
- III) and then also referred as parts per million (ppm)
- IV) the total dissolved solid high concentration of colloidal solid ranges from the 0.01 to 1.0

total volatile solid (Tus)

- I) In this water present high concentration of volatile solid. burned at high temp. of organic matter present in the water.





- ii) It is the major amount of concentration of volatile solid
- iii) They are not suitable for drinking present in synthetic organic matter
- iv) e.g. Lignin

② colour

i) The colour of waste water or sewage water are change from industry to industry

ii) The colour of water are depend upon the concentration of organic & inorganic matter

iii) The waste water are colour ranges brownish & grey

iv) ① brown - The brown colour of waste water. Sulfide industrial microbial activity

② grey - The grey colour of waste water. domestic use, bathroom, kitchen.





v) The normal pH range of sewage water is 5.5 to 8.

② gases

i) The various type of gaseous present in the waste water

ii) carbon, nitroge, hydroge, carbon dioxide, carbon monoxide

iii) The O_2 & CO_2 is help in the oxidase the organic matter

iv) decomposition of organic matter. O_2 , CO_2 & ammonia (NH_3) methane (CH_4) gas are produced.

③ Heavy metal.

i) The the sewage water various types of metals are present in the water

ii) cadmium (Cd) chromium (Cr) Iron (Fe) magnesium (Mg) silver (Ag) copper (Cu) Nickel (Ni)

iii) The high amount of the heavy metal the toxic suspibility are increased the waste water.



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शिवाजी विद्यापीठ, कोल्हापूर

या विषयाच्या प्रयोग परीक्षा

Practical Examination in value added course (microbiology)

at the _____ Examination

उमेदवाराचा आसन क्रमांक
(Candidate's Seat No.)

132

विभाग
(Section)

उमेदवारांना सूचना

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		④ Inorganic matter
		⑥ chloride
		→ The sewage water is the concentration of chloride is higher than normal water supply
		→ The excess amount of the chlorine they are used in the indese pollution.





13) The Global warming are decrease a solution plantation of trees

14) The plantation of tree. increase the atmospheric oxygen level. maintain the temperature

15) The maintain the temperature that not decrease the ozone layer.

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Department of Microbiology

Value Added Course 2021-2022

Name of the course – “Waste water management”

LIST OF STUDENTS

Sr. No.	Name of Student	Roll number	Theory marks (Out of 100)	Practical marks (Out of 50)
1	Ms. Aarohi Anil Tadvale	101	37	35
2	Ms. Shweta Santosh Patil	102	69	40
3	Ms. Gayatri Pramod Basare	103	65	28
4	Ms. Karina Suraj Bagade	104	62	30
5	Ms. Kishori Narayan Padwal	105	40	42
6	Ms. Siddhi Dhananjay Salwankar	106	82	38
7	Ms. Manasi Shekhar Killedar	107	60	40
8	Mr. Mayur Manohar Katale	108	35	20
9	Ms. Madhura Buddhiraj Patil	109	50	28
10	Ms. Shamita Shital Patil	110	70	35
11	Ms. Shital Ekanath Powar	111	72	40
12	Mr. Yash Sandesh Barapatre	112	67	44
13	Ms. Manasi Suresh Ghosalkar	113	35	23
14	Ms. Divya Vitthal Wakrushe	114	44	20
15	Ms. Sakshi Krishna Kurdekar	115	41	32
16	Ms. Aditi Ajay Jadhav	116	76	42
17	Ms. Shrutika Sambhaji Powar	117	39	38
18	Mr. Prasad Ashok Bandivadekar	118	50	40
19	Ms. Vaishnavi Mahesh Baganikar	119	35	28
20	Mr. Pranav Shriram Datar	120	77	45
21	Ms. Nisha Shashikant Jadhav	121	35	32
22	Ms. Saniya Rajvardhan Sawant	122	52	35
23	Ms. Diptee Bajirao Shirolkar	123	49	35
24	Ms. Veda Sunil Sakhalkar	124	75	42
25	Ms. Pratiksha Prabhakar Pange	125	38	30
26	Ms. Roma Baramdin Kesarwani	126	72	25
27	Ms. Abhilasha Avinash Yadav	127	42	34
28	Ms. Phulabai Prakash Powar	128	95	45
29	Ms. Pavanashwari Mallappa Kamble	129	49	32
30	Ms. Shraddha Adinath Davang	130	59	42



31	Ms. Sana Chand Mullani	131	91	43
32	Ms. Saniya Shakil Shaikh	132	68	45
33	Ms. Shagufta Rizwan Moulavi	133	57	42
34	Ms. Sujata Ramashish Dixit	134	64	42
35	Ms. Vaishanavi Vinayak Ghadage	135	84	40
36	Ms. Ashwini Shivaji Khot	136	95	42
37	Ms. Divya Ashok Kulkarni	137	38	38
38	Ms. Ruth Madan More	138	50	35



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Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

Department of Microbiology

Value Added Course (2021-2022)

Name of the course – “Waste Water Management”

Name of Student: Ms. Roma Baramdin Kesarwani

Exam Seat No.- 126

	Theory	Practical	Grand Total	Percentage (%)	Remark
Max. Marks	100	50	150	64.66	Pass with first class
Min. Marks for passing	35	18	-		
Marks Obtained	72	25	97		


Course Co-ordinator




Principal
PRINCIPAL
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Kolhapur

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Shikshanmaharshi Dr. Bapuji Salunkhe
Shri Swami Vivekanand Shikshan Sanstha's
VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR
Department of Microbiology
Value Added Course (2021-2022)
Name of the course – "Waste Water Management"

Name of Student: Ms. Karina Suraj Bagade

Exam Seat No. – 104

	Theory	Practical	Grand Total	Percentage (%)	Remark
Max. Marks	100	50	150	61.33	Pass with first class
Min. Marks for passing	35	18	-		
Marks Obtained	62	30	92		

Sw
Course Co-ordinator



Pee
Principal
PRINCIPAL
Vivekanand College
Kolhapur



"Education for Knowledge, Science and Culture"

- Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's **Vivekanand College, Kolhapur (Autonomous)**

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Department of Microbiology **Certificate**

This is to certify that *Ms. Shweta Santosh Pabli* of *B.Sc. I/II/III*
Roll No. *102* has successfully completed the value added course on
"Waste water management" carried out in the Department of Microbiology,
Vivekanand College, Kolhapur during *6th Dec. 2021 to 28th April 2022*

This certificate is awarded to him/her after passing theory and practical examination.

Mr. S. D. Gabale
Course co-ordinator



Dr. R. R. Kumbhar
Principal
PRINCIPAL
Vivekanand College