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

Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)
Department of Microbiology (PG)

Surprise Test (M.Sc. I Sem I)

Research Methodology

Date-13/09/2024 Marks-20

Q1. Attempt any one of the following 16M

1. Write in detail steps involved in writing research report
2. Explain research methods, methodology and scientific methods

Q.2. Attempt any one of the following 4M

1. Research approach
2. Literature survey

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Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE, KOLHAPUR

(EMPOWERED AUTONOMOUS)

Department of Microbiology (PG)

Academic Year 2024-25

M.Sc. I-Sem I

Surprise Test-Research Methodology

Attendance

Date:13/09/2024

Time: 11:30 to 12:30

Sr. No.	Student Name	Roll No.	Signature
1.	Angaj Aishwarya Maruti	5401	
2.	Balekundri Dhanashri Raju	5402	
3.	Bhinge Revati Gajanan	5403	
4.	Bhosale Rasika Sanjay	5404	
5.	Bhosale Sharayu Pradeep	5405	
6.	Chandala Vaishnavi Vivek	5406	
7.	Chavan Sanika Sagar	5407	
8.	Chavan Sharvari Subhash	5408	
9.	Chavan Vaishnavi Vijay	5409	
10.	Ghodasara Sakshi Pankaj	5410	
11.	Gurav Atharva Ramdas	5411	
12.	Hande Pallavi Ravindra	5412	
13.	Kalamkar Asavari Anil	5413	
14.	Kandalkar Namrata Anil	5414	
15.	Kesarkar Prachi Chandrakant	5415	
16.	Koli Sakshi Deepak	5416	
17.	Malavi Rahul Gautam	5417	
18.	Mane Yash Sanjay	5418	
19.	Mulani Samina Firoj	5419	
20.	Mulla Sanovar Salim	5420	

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ESTD JUNE 1964

21.	Mullani Aasma Sameer	5421	
22.	Padaval Damini Mohan	5422	Damini
23.	Pardeshi Shrutika Manik	5423	SMP
24.	Patil Bhushan Dhanaji	5424	
25.	Patil Samruddhi Bhanudas	5425	SPatil
26.	Patil Samruddhi Sudhir	5426	SPatil
27.	Pawar Galaxy Sunil	5427	Galaxy
28.	Powar Rushita Dinkar	5428	Powar
29.	Sankpal Sourabh Rajaram	5429	SRS
30.	Sawant Rohan Ravindra	5430	RRS
31.	Surgali Shreeshail Mallappa	5431	SMS
32.	Tangade Priti Anil	5432	PTongade
33.	Thorbole Sanika Prakash	5433	Sanika
34.	Yadav Kalyani Dipak	5434	KYadav

Dr. K. K. Bhise

KKBhise

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VIVEKANAND COLLEGE, KOLHAPUR

(EMPOWERED AUTONOMOUS)

Department of Microbiology (PG)

Academic Year 2024-25

M.Sc. I-Sem I

Surprise Test-Research Methodology

Marksheet

Date:13/09/2024
Time: 11:30 to 12:30

Sr. No.	Student Name	Roll No.	Marks (out of 20)
1.	Angaj Aishwarya Maruti	5401	16
2.	Balekundri Dhanashri Raju	5402	18
3.	Bhinge Revati Gajanan	5403	19
4.	Bhosale Rasika Sanjay	5404	14
5.	Bhosale Sharayu Pradeep	5405	20
6.	Chandala Vaishnavi Vivek	5406	16
7.	Chavan Sanika Sagar	5407	20
8.	Chavan Sharvari Subhash	5408	10
9.	Chavan Vaishnavi Vijay	5409	18
10.	Ghodasara Sakshi Pankaj	5410	18
11.	Gurav Atharva Ramdas	5411	16
12.	Hande Pallavi Ravindra	5412	17
13.	Kalamkar Asavari Anil	5413	16
14.	Kandalkar Namrata Anil	5414	16
15.	Kesarkar Prachi Chandrakant	5415	14
16.	Koli Sakshi Deepak	5416	17
17.	Malavi Rahul Gautam	5417	13
18.	Mane Yash Sanjay	5418	14
19.	Mulani Samina Firoj	5419	17

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

20.	Mulla Sanovar Salim	5420	18
21.	Mullani Aasma Sameer	5421	AB
22.	Padaval Damini Mohan	5422	20
23.	Pardeshi Shrutika Manik	5423	16
24.	Patil Bhushan Dhanaji	5424	Ab
25.	Patil Samruddhi Bhanudas	5425	13
26.	Patil Samruddhi Sudhir	5426	14
27.	Pawar Galaxy Sunil	5427	15
28.	Powar Rushita Dinkar	5428	19
29.	Sankpal Sourabh Rajaram	5429	13
30.	Sawant Rohan Ravindra	5430	12
31.	SurgaliShreeshailMallappa	5431	10
32.	Tangade Priti Anil	5432	19
33.	Thorbole Sanika Prakash	5433	18
34.	Yadav Kalyani Dipak	5434	20

Dr. K. K. Bhise

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

20/20

Damini Mohan Padaval
Msc.I . Roll No. 5422
Sub :- Research Methadology

Ques. Write steps involved in Report writing . also write mechanics & Precaustions of report writting.

→

- Research reports are the product of slow, painstaking, accurate inductive work.
- Different steps involved in writing report are as follows :

a) Logical analysis of the subject-matter
b) Preparation of the final outline
c) Preparation of the rough draft
d) Rewriting and polishing
e) Preparation of the final bibliography
f) Writing the final draft

a) Logical analysis of the subject-matter

- It is the first step which is primarily concerned with the development of a subject.
- There are 2 ways in which to develop a subject i) Logically & ii) Chronologically
- The logical development is made on the basis of mental connections & asscciations between the one thing and another by means of analysis.
- logical treatment often consists in developing the material from the simple possible to the most complex structures.
- Chronological development is based on a connection or sequence in time or occurrence.
- The directions for doing or making something usually follow the chronological order.

b) Preparation of the final outline :

- It is the next step in writing the research report "outlines are the framework upon which long written works are constructed.
- They are an aid to the logical organication of the ma-

terial and a reminder of the points to be stressed in the report."

c) Preparation of the rough draft :-

- This follows the logical analysis of the subject & the preparation of the final outline.
- Such a step is of most importance for the researcher now sits to write down what he has done in the context of his research study.
- He will write down the procedure adopted by him in collecting the material for his study along with various limitations faced by him, the technique of analysis adopted by him, the broad findings and generalizations & the various suggestions he wants to offer regarding the problem conneerned.

d) Rewriting & polishing of the rough data :-

- This step happens to be most difficult part of all formal writing.
- Usually this step requires more time than the writing of the rough draft.
- The careful revision makes the difference bet^n a mediocre & a good piece of writing.
- In addition the researcher should give due attention to the fact that in his rough draft he has been consistent or not. He should cheack the mechanics of writing - grammer, spelling & usage.

e) Preparation of the final bibliography :-

- Next in order comes the task of the preparation of the final bibliography.
- The bibliography, which is generally appended to the research report, is a list of books in some way pertinent to the research which has been done.
- It should contain all works which the researcher has consulted. The bibliography should be arraged alphabetically & may be divided into 2 parts; the 1st part may contain the names of books & pamphlets, & 2nd part may contain the names of magazine & newspaper articles.

PAGE NO.:
DATE: / /

↳ For books & pamphlets the order may be as under:

1. Name of author, last name first
2. Tittle, underlined to indicate italics.
3. Place, publisher, & date of publication
4. No. of volumes.

↳ For magazines & newspapers order may be as

1. Name of the author, last name first.
2. Tittle of article, in quotation marks.
3. Name of periodical, underlined to indicate italics.
4. The volume or volume & number.
5. The date of the issue
6. The pagination.

f) Writing the final draft :

- This constitutes the last step.
- Final draft should be written in a concise & objective style & in simple language, avoiding vegue expressions like "it seems", like ones & etc.
- The researcher must avoid abstract terminology & technical jargon.
- Illustrations & examples based on common experiences must be incorporated
- It should not be dull, but must enthuse people & maintain interest & must show originality.
- It should be an attempt to solve some intellectual problem & must contribute to the solution of a problem & must add to the knowledge of both the researcher & the reader.

• MECHANICS OF WRITING A RESEARCH REPORT

- There are very definite & set rules which should be followed in the actual preparation of the research report or paper.

1. Size & physical design :

- The manuscript should be written on unruled paper 8 1/2" x 11" in size
- If it is to be written by hand, then black or blue-black ink should be used
- A margin of at least one & half inches should be allowed at

the left hand & of at least half an inch at the right hand of the paper.
- There should be one-inch margins, top & bottom.
- The paper should be neat & legible.
- If the manuscript is to be typed, then all typing should be double-spaced on one side of the page only, except for the insertion of the long quotations.

2. Procedure :
- various steps in writing the report should be strictly adhered

3. Layout :
- keeping in view the objective & nature of the problem, the layout of the report should be thought of & decided & accordingly adopted. ~~types of reports~~

4. Treatment of quotations :
- Quotations should be placed in quotation marks & double spaced, forming an immediate part of the text.
- But if a quotation is of a considerable length then it should be single-spaced & indented at least half an inch to the right of the normal text margin.

5. The Footnotes :
- The footnotes serve 2 purposes viz., the identification of materials used in quotations in report & the notice of materials not immediately neccessary to body of the research text but still of supplemental value.
- Footnotes should be placed at bottom of page on which the reference or quotation which they identify or supplement ends.
- It should be numbered consecutively, usually beginning with 1 in each chapeter separately.
- They are customarily separated from textual material by a space of half an inch & line about one & half inches long.

6. Documentation style :
(a) Regarding the single-volume reference
i) Author's name in normal order followed by comma,

ii) Tittle of work, underlined to indicate italics;
iii) place & date of publication.
iv) Pagination references (Page no.)

b) Regarding multivolumed reference
i) Author's name in normal order
ii) Tittle of work, underlined to indicate italics;
iii) Place & date of publication;
iv) No. of volume;
v) Pagiation references.
, etc.

7. Puncluation & abbreviations in footnotes :
- Author's name followed by comma then
- Tittle of book (- 1st letter capital) followed by comma
- Then edition information followed by comma
- Place of publication (mentioned in abbrevated form) followed by comma
- Then name of publisher followed by comma
- Date of publication followed by comma (date in square bracket)
- Then volume & page references are separated by comma, if both are given.

8. Use of statistics, charts & graphs :
- Use of statistics contributes a great deal towards the clarification & simplification of the material & research results.
- Usually presented in form of tables, charts, bars & line-graphs & pictogram
- should be self explanatory & complete in itself, should be neat & attractive.

9. The Final draft :
- Revising & rewriting the rough draft of the report should be done with great care before writing the final draft.

10. Bibliography :
- It should be prepared & appended to research report

11. Preparation of the index :
- At end of report, an index should invariably be given, the value of which lies in the fact that it is a good guide,

, to the reader.
- It may be prepared both as subject index & as author index.
- Should be always arrange in alphabetically.

• PRECAUTIONS FOR WRITING RESEARCH REPORTS

1. While determining the length of report, one should keep in view the fact that it should be long enough to cover the subject but short enough to maintain interest. In fact, report writing should not be a means to learning more & more about less & less.
2. A research report should not, if this can be avoided, be dull; it should be such as to sustain reader's interest.
3. Abstract terminology & technical jargon should be avoided in a research report. The report should be able to convey the matter as simply as possible.
4. Readers are often interested in acquiring a quick knowledge of main findings & as such the report must be provided a ready availability of the findings.
5. The layout of the report should be well thought out & must be appropiate & in accordance with the objective of the research problem.
6. The reports should be free from grammatical mistakes & must be prepared strictly in accordance with the techniques of composition of report-writing such as the used of quotations, footnotes, documentation, proper punctuation & use of abbreviations in footnotes and the like.
7. The report must present the logical analysis of the subject matter.
8. A research report should show originality & should necessarily be an attempt to solve some intellectual problem.
9. Towards the end, the report must also state the

Policy implications relating to the problem under consideration.

10. Appendices should be enlisted in respect of all the technical data in report.

11. Bibliography of sources consulted in/is a must for a good report & as must be prepared & appended at the end.

12. Index is also considered an essential part of a good report & as such must be prepared & appended at the end.

13. Report must be attractive in appearance, neat & clean, whether typed or printed.

14. Calculated confidence limits must be mentioned & the various constraints experienced in conducting the research study may also be stated in the report.

15. Objectives of the study, the nature of the problem, the methods employed & the analysis techniques adopted must all be clearly stated in the beginning of the report in the form of introduction.

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Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur

(An Empowered Autonomous Institute)

Department of Microbiology (PG)

Academic Year 2024-25

Notice

10/02/25

All students of M. Sc. Part I are informed that a unit test of Microbial Physiology. Biochemistry and Metabolism will be conducted on Thursday, 20th February 2025 at 12.30 pm. All students should be present for it.

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

Gaupale

Dr. T. C. Gaupale
I/C Head
Department of Microbiology
Vivekanand College, Kolhapur
(Empowered Autonomous)

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Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur

(An Empowered Autonomous Institute)

Department of Microbiology (PG)

Academic Year 2024-25

M. Sc. I Semester II

Unit test

Microbial Physiology, Biochemistry and Metabolism

Date: 20/02/25

Attendance of students

Sr. No.	Name of Student	Roll No.	Sign
1	Angaj Aishwarya Maruti	5401	
2	Balekundri Dhanashri Raju	5402	
3	Bhinge Revati Gajanan	5403	Ab
5	Bhosale Rasika Sanjay	5404	Ab
4	Bhosale Sharayu Pradeep	5405	
6	Chandala Vaishnavi Vivek	5406	
7	Chavan Sanika Sagar	5407	
9	Patil Sharvari Subhash	5408	Ab
8	Chavan Vaishnavi Vijay	5409	
10	Ghodasara Sakshi Pankaj	5410	
11	Gurav Atharva Ramdas	5411	
12	Hande Pallavi Ravindra	5412	
13	Kalamkar Asavari Anil	5413	
14	Kandalkar Namrata Anil	5414	
15	Kesarkar Prachi Chandrakant	5415	
16	Koli Sakshi Deepak	5416	
17	Malavi Rahul Gautam	5417	
18	Mane Yash Sanjay	5418	
19	Mulani Samina Firoj	5419	
20	Mulla Sanovar Salim	5420	
21	Mullani Aasma Aameer	5421	Ab
22	Padaval Damini Mohan	5422	
23	Pardeshi Shrutika Manik	5423	Ab
24	Patil Bhushan Dhanaji	5424	Ab
28	Patil Samruddhi Bhanudas	5425	
25	Patil Samruddhi Sudhir	5426	
26	Pawar Galaxy Sunil	5427	Ab
27	Powar Rushita Dinkar	5428	
29	Sankpal Sourabh Rajaram	5429	
30	Sawant Rohan Ravindra	5430	Ab
31	SurgaliShreeshailMallappa	5431	
32	Tangade Priti Anil	5432	
33	Thorbole Sanika Prakash	5433	
34	Yadav Kalyani Dipak	5434	

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Smali

Dr. S. D. Mali

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Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur

(An Empowered Autonomous Institute)

Department of Microbiology (PG)

Academic Year 2024-25

M. Sc. I Semester II

Unit test

Microbial Physiology, Biochemistry and Metabolism

Date: 20/02/25 Marks - 10

Choose the correct alternative and rewrite sentence

1) The fatty acid oxidation in human body occurs in ----------
a) Endoplasmic reticulum b) Golgi apparatus c) Mitochondria d) Lysosomes

2) In eukaryotes TCA occurs in ----------
a) Endoplasmic reticulum b) Golgi apparatus c) Mitochondria d) Lysosomes

3) Arginine is an example of ---------- family amino acid
a) alpha ketoglutarate b) pyruvate c) aspartate d) oxaloacetic acid

4) Urea cycle occurs in ---------- degradation process
a) Amino acid b) Fatty acid c) Nucleic acid d) Organic acid

5) Lauric acid is a fatty acid with a ---------- carbon chain.
a) 18 b) 12 c) 14 d) 16

6) The substrate of enzyme catalase is ----------
a) Superoxide radical b) Hydrogen peroxide c) Hydroxyl radical d) Singlet oxygen

7) Superoxide dismutase carries out dismutation of ----------
a) Superoxide radical b) Hydrogen peroxide c) Hydroxyl radical d) Singlet oxygen

8) In eukaryotes TCA occurs in ----------

8) ---------- is an aromatic amino acid
a) Tyrosine b) Methionine c) Alanine d) Arginine

9) ------ is a first purine nucleotide synthesised during de-novo biosynthesis.
a) Inosinate b) Xanthilate c) Cytidylate d) Adenylate

10) Transfer of NADH from cytoplasm to matrix of mitochondria occurs through ----------
shuttle system
a) Aspartate malate b) Aspartate fumarate c) Aspargine malate d) Aspargine fumarate

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

Date :- 20/02/2025
~~Year~~ :- 2024 - 2025
M. SC I

7/10

unit Test

Name :- Dhanashri Raju Balekundri
Roll No :- 5402
Subject :- Microbial physiology and Biochemistry

1) fatty acid oxidation in human body occurs in Mitochondria

a) Endoplasmic reticulum
b) golgi apparatus
c) Mitochondria
d) lysosomes

2) In Eukaryotes TCA occurs in Mitochondria

a) Endoplasmic reticulum
b) golgi apparatus
c) Mitochondria
d) lysosome

3) Arginine is an example α - keto glutarate family amino acid

a) α - keto glutarate
b) Pyruvate
c) aspartate
d) OAA

4) Urea cycle occurs in amino acid degradation process

a) amino acid
b) fatty acid
c) Nucleic acid
d) organic acid

VIVEKANAND COLLEGE ESTD JUNE 1964 KOLHAPUR (MS)

5) Lauric acid is a fatty acid with a 18 Carbon Chain

a) 18
b) 12
c) 14
d) 16

6) The substrate of enzyme catalase is Hydrogen peroxide

a) superoxide radical
b) Hydrogen peroxide
c) Hydroxil radical
d) sigulate oxygen.

17) Superoxide dismutase carries out dismutation of superoxide radical

a) superoxide radical b) Hydrogen peroxide
c) hydroxil radical d) Sigulate oxygen.

X8) Arginine is an aromatic amino acid

a) Tyrosine b) methionine c) alanine d) arginine

X9) Xanthilate is a 1st purine nucleotide synthesized during de novo biosynthasis

a) Inosinate b) xanthilate c) cytidilate d) adenylate

10) Transfer of NADH from cytoplasm to matrix of mitochondria occurs through Aspartate malate shuttle system

a) Aspartate malate b) Aspartate fumarate
c) Aspargine malate c) Aspargine fumarate

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Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur

(An Empowered Autonomous Institute)

Department of Microbiology (PG)

Academic Year 2024-25

M. Sc. I Semester II

Unit test - Microbial Physiology, Biochemistry and Metabolism

Mark sheet Date: 20/02/25

Sr. No.	Name of Student	Roll No.	Marks – Out of 10
1	Angaj Aishwarya Maruti	5401	7
2	Balekundri Dhanashri Raju	5402	7
3	Bhinge Revati Gajanan	5403	Ab
5	Bhosale Rasika Sanjay	5404	Ab
4	Bhosale Sharayu Pradeep	5405	10
6	Chandala Vaishnavi Vivek	5406	7
7	Chavan Sanika Sagar	5407	10
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16	Koli Sakshi Deepak	5416	9
17	Malavi Rahul Gautam	5417	7
18	Mane Yash Sanjay	5418	7
19	Mulani Samina Firoj	5419	8
20	Mulla Sanovar Salim	5420	10
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31	Surgali Shreeshail Mallappa	5431	5
32	Tangade Priti Anil	5432	10
33	Thorbole Sanika Prakash	5433	8
34	Yadav Kalyani Dipak	5434	10

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Vivekanand College, Kolhapur

(An Empowered Autonomous Institute)

Department of Microbiology (PG)

Academic Year 2024-25

M. Sc. I Semester II

Surprise test - Microbial Physiology, Biochemistry and Metabolism

Attendance Date: 21/03/25

Sr. No.	Name of Student	Roll No.	Sign
1	Angaj Aishwarya Maruti	5401	
2	Balekundri Dhanashri Raju	5402	
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16	Koli Sakshi Deepak	5416	Ab
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22	Padaval Damini Mohan	5422	Damini
23	Pardeshi Shrutika Manik	5423	Ab
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Dr. S. D. Mali

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur

(An Empowered Autonomous Institute)

Department of Microbiology (PG)

Academic Year 2024-25

M. Sc. I Semester II

Surprise test

Microbial Physiology, Biochemistry and Metabolism

Date: 21/03/25 Marks - 20

Q. 1 Attempt any one 16

1. Discuss in detail mitochondrial shuttle system
2. Discuss mitochondrial ETC

Q. 2 Attempt any one 4

1. Oxygen toxicity
2. Pasteur effect

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416003

Date

9/20

Name- Pallavi Ravindra Hande
class- MSCI SEM II
Subject- Microbial physiology, Biochemistry & Metabolism
Roll no.- 5412

Q. Microbial Shuttle System.

- Shuttle system is a system that helps in transfer of electron from NADH to Electron transport chain.
- NADH is produced by glycolysis, which occur in the cytosol, electrons can be transferred to a Carrier that can cross the membrane.
- Mitochondrial shuttles are biochemical transport System used to transport reducing agent across the inner mitochondrial membrane. NADH as well as NAD^+ cannot across the membrane. but reduce FAD and $[QH_2]$ that across the membrane.
- There are two types of shuttle in Mitochondria
  1. Malate Aspartate shuttle
  2. Glycerol phosphate shuttle

1. Malate Aspartate Shuttle.

- It is found in Mamalian kidney, liver & heart.
- This shuttle use malate to cross the mitochondrial membrane.
- this shuttle mechanism is that the transfer of electrons from NADH in the cytosol produces NADH in the mitochondria.
- In the cytosol, oxaloacetate is reduced to malate by the cytosolic malate dehydrogenase.

accompained by the oxidation of cytosolic NADH to NAD^+. The malate then crosses the mitochondrial membrane.

- In mitochondria, conversion of malate back to oxaloacetate is catalyzed by the mitochondrial malate dehydrogenase.
- oxaloacetate is converted to aspartate, which cross the mitochondrial membrane. aspartate is converted to oxaloacetate in the cytosol, completing the cycle of shuttle
- Malate - Aspartate shuttle used to transport the electron produced during glycolysis
- electrons enter the electron transport chain and help to generate ATP

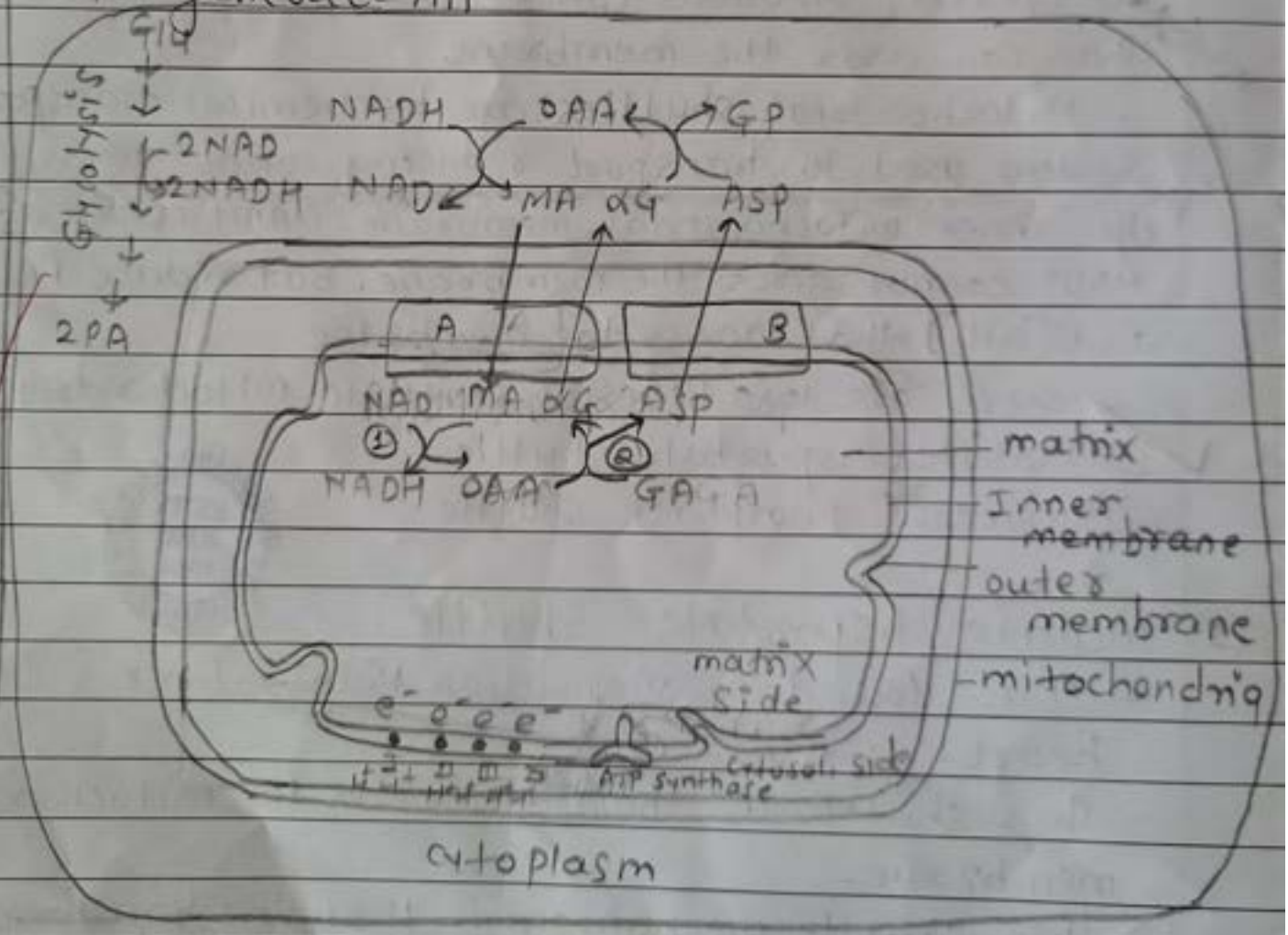
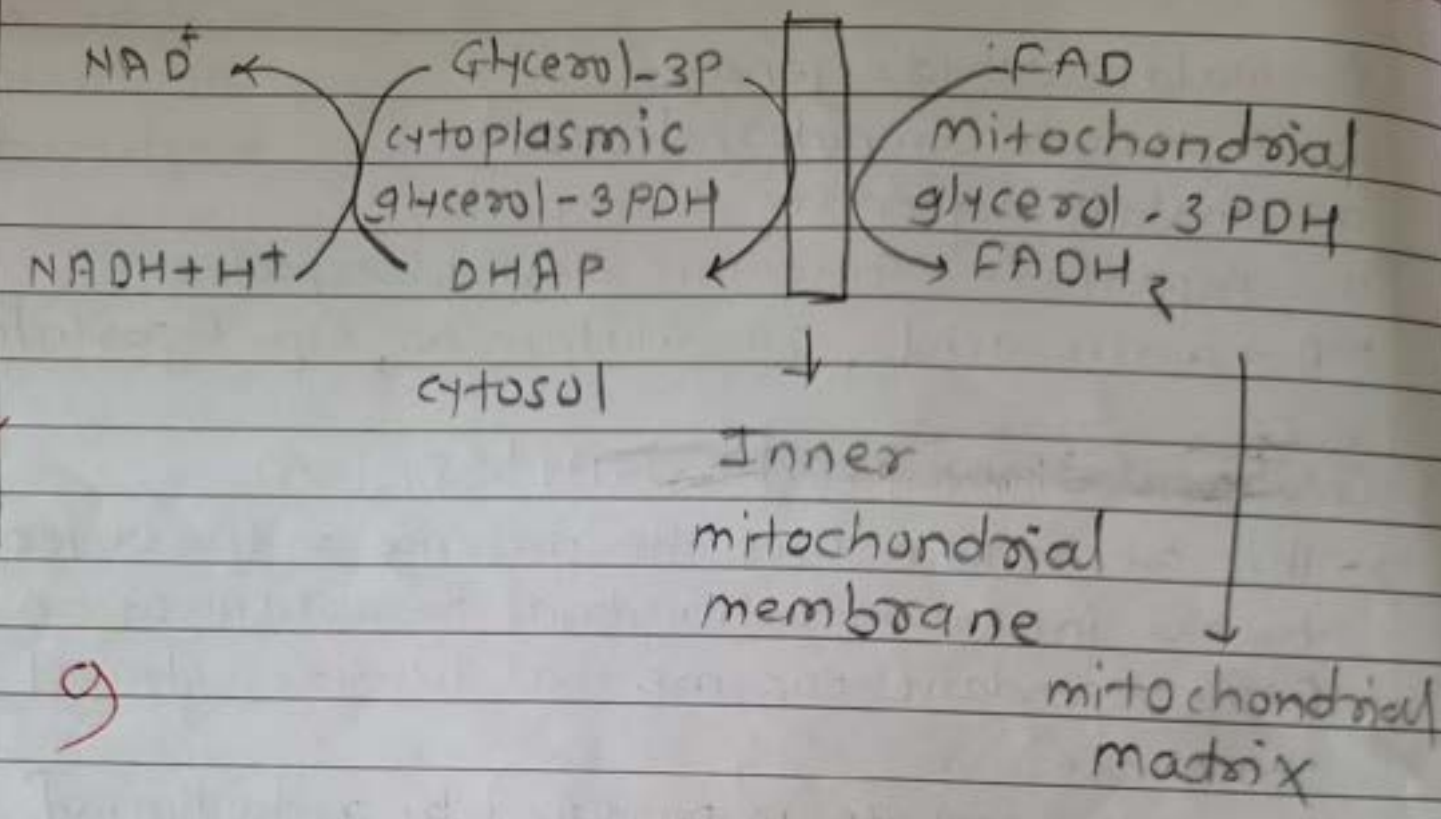


fig- Malate Aspartate shattle system.

① = Malate dehydrogenase
② = Aspartate aminotransferase
A = malate aspartate transporter.
B = Aspartate . Glutamic acid transporter
MA = malic acid , GA - Glutamate, Asp. Aspartate.

2] Glycerol - Phosphate shuttle system
- This mechanism uses the presence on the outer face of inner mitochondrial membrane of an FAD - dependant enzyme that oxidizes glycerol phosphate.
- glycerol phosphate is produced by reduction of dihydroxy acetone phosphate in the reaction, NADH is oxidized to NAD^+.
- In this reaction, the oxidizing agent is FAD & the product is $FADH_2$.
- The $FADH_2$ passes electrons through the electron transport chain leading to the production of 1.5 moles of ATP for each mole of cytosolic NADH.
- This mechanism has also observed in mammalian muscle & brain T.
- Glycerol - phosphate shuttle is suttle is used to regenerate NAD^+ from NADH.
- NADH is a by product of glycolysis.
- NADH synthesized in the cytosol by glycolysis is transported to mitochondria to participate in the oxidative phosphorylation to generate ATP.



9

Glycerol - 3 - phosphate shuttle

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Vivekanand College, Kolhapur

(An Empowered Autonomous Institute)

Department of Microbiology (PG)

Academic Year 2024-25

M. Sc. I Semester II

Surprise test - Microbial Physiology, Biochemistry and Metabolism
Mark sheet

Date: 21/03/25

Sr. No.	Name of Student	Roll No.	Marks – Out of 20
1	Angaj Aishwarya Maruti	5401	7
2	Balekundri Dhanashri Raju	5402	10
3	Bhinge Revati Gajanan	5403	9
5	Bhosale Rasika Sanjay	5404	8
4	Bhosale Sharayu Pradeep	5405	15
6	Chandala Vaishnavi Vivek	5406	7
7	Chavan Sanika Sagar	5407	10
9	Patil Sharvari Subhash	5408	5
8	Chavan Vaishnavi Vijay	5409	10
10	Ghodasara Sakshi Pankaj	5410	8
11	Gurav Atharva Ramdas	5411	8
12	Hande Pallavi Ravindra	5412	9
13	Kalamkar Asavari Anil	5413	7
14	Kandalkar Namrata Anil	5414	8
15	Kesarkar Prachi Chandrakant	5415	Ab
16	Koli Sakshi Deepak	5416	Ab
17	Malavi Rahul Gautam	5417	7
18	Mane Yash Sanjay	5418	7
19	Mulani Samina Firoj	5419	8
20	Mulla Sanovar Salim	5420	10
21	Mullani Aasma Aameer	5421	Ab
22	Padaval Damini Mohan	5422	10
23	Pardeshi Shrutika Manik	5423	7
24	Patil Bhushan Dhanaji	5424	Ab
28	Patil Samruddhi Bhanudas	5425	Ab
25	Patil Samruddhi Sudhir	5426	9
26	Pawar Galaxy Sunil	5427	9
27	Powar Rushita Dinkar	5428	13
29	Sankpal Sourabh Rajaram	5429	6
30	Sawant Rohan Ravindra	5430	7
31	Surgali Shreeshail Mallappa	5431	Ab
32	Tangade Priti Anil	5432	10
33	Thorbole Sanika Prakash	5433	8
34	Yadav Kalyani Dipak	5434	10

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VIVEKANAND COLLEGE, KOLHAPUR
(AN EMPOWERED AUTONOMOUS INSTITUTE)
Department of Microbiology (PG)

Academic Year 2024-25

NOTICE Date- 01/03/2025

All students of M. Sc. part I (semester II) are hereby informed that the Unit test of Medical Microbiology is arranged on 10th March 2025 at 11:30 am

Dr. T. C. Gaupale

I/C HEAD
DEPARTMENT OF MICROBIOLOGY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous)
ESTD JUNE 1964

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VIVEKANAND COLLEGE, KOLHAPUR
(AN EMPOWERED AUTONOMOUS INSTITUTE)
Department of Microbiology(PG)

Unit Test (M.Sc-I Sem-II)

Medical Microbiology

Date-10/03/2025 Marks-20

Q1. Attempt any one of the following 16M

1. Discuss in detail tuberculosis and its control
2. Explain in detail steps of disease cycle

Q.2. Attempt any one of the following 4M

1. Antigenetic properties and pathogenesis of disease caused by *R. burnetti*
2. Pathogenesis and control of cutaneous mycoses

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VIVEKANAND COLLEGE, KOLHAPUR
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Department of Microbiology (PG)
Academic Year 2024-25

M.Sc. I-Sem II
Unit Test-Medical Microbiology
Attendance

Date:10/03/2025
Time: 11:30 to 12:30

Sr. No.	Student Name	Roll No.	Signature
1.	Angaj Aishwarya Maruti	5401	
2.	Balekundri Dhanashri Raju	5402	
3.	Bhinge Revati Gajanan	5403	
4.	Bhosale Rasika Sanjay	5404	
5.	Bhosale Sharayu Pradeep	5405	
6.	Chandala Vaishnavi Vivek	5406	
7.	Chavan Sanika Sagar	5407	
8.	Chavan Sharvari Subhash	5408	
9.	Chavan Vaishnavi Vijay	5409	
10.	Ghodasara Sakshi Pankaj	5410	
11.	Gurav Atharva Ramdas	5411	
12.	Hande Pallavi Ravindra	5412	
13.	Kalamkar Asavari Anil	5413	
14.	Kandalkar Namrata Anil	5414	
15.	Kesarkar Prachi Chandrakant	5415	
16.	Koli Sakshi Deepak	5416	
17.	Malavi Rahul Gautam	5417	
18.	Mane Yash Sanjay	5418	
19.	Mulani Samina Firoj	5419	
20.	Mulla Sanovar Salim	5420	

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21.	Mullani Aasma Sameer	5421	AB
22.	Padaval Damini Mohan	5422	Damini.
23.	Pardeshi Shrutika Manik	5423	Smp.
24.	Patil Bhushan Dhanaji	5424	AB.
25.	Patil Samruddhi Bhanudas	5425	SPatil
26.	Patil Samruddhi Sudhir	5426	SPatil
27.	Pawar Galaxy Sunil	5427	Galaxy.
28.	Powar Rushita Dinkar	5428	Powar
29.	Sankpal Sourabh Rajaram	5429	SRS
30.	Sawant Rohan Ravindra	5430	RPS.
31.	Surgali Shreeshail Mallappa	5431	Smp
32.	Tangade Priti Anil	5432	PTangade
33.	Thorbole Sanika Prakash	5433	Sanika.
34.	Yadav Kalyani Dipak	5434	

Dr. K. K. Bhise

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Department of Microbiology (PG)

Academic Year 2024-25

M.Sc. I-Sem II
Unit Test-Medical Microbiology
Marksheet

Date:10/03/2025
Time: 11:30 to 12:30

Sr. No.	Student Name	Roll No.	Marks (out of 20)
1.	Angaj Aishwarya Maruti	5401	16
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3.	Bhinge Revati Gajanan	5403	16
4.	Bhosale Rasika Sanjay	5404	15
5.	Bhosale Sharayu Pradeep	5405	19
6.	Chandala Vaishnavi Vivek	5406	19
7.	Chavan Sanika Sagar	5407	19
8.	Chavan Sharvari Subhash	5408	13
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10.	Ghodasara Sakshi Pankaj	5410	18
11.	Gurav Atharva Ramdas	5411	14
12.	Hande Pallavi Ravindra	5412	17
13.	Kalamkar Asavari Anil	5413	19
14.	Kandalkar Namrata Anil	5414	16
15.	Kesarkar Prachi Chandrakant	5415	15
16.	Koli Sakshi Deepak	5416	18
17.	Malavi Rahul Gautam	5417	13
18.	Mane Yash Sanjay	5418	13
19.	Mulani Samina Firoj	5419	19

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1964

Attachment is highly appreciated

20.	Mulla Sanovar Salim	5420	19
21.	Mullani Aasma Sameer	5421	Ab
22.	Padaval Damini Mohan	5422	19
23.	Pardeshi Shrutika Manik	5423	14
24.	Patil Bhushan Dhanaji	5424	Ab
25.	Patil Samruddhi Bhanudas	5425	13
26.	Patil Samruddhi Sudhir	5426	12
27.	Pawar Galaxy Sunil	5427	15
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29.	Sankpal Sourabh Rajaram	5429	12
30.	Sawant Rohan Ravindra	5430	13
31.	Surgali Shreeshail Mallappa	5431	11
32.	Tangade Priti Anil	5432	18
33.	Thorbole Sanika Prakash	5433	19
34.	Yadav Kalyani Dipak	5434	19

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VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

Name :- Asavari Anil kalamkar. 19/20 WBH.
Roll No:- 5413
Class :- M.Sc I.
Subject :- ~~Microbial~~ medical microbiology.

Q. Explain in detail steps of disease cycle ?.

→ The term 'pathogenicity' & virulence refers To the ability of a microbe to produce disease or tissue injury - but it is important to make a distinction between them.
Pathogenicity is generally employed to refer to the Ability of a microbial species. To produce disease Virulence is the ability of microbial strain to Produce disease. Enrichment of virulence is Exaltation & Reduction of virulence is attenuation
Virulence is the sum of total of several Determinants as detailed below.

Steps included in Pathogenesis.
1) Adhesion
2) Invasiveness
3) Taxigenicity
4) Plasmid
5) Communicability
6) other bacterial products.
7) Biofilms
8) Infective dose.
9) Route of Infection.

1) Adhesion :-
Attachment of pathogen to host surface is known as adhesion.
- Attachment is highly specific.
- Host cell contain receptor; Pathogen will have Ligand which can bind to the host cell Receptor.

- Ligand also known as adhesion.
- (capsule, pilli, Flagella etc)
- Adhesion are highly antigenic in nature. and mainly made up of proteins.
- Pathogen established itself in host body.

2) Invasiveness :-

This refers to the ability of pathogen To spread in the host tissue after establishing Infection. Highly invasive pathogens characteristically produce spreading or generalised lesion, while less Invasive pathogens cause more localised lesion. Some pathogens, though capable of causing serious or even fatal diseases lack invasiveness Together.

3) Toxigenicity :-

Bacteria can produce two types of toxins. Exotoxin and endotoxin.

Exotoxins :- These are heat labile proteins which are secreted by certain species of Bacteria & diffuse readily into the surrounding medium. They are highly potent in minute amount Exotoxin are usually produced by gram positive Bacteria, they are in good antigenic in nature.

Endotoxins :- These are heat stable Lipopolysaccharides which form an integral part of the cell wall of gram negative bacteria. Their Toxicity depends on the lipid component. They are not secreted outside the bacterial cell.

- They are poor antigenic in nature.
- Do not release pharmocologically active substance.
- Used for experimental animal it shows pyogenic effect.

4) Plasmids :-

Plasmid is an extrachromosomal genetic material That provides additional properties to organism ex:- Resistance ability. some pathogen shows MDR (multiple drug resistance) That increases severity of clinical disease by their resistance To antibiotic therapy.

5) Communicability :-

Ability of pathogen to spread from one host to another is called communicability
- Disease will communicate very fast.
- Determine survival & distribution of pathogen in community. It is not necessary to be in correlation between Virulence & communicability. If Factor Virulence is more than communicability is less & vice versa. Development of epidemic & pendemic disease require the pathogen strain To posses high degree of virulence & communicability.

6) other bacterial products :-

Some bacterial products other than toxin though devoid of intrinsic toxicity, may contribute to virulence by inhibiting the mechanism of host Resistance.
- Coagulase enzyme - It will prevent bacteria as CMI is fails to produce.
- Fibrinolysin - promote spread of infection by Breaking fibrin barriers in tissues
- Hyalurunidase - split hyaluronic acid. Pathogen will spread.
- Haemolysin - carry lysis of RBCs
- Leucocidase - Act as Leukocytes cells.

7) BioFilm formation :-

These are well organized microbolonies of bacteria enclosed in self produced Extracellular Polysaccharides.

8) Infecting Dose :-

successful infection requre adequate number of bacteria enter in host.

- Pathogen should grow in minimum infecting dose (MID) to cause disease which are respectively The minimum number of bacteria required to produce clinical evidence.

Pathogenesis :-

Free - Floating bacteria come in contact with Medical devices & attach to them with pilli. They then aggregate, multiple & secrete Extracellular polymers & are encased. Prevention is by using sonication, antibiotics, catheter lock solutions, catheter, flushing & removal of the catheter.

9) Route of infection :-

Some bacteria such as Streptococci, can Initiate infection whatever be the mode of Entry. An entry of Pathogen in host e.g Broken barrier, nose, inhalation, coounds, Oral etc. The entry of Pathogen through Different sites. Can determines severity of Infection eg :- Cholera. Vibrio are infective orally but anable to cause A infection when introduced subcutaneously.

Name - Asavari Anil kalamkar
Roll No:- 5413
class :- M.Sc I
Sub :- Medical Microbiology.

Rickettsia Burnetti.

Introduction -

In 1906 out break of spotted fever scientist Howard ricketts studied and find out the causative agent so it known as Rickettsia.

The R. Burnetti belongs to family Rickettsiaceae

The family Rickettsiaceae includes a diverse group of organisms.

They shows common features of intracellular growth and transmission.

- classification :- The Rickettsiaceae family contain mainly three genera.
  1. Rickettsia 2. Orientia 3. Ehrlichia.

- characteristics of Rickettsia :-
  - Rickettsia are small coccobacilli.
  - Gram -ve bacteria, non-motile.
  - Highly pleomorphic bacteria.
  - They are virus like having intracellular growth.
  - cannot seen by ordinary light microscope.
  - They are obligate intracellular parasite.
  - cell wall made up of peptidoglycan.
  - They are spread by arthropod vectors.

Genus - Rickettsia:
- It is small cocobacili
- It causes Q fever
- It contain properties similar to bacteria.
- cell wall made up of peptidoglycan.
- contain both DNA & RNA
- Enzymes - metabolic enzymes.
- Reproduction by binary fission.

① Morphology:-

Rickettsia appear as pleomorphic cocobacilli.
size 0.3 - 0.6 X 0.8 - 2
- They are non-motile, non capsulated.
They are gram negative.
- They occur singly, pairs or in strands.

② Cultural properties :-
- Rickettsia are unable to grow in cell free media.
- Growth occurs in cytoplasm of infected cells.
- Rickettsia grows best in cells that are not metabolising activity.
- The optimum temp. for growth is 32-35 °C
- They are cultivated in yolk sac of developing chick embryo.
- Also grows in mouse fibroblast (HeLa, HEP-2)
- Tissue culture are not satisfactory for primary Isolation.

③ Resistance :-
- It is inactivated by physical and chemical agents
- They rapidly destroyed at 56°C and at room temp
- Preserved in skimmed milk or suspending medium containing sucrose, potassium, phosphate, glutamate.

④ Antigenic Properties :-
It have species and group specific antigens
- The immunodominant surface protein antigen of R. prowazekii & R. Typhi
- Spotted fever rickettsia have dominant outer membrane proteins comp) A & B.
- A species specific antigen acting as adhesion for Host cell showing limited cross reaction with surface protein antigen.
- The third surface antigen is an alkali stable polysaccharides found in some rickettsia and some strains of proteus bacilli

⑤ Pathogenesis :—

- Rickettsia are transmited to human by Arthropod vectors through bite or feces.
- On entry into humans body this bacteria multiply locally and enters in blood.
- Rickettsia are bacteria that cause rickettsial infection.
- It enters in body through eyes, skin.
- They spread through blood stream and infect vascular endothelial cells.
- It leads to inflammation loss of barrier function increase vascular permeability.

⑥ Laboratory diagnosis :—

The Lab diagnosis of R. Burnetti also known as coxiella burnetti.

- Specimen is blood, tissue sample.

serological test - It is common method. which detect antibodies against R. Burnetti in patient sample. In serological test,

① Take clean grese free slide
② Prepare blood smear.
③ Then add the macchivello's stain
④ observe the red coloured cells of cocobacili

Serological test include nitro- agglutination test compliment fixation.

- Animal Enoculation - we can perform animal inoculation using guinea pig.

1) Pathogen injected intradermaly into pigs.
2) Then kept for 4-6 weeks.
3) After 4-6 weeks observe the symptoms.

⑦ Treatment :-

To treat this bacterial disease following Antibiotics are preefered.

1) Doxycline
2) Tetracycline
3) chloramphenicol.

⑧. prophylaxis :-

1) It involves avoiding exposure to infected animals
2) wearing protective clothing.
3) minimize animal contact
4) proper handling of animal products.
5) Hygiene Practices.

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VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)
Department of Microbiology (PG)

Unit Test (M.Sc-II Sem-III)

Agricultural Microbiology and Phytopathology

Date-17/08/2024 Marks-20

Q1. Attempt any one of the following 16M

1. Discuss in detail plant diseases caused by bacteria
2. Describe factors affecting soil microflora

Q.2. Attempt any one of the following 4M

1. Rhizosphere
2. Soil aggegates

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VIVEKANAND COLLEGE, KOLHAPUR
(AN EMPOWERED AUTONOMOUS INSTITUTE)
Department of Microbiology (PG)
Academic Year 2024-25

Surprise Test-Agricultural Microbiology and Phytopathology
M.Sc. II-Sem III
Attendance

Date:17/08/2024
Time: 11:30 to 12:30

Sr. No.	Student Name	Roll No.	Signature
1.	Attar Taisina Sajjan	5501	
2.	Bangodi Harsh kishor	5502	
3.	Basare Gayatri Pramod	5503	
4.	Bhavake Priyanka .B	5504	
5.	Bodake Harshada Bajirao	5505	
6.	Buva Akshata Krishnat	5506	
7.	Chavan Sanika Gorakhnath	5507	
8.	Chougule Snehal Balaso	5508	
9.	Desai Tammana Sulatan	5509	
10.	Gore Vishal Bapu	5510	
11.	Jadhav Apurva Uday	5511	
12.	Jangam Bhgyashree Sanjay	5512	
13.	Kadam Vijay Sanjay	5513	
14.	Kesare Ankita Bhagvan	5514	
15.	Khadake Aishwarya Amar	5515	
16.	Khatave Nikhil Anil	5516	
17.	Kumthekar Krushnakant Surendra	5517	
18.	Lad Devdatta	5518	
19.	Lambe Sanika Krushna	5519	
20.	Madane Omkar Sanjay	5520	

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21.	Magar Pratik Shrikant	5521	
22.	Momin Mubina Salim	5522	
23.	Mujawar Liza Naushad	5523	
24.	Naik Shalom Vishwas	5524	
25.	Parit Akshata Ananda	5525	
26.	Patil Niranjan Krishnatah	5526	
27.	Patil Pranav Anilkumar	5527	
28.	Patil Sakshi Bhauso	5528	
29.	Patil Shivani Tanaji	5529	
30.	Patil Vaishnavi Hanmant	5530	
31.	Patil Sakshi Anil	5531	
32.	Powar Shrutika Sambhaji	5532	
33.	Rajput Kedar Laxmansing	5533	
34.	Sakpal Samiksha Rajesh	5534	
35.	Vast Karishma Umesh	5535	
36.	Zunake Suyash Dnyandev	5536	

Dr. K. K. Bhise

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VIVEKANAND COLLEGE, KOLHAPUR
(AN EMPOWERED AUTONOMOUS INSTITUTE)
Department of Microbiology (PG)
Academic Year 2024-25

M.Sc. II-Sem III Attendance
Surprise Test-Agricultural Microbiology and Phytopathology
Marksheet

Date:17/08/2024
Time: 11:30 to 12:30

Sr. No.	Student Name	Roll No.	Marks (out of 20)
1.	Attar Taisina Sajjan	5501	12
2.	Bangodi Harsh kishor	5502	11
3.	Basare Gayatri Pramod	5503	13
4.	Bhavake Priyanka .B	5504	16
5.	Bodake Harshada Bajirao	5505	15
6.	Buva Akshata Krishnat	5506	10
7.	Chavan Sanika Gorakhnath	5507	16
8.	Chougule Snehal Balaso	5508	18
9.	Desai Tammana Sulatan	5509	15
10.	Gore Vishal Bapu	5510	13
11.	Jadhav Apurva Uday	5511	19
12.	Jangam Bhgyashree Sanjay	5512	14
13.	Kadam Vijay Sanjay	5513	18
14.	Kesare Ankita Bhagvan	5514	13
15.	Khadake Aishwarya Amar	5515	20
16.	Khatave Nikhil Anil	5516	17
17.	Kumthekar Krushnakant Surendra	5517	20
18.	Lad Devdatta	5518	19
19.	Lambe Sanika Krushna	5519	17

VIVEKANAND COLLEGE KOLHAPUR
ESTD JUNE 1964
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20.	Madane Omkar Sanjay	5520	16
21.	Magar Pratik Shrikant	5521	20
22.	Momin Mubina Salim	5522	18
23.	Mujawar Liza Naushad	5523	19
24.	Naik Shalom Vishwas	5524	12
25.	Parit Akshata Ananda	5525	14
26.	Patil Niranjan Krishnatah	5526	10
27.	Patil Pranav Anilkumar	5527	13
28.	Patil Sakshi Bhauso	5528	15
29.	Patil Shivani Tanaji	5529	16
30.	Patil Vaishnavi Hanmant	5530	14
31.	Patil Sakshi Anil	5531	16
32.	Powar Shrutika Sambhaji	5532	18
33.	Rajput Kedar Laxmansing	5533	17
34.	Sakpal Samiksha Rajesh	5534	19
35.	Vast Karishma Umesh	5535	18
36.	Zunake Suyash Dnyandev	5536	18

Dr. K. K. Bhise

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

17/20

Name : Karishma Umesh Vast

Roll No - 5536

Class : M.Sc - II (Microbiology).

Subject : Agricultural Microbiology & Phytopathology

✱ Plant disease caused by the Bacteria.

- Plant disease are disease in plant caused by pathogen and environmental condition.
- Organism that cause infectious disease include fungi oomycetes, bacteria, viruses, viroids, virus like organism, phytoplasmas, protozoa, nematodes and parasitic plants.
- Not included are endoparasite like insects, mites, vertebrates or other pests that affect plant health by eating plant tissue and causing injury that may admit plant pathogen.
- The study of plant disease is called plant pathology.

Classification of plant Disease

A] Based on host plant

Ex : Disease of cereals, Disease of vegetable, Disease of plantation plant.

B] Mode of spreads

1. Soil Borne Disease - Endemic
2. Seed Borne Disease - Epiphytic
3. Air Borne Disease - Sporadic

C] Based upon the plant part infected.
Ex : Root disease, fruit disease, shoot disease, leaves

D] Causative Agent
1. Non - Parasitic disease
2. Parasitic disease

1. Non - Parasitic disease
- They are caused by environmental, chemical or soil factor that affect a plant's growth and development.
eg - soil condition, fluctuation in pH soil moisture content imbalance, Nutritional imbalance, salinity, Presence of excessive salt.

Atmospheric condition
eg. Temperature, sunlight, wind, rain, humidity

Agricultural Practices (Chemical based)
eg - Chemical Pesticides, insecticides.

2 Parasitic disease
- A parasitic disease, also known as parasitosis.
- They infectious disease causes in bacteria, virus, insects, nematodes.
eg. Disease in human : Protozoa, helminths, Ectoparasites.

• Symptoms of disease

- The plants infected then it show discolaration, blight curling, damping off, tumor, spot-shot, holes wilting, smut.
- The change in plant growth or appearence that may indicate or describe plant health problem.

Eg. Yellowing, wilting, dieback, galls or blight.

• Plant disease

1] Fire Blight

- It is destructive disease
- which occurs in many plant.
- which mainly occurs in apples and pears plant and reduces yeild.

• Symptoms

1. Blossom & spur blight
2. Cankers
3. Shoot Blight
4. Root Blight

1. Blossom & Spur Blight –

- The earliest disease symptoms are evident when blossoms are infected and become water soaked wilted and darkened.
- first part of blossom of infectious.
- Blossom become will be in water soaked.
- That infections will be transffered to the clusters.
- The entire spur is wilted
- They blossom are white creamy coloured, bacterial ooze that get infected to blossoms.

DATE / /

2. Conkers –
- The blossom is infected that infection will be inoculum.
- That pathogen one plant to another plant is transfered through insects.
- which occurs to the blossoms to rain and wind, insects, plants, transfered to pathogen source.
- The infection to transfered to spur to stem.
- That formation of spur to stem lesions.
- That stem lesions are called as cankers.
- That are dark brown or dark purple coloured form of the conkers.

3. Shoot Blight –
- It will infect to infected shoot.
- The pathogen growing in bacterial mass that pathogen transfered to plant.
- Then transfered to leaves. The leaves become dark in colour.
- Then transfered in form of veins midriness.
- Veins midrin become black in colour.
- They are attacked to leaves, plants, & shoots which gives trees a 'scorched by fire' appearence.
- Infected shoot wilt from the tip and develop a crook or bend at growing point; commonly referred to as shepherd crook.

4. Root Blight -

- Root Blight infection can develope near the root stock graft union from internal movement of pathogen within water conducting tissue or via infected water sprouts.
- The bark of these infection site become water soaked discloloured and cracked.
- The wood beneath develop a reddish brown dislolouration.

• Causative Agent -

- The fire blight bacterium, Erwinia amylovora.
- survives from one year to next at the margins of previously formed branch and trunck canker. margin in spring.
- Insects attacked to bacterial ooze, along with wind driven rain are the primary means for dispersal from overwintering cankers to blossoms.

• Disease Management -

- Fire Blight management is preventing blossom infection.
- Disease management requires on integrated approach that release primarily on cultural pratices and is supported by the judicious use of bactericides.

• Resistant cultivars -
- Few cultivars of apple, pear or the various ornamental host species are immune to fire blight.
- Cultivars are more resistant or tolerant than others.

• Cultural Practices -
- Avoid production practices that stimulate rapid tree growth young succulent tissue is susceptible to infection.
- Avoid excess fertilization.
- Avoid aggressive pruning that will stimulate tissue growth.
- Avoid planting of new trees downwind from or near already infected trees.
- Remove or destroy pruning, do not leave them in the orchard.

• Pruning infected Tissue -
- Pruning can play an important role in comprehensive fire blight management program.
- Should reduce inoculum and tree damage
- Pruning during dormancy
- Diseased limbs may be flagged or paint during the growing season so they can be easily identified during winter.
- Prune carefully so that infected branches are removed.
- Blighted twings should be pruned at least 6 to 8 inches below cankers and infected areas preferably down to the branch union.

DATE / /

Bactericides & Growth Regulators:

- Fire blight during spring when the pathogen is on surface of cankers and on blossoms.

• Copper sulfate -

- Applied during late dormancy to achive canker, twings and branches to help to reduce bacterial cells that exude from over wintering site.
- These are highly recommended during silver tip to reduce ~~ind~~ inoculum during bloom.
- Copper does not directly affect the infected tissue or cure the canker

• Streptomycin -

- Effective in preventing infechon of flower and stem tissue and thereby controlling the blossom blight and shoot stages.
- Streptomycin is used as preventive not a curative treatment.
- Streptomycin can also be combined with spreader - activator regulate for improved efficiency.

• Oxytetracyclin -

- These used in rotation with shepto-mycin to help discourage patheger resistance development.
- It is not effective as shreptomycin.
- Oxytetracyclin used as preventive for protecting susceptible plant tissue.

• Apogee –
- Growth hormone that reduces terminal growth thereby making plant less succulent & less susceptible to infection.
- Apply between king bloom & petal fall reducing that shoot phase of fire blight.

• Disease forecasting –
- Disease prediction model utilize local weather data during bloom to determine the risk for fire blight infection.
- Bactericide application can be eliminated when condition are unfavorable for disease development based on the predictive model.

2] Common Tuber Disease –
- It is caused by filamentous bacteria in the genus streptomyces.
- The genus is diverse and abundant in most soils of the world.
- The most widely distributed pathogen in genus is streptomyces scabies.
- Streptomyces scabies caused common scab of potato which tolerates very acidic soil and is usually seed-borne and S. turgidiscabies
- which is also tolerant of acidity.
- Streptomyces acidiscabies is able to cause disease at lower soil pH that of Streptomyces scabies.

DATE / /

• Life cycle –

- Streptomyces scabies is a saprophyte that can survive for long period.
- Organic matter in the absence of host.
- Susceptibility to S. scabies increase from about pH 5.2 to an optimum of between 6.0 to 7.5.
- The pathogen can tolerate a wide temperature range but optimum range between 20 & 35°C
- The pathogen enter through wound, lenticles or directly through the skin of young developing tuber & stimulate the growth of corky tissue.
- Dry soil condition during this period reduce competition and can serve to encorage information by the pathogen.

• Symptoms –

- Potato scab lession on tuber can be quite variable but generally appear as rough, corkey lession.
- range from small and raised to deeply pitted.
- Infection appears as small tan to reddish brown spots on tuber surface.
- Pitted scab can be as deep as one half inch the tuber.
- Tuber with russetted scab can have large areas superficially covered with corky tissue.
- Infection can also occur on stem, stolons or roots.
- Russetted varieties tend to be less affects than smooth skinned varieties.

- Susceptibility varies considerably, but even the most resistant varieties may have significant amount of disease in same years.

• Control / Treatment -
- Chemical control, short of soil fumigation are not particularly effective.
- Planting certified seed with no scab lesions is the most effective means of control.
- Treatment with mancozeb has been suggested for seed with same scab contamination.
- Amend soil to increase the acidity use acidifying fertilizer use gypsum rather than lime.
- Varieties with some resistance to scab include Nook sack Russet Burbank, superior & Dark red Norland.
- Several of fingerling type variety also have same resistance.
- Yukon Gold, Kennebec, katabdin, Norkis Shepady, Russet Norkatab and Defender are same of more scab susceptible lines.

Rhizosphere -
Plant root surrending area
contains MOs in maximum numbers
Rhizosphere provides nutrients for MOs known as root exudates
These exudates rich in sugers, amino acids, peptides, organic acids, organic acid vitamins etc.

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Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE, KOLHAPUR
(AN EMPOWERED AUTONOMOUS INSTITUTE)
Department of Microbiology (PG)

Academic Year 2024-25

NOTICE Date- 15/03/2025

All students of M. Sc. part II (semester IV) are hereby informed that the Unit test of Industrial Waste Management is arranged on 27th March 2025 at 11:30 am

Gaupale

Dr. T. C. Gaupale
I/C HEAD
DEPARTMENT OF MICROBIOLOGY
VIVEKANAND COLLEGE,KOLHAPUR
(EMPOWERED AUTONOMOUS)

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous)
ESTD JUNE 1964

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Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE, KOLHAPUR
(AN EMPOWERED AUTONOMOUS INSTITUTE)
Department of Microbiology (PG)

Unit Test (M.Sc-II Sem-IV)

Industrial Waste Management

Date-27/03/2025 Marks-20

Q1. Attempt any one of the following 16M

1. Explain in detail self purification system
2. Discuss physic-chemical methods of wastewater treatment

Q.2. Attempt any one of the following 4M

1. Ultimate COD
2. Physical characters of sewage

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VIVEKANAND COLLEGE, KOLHAPUR

(AN EMPOWERED AUTONOMOUS INSTITUTE)

Department of Microbiology (PG)

Academic Year 2024-25

M.Sc. II-Sem IV

Unit Test-Industrial Waste Management

Attendance

Date:27/03/2025
Time: 11:30 to 12:30

Sr. No.	Student Name	Roll No.	Signature
1.	Attar Taisina Sajjan	5501	
2.	Bangodi Harsh kishor	5502	
3.	Basare Gayatri Pramod	5503	
4.	BhavakePriyanka .B	5504	
5.	Bodake Harshada Bajirao	5505	
6.	Buva Akshata Krishnat	5506	
7.	Chavan Sanika Gorakhnath	5507	
8.	Chougule Snehal Balaso	5508	
9.	Desai Tammana Sulatan	5509	
10.	Gore Vishal Bapu	5510	
11.	Jadhav Apurva Uday	5511	
12.	Jangam Bhgyashree Sanjay	5512	
13.	Kadam Vijay Sanjay	5513	
14.	Kesare Ankita Bhagvan	5514	
15.	Khadake Aishwarya Amar	5515	
16.	Khatave Nikhil Anil	5516	
17.	Kumthekar Krushnakant Surendra	5517	
18.	Lad Devdatta	5518	
19.	Lambe Sanika Krushna	5519	
20.	Madane Omkar Sanjay	5520	

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21.	Magar Pratik Shrikant	5521	
22.	Momin Mubina Salim	5522	
23.	Mujawar Liza Naushad	5523	
24.	Naik Shalom Vishwas	5524	
25.	Parit Akshata Ananda	5525	
26.	Patil Niranjan Krishnatah	5526	
27.	Patil Pranav Anilkumar	5527	
28.	Patil Sakshi Bhauso	5528	
29.	Patil Shivani Tanaji	5529	
30.	Patil Vaishnavi Hanmant	5530	
31.	Patil Sakshi Anil	5531	
32.	Powar Shrutika Sambhaji	5532	
33.	Rajput Kedar Laxmansing	5533	
34.	Sakpal Samiksha Rajesh	5534	
35.	Vast Karishma Umesh	5535	
36.	ZunakeSuyash Dnyandev	5536	

Dr. K. K. Bhise

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Department of Microbiology (PG)
Academic Year 2024-25

M.Sc. II-Sem IV
Unit Test-Industrial Waste Management
Marksheet

Date:27/03/2025
Time: 11:30 to 12:30

Sr. No.	Student Name	Roll No.	Marks (out of 20)
1.	Attar Taisina Sajjan	5501	15
2.	Bangodi Harsh kishor	5502	14
3.	Basare Gayatri Pramod	5503	16
4.	Bhavake Priyanka .B	5504	14
5.	Bodake Harshada Bajirao	5505	13
6.	Buva Akshata Krishnat	5506	12
7.	Chavan Sanika Gorakhnath	5507	16
8.	Chougule Snehal Balaso	5508	17
9.	Desai Tammana Sulatan	5509	10
10.	Gore Vishal Bapu	5510	10
11.	Jadhav Apurva Uday	5511	20
12.	Jangam Bhgyashree Sanjay	5512	16
13.	Kadam Vijay Sanjay	5513	18
14.	Kesare Ankita Bhagvan	5514	14
15.	Khadake Aishwarya Amar	5515	20
16.	Khatave Nikhil Anil	5516	17
17.	Kumthekar Krushnakant Surendra	5517	19
18.	Lad Devdatta	5518	17
19.	Lambe Sanika Krushna	5519	16
20.	Madane Omkar Sanjay	5520	17
21.	Magar Pratik Shrikant	5521	19

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35.	Vast Karishma Umesh	5535	19
36.	Zunake Suyash Dnyandev	5536	19

Dr. K. K. Bhise

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20/20 ABG

DATE 27/03/2025

Name - Aishwarya Amar Khadake
Roll no. - 5515
class - M.Sc II
Subject - Industrial waste management.

Q. Discuss in detail physico-chemical methods for waste water treatment.

↳ (i) Industry will form product by using the raw material.
(ii) These raw material will undergo number of steps to form this product.
(iii) During this process, huge content of effluent i.e waste water will formed.
(iv) And it is neressary to treat waste water.

Physico-chemical methods used for treatment of waste -
(1) Neutralization
(2) Reverse osmosis
(3) Destruction or removal of phenolic compounds
(4) carbon absorption
(5) oxidation of cyanides
(6) chromium reduction

1. Neutralization -
(i) After collecting the effluent, we can check the pH of effluent.
(ii) Effluent is acidic in nature & that acid will affect the growth of microorganisms.
(iii) Most of the organisms grow well under the neutral condition.
(iv) The process in which the pH of effluent is adjusted to neutral before its discharge into the water bodies. known as neutralization.
(v) Addition of acids & bases is depends upon the initial pH of effluent.

(VI) If the effluent is acidic we will add strong base solution in order to make it neutral.
(VII) If initial pH of effluent is basic then we will add acid solution to make it neutr
(VIII) Neutral pH increases the growth & metabolism of microorganisms.
(IX) so, the degradation rate of effluent will get increased.

Components of neutralization unit -
(1) Proper instrumentation
(2) Effluent holding tank
(3) chemical reagents
(4) Addition pump & storage tanks
(5) One or more agitators
These will continuously check the pH.

(1) Proper instrumentation -
pH meter we can use to check the pH of effluent.

(2) Effluent holding tank -
(I) This will hold the effluent for long period of time.
(II) We will collect the effluent & directly check the pH.

(3) chemical reagents -
(I) We require pumps for addition of chemicals and then storage tank.
(II) This will add acid & base into the pump which depends initial pH of effluent

(4) storage tank -
(I) Pipes are connected to the pump.
(II) pH meter is authorized to effluent holding tank

which can directly check the pH of effluent.

(5) One or more agitators -
When the acids or bases are added, agitator will be proper mix the content along with this acids or bases.

Neutralisation is occurs in two system -
1] Batch system
2] continuous system

1] Batch system -
(i) In this case, neutralisation reaction will be carried out in batches.
(ii) The small batch of effluent is treated by neutralisation followed by other methods of treatment, which are based on effluent composition.
(iii) Small scale industry will used batch system of neutralisation.
(iv) Because in this case the quantity of effluent generated is limited as compared to other industries.

2] continuous system -
(i) The industries which operates continuously, they use continuous system of neutralisation.
(ii) In this case, effluent is not hold in holding tank but it is continuously treated as the quantity of effluent is more.

7. Reverse Osmosis -
(i) This is type of diffusion which occurs in two soln of different concentration repeated by semipermeable membrane.
(ii) They are used for water purification.
(iii) They are effective to remove contaminants such as

pesticides, volatile compounds, soluble organic compounds.

(iv) It is also known as RO purifier.

(v) They are not effective to remove dissolved gases.

(vi) Here, we use the filter membrane which is made up of cellulose acetate, cellulose triacetate thin membrane composite / thin film composite. also we can use membrane tube.

(vii) The efficiency is slow due to the contaminants which are trapped into that membrane. Hence we should removed the filter & it washed for removing contaminants. And we can reuse the same filter membrane to get pure water.

(viii) If efficiency of membrane material is still less than we should replace membrane material.

3. Destruction or removal of phenolic compounds -

(i) There are many industries which produces phenolic compounds such as dye industry, detergent industry, foam industry, imulsifier industry, adhesive industry, resins industry, nano material industry.

(ii) Many industries such as food industry, medicine, petrochemical, agriculture, chemical synthesis & polymer chemical synthesis generates phenolic compounds which are released their effluent.

(iii) Phenolic compounds are carcinogenic in nature.

(iv) Removal of phenolic compound is done by many methods which includes -

(1) Adsorption

(2) Membrane process

(3) Reverse osmosis & Nano filtration

(4) chemical oxidation

(5) Electro chemical oxidation

(6) Advanced oxidation process
(7) Fenten & Fenten like treatment
(8) Biological treatment.

(1) Adsorption -

In this case, the best soln is use of activated carbon to remove phenolic compounds

Advantages -

(i) It is effective (in both cases, low conc. & high conc. of effluent).
(ii) In order to remove trace amount of phenolic compound. We can use activated carbon.

Disadvantage -

It is expensive.

(i) In order to release cost of treatment, we can use carbon nano tubes (c forms, c tubes)
(ii) We can replace activated carbon by using biological based adsorbant (biosorbant) such as chitin.
(iii) It will make free from effluent.

(2) Membrane process -

If the effluent contain organic pollutants then they are removed by membrane filteration method.

Advantages -

(i) Low energy consumption
(ii) Low operating cost
(iii) Easy scale up.

(3) Reverse Osmosis & Nano filtration -

(i) Here, we applied the osmosis process.
(ii) By this method we will remove organic contaminants.
(iii) This method is membrane based demineralization process.
(iv) By this process we remove dissolved solids.

(v) Very small pore size membrane means nano filtration. which is effective to remo phenolic compound.

(vi) We can combine both RO & nano filtration first we should use nanofilter & then RO in order to prevent direct pressure on RO.

(4) chemical oxidation -

In this case, we can use chemicals in order to remove phenolic compounds such as chlorine, chlorine dioxide, chloramine, ferrate & per magnate.

(5) Electrochemical oxidation -

(i) It is more effective than chemical oxidation.
(ii) It can oxidise many organic contaminants at high conc. of chlorides.
(iii) Here, we are not using chemicals, we are using anode which will removed the phenolic compounds.

(6) Advanced oxidation process -

(i) oxidation is is carried out at high rate that result in formation of hydroxyl radical.
(ii) They are strong oxidant.
(iii) There will be mineralisation of organic pollutants including phenolic compounds.

(7) Fenton & Fenton like treatment -

(i) This reaction also carried out AOP.
(ii) It is highly effective to remove or oxidise aromatic compounds.
(iii) Fenton reagent contain hydrogen peroxide & Ferrous ions, at low pH.
(iv) Fenton reagent reacts with water to form hydroxyl radical.

(8) Biological method -

We can isolate the MO's which has ability to degrade phenolic compounds such as bacteria & yeast.

4. Carbon adsorption -

(i) Here we can remove dye, odour, colour, different organic & inorganic pollutant.
(ii) Absorption ability of carbon is high.
(iii) Pore size is maximum & surface area is also maximum.
(iv) High quantity of effluent can be treated.

Applications -

(i) Removal of dyes from water resources.
(ii) Removal of heavy metals from water.
(iii) Removal of organic pollutants from water bodies.
(iv) Pharmaceutical & personal care product pollutant removal.

Other applications -

(i) Removing contaminants in drinking water that add colour, odour & flavour.
(ii) Decafination of coffee.
(iii) Refining sugar, honey & candies.
(iv) Dis colouration of juices & veneguars.
(v) Water treatment in industries.
(vi) Purification of air & industrial gases.
(vii) Compressed air purification.
(viii) Recovery of gold, silver & other precious metals.

5. Oxidation of cyanides -

(i) Some industries for e.g mining & electroplating will produce effluent which contain cyanide.
(ii) In addition to cyanide the effluent also contain heavy metals & alky's.
(iii) cyanides is carcinogenic. so, effluent will treated.

(iv) Treatment involves oxidation, reduction & also monitoring the pH.

This occurs in 2 steps -

i) In primary reaction, cyanide is oxidised to cynate under high alkaline condition.

It is necessary to maintain oxidation-reduction potential of effluent.

And in order to maintain O-R potential we will add chlorine.

2) In secondary reaction, cyanate is further oxidised & converted to harmless carbon dioxide & nitrogen gas.

This condition occurs in neutral condition.

(v) Finally testing of pathogen ie presence of coliforms can done eg E.coli

(vi) And then effluent will discharged into water bodies.

6. chromium reduction -

(i) It is commonly used in wastewater treatment to convert toxic hexavalent chromium into the less toxic & more easily precipited trivalent chromium.

(ii) This process widely employed in industries like electroplating, leather tanning & metal finishing.

(iii) There are four existing chromium-reduction treatment methods were tested on the wastewater samples : treatment with (1) sodium metabisulfite (2) ferrous sulfate (3) zero-valent iron and (4) dimethyl dithio carbamate, ferrous sulfate and aluminum / chloride

Advantage -

It is cost effective & widely used in industry.

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Vivekanand College, Kolhapur

(An Empowered Autonomous Institute)

Department of Microbiology (PG)

Academic Year 2024-25

Notice

30/01/25

All students of M. Sc. Part II are informed that a unit test of Food and Dairy Microbiology will be conducted on Thursday, 7th February 2025 at 12.30 pm. All students should be present for it.

Dr. V. C. Gaupale
I/C Head
Department of Microbiology
Vivekanand College, Kolhapur
(Empowered Autonomous)

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Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)
Department of Microbiology (PG)
Academic Year 2024-25

M. Sc. II Semester IV

Unit test - Food Dairy Microbiology

Date: 07/02/25 Marks: 10

Choose the correct alternative and rewrite sentence

1. Asepsis is
a. reducing the populations of microorganisms
b. identifying methods of destruction
c. sterility checks
d. keeping out microorganisms

2. Delay in microbial decomposition can be achieved by
a. asepsis
b. filtration
c. radiation
d. all the above

3. Prevention of self-decomposition can be accomplished by
a. blanching
b. washing
c. chemicals
d. heat

4. Which of the following is not a preservation factor?
a. to restrict oxygen
b. radiation
c. heat
d. mechanical damage

5. The rapid and constant rate of multiplication of an organism occurs during the
a. lag phase
b. exponential phase
c. stationary phase
d. survival phase

6. Microbial decomposition of foods can be prevented by
a. recontamination
b. killing microbes
c. scalding
d. none of them

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7. Restriction of access of microorganisms to a product cannot be achieved by using
a. heat
b. HCl
c. H_2O_2
d. H_2O

8. The widely used application of asepsis is
a. clean handling
b. decontamination
c. packaging
d. radiation

9. Heat is used to
a. inactivate microbes
b. inhibit growth of microbes
c. kill microbes
d. restrict the growth of microbes

10. 'Bacteria proof' filter is made of
a. sintered glass
b. diatomaceous earth
c. unglazed porcelain
d. all the above

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Vivekanand College, Kolhapur

(An Empowered Autonomous Institute)

Department of Microbiology (PG)

Academic Year 2024-25

M. Sc. II Semester IV

Unit test - Food and Dairy Microbiology

Attendance of students Date – 07/02/2025

Sr. No.	Name of Student	Roll No.	Sign
1.	Attar Taisina Sajjan	5501	
2.	Bangodi Harsh kishor	5502	Ab
3.	Basare Gayatri Pramod	5503	Ab
4.	Bhavake Priyanka .B	5504	
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30.	Patil Vaishnavi Hanmant	5530	
31.	Patil Sakshi Anil	5531	
32.	Powar Shrutika Sambhaji	5532	
33.	Rajput Kedar Laxmansing	5533	Ab
34.	Sakpal Samiksha Rajesh	5534	
35.	Vast Karishma Umesh	5535	
36.	Zunake Suyash Dnyandev	5536	Ab

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR 416 003

Dr. S. D. Mali

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

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur

(An Empowered Autonomous Institute)

Department of Microbiology (PG)

Academic Year 2024-25

M. Sc. II Semester IV

Unit test - Food and Dairy Microbiology

Mark sheet

Date –7/02/2025

Sr. No.	Name of Student	Roll No.	Marks out of 10
1.	Attar Tuisina Sajjan	5501	7
2.	Bangodi Harsh kishor	5502	Ab
3.	Basare Gayatri Pramod	5503	Ab
4.	Bhavake Priyanka B	5504	10
5.	Bodake Harshada Bajirao	5505	Ab
6.	Buva Akshata Krishnat	5506	Ab
7.	Chavan Sanika Gorakhnath	5507	10
8.	Chougule Snehal Balaso	5508	7
9.	Desai Tammana Sulatan	5509	8
10.	Gore Vishal Bapu	5510	7
11.	Jadhav Aparva Uday	5511	10
12.	Jangam Bhgyashree Sanjay	5512	8
13.	Kadam Vijay Sanjay	5513	9
14.	Kesare Ankita Bhagvan	5514	Ab
15.	Khadake Aishwarya Amar	5515	9
16.	Khatave Nikhil Anil	5516	8
17.	Kumthekar Krinshnkanth	5517	Ab
18.	Lad Devdatta	5518	Ab
19.	Lambe Sanika Krushna	5519	7
20.	Madane Omkar Sanjay	5520	8
21.	Magar Pratik Shrikant	5521	10
22.	Momin Mubina Salim	5522	10
23.	Mujawar Liza Naushad	5523	10
24.	Naik Shalom Vishwas	5524	5
25.	Parit Akshata Ananda	5525	8
26.	Patil Niranjan Krishnatah	5526	Ab
27.	Patil Pranav Anilkumar	5527	Ab
28.	Patil Sakshi Bhauso	5528	10
29.	Patil Shivani Tanaji	5529	Ab
30.	Patil Vaishnavi Hanmant	5530	7
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VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

Name - Aishwarya Amar khadake
Roll no. - 5515
Year - 2024-25
M.Sc II semister IV

9/10

Page No.
Date 17 02 25

Food and Dairy Microbiology

choose the correct alternative & rewrite the sentence.

1. Asepsis is -

a) reducing the populations of microorganisms
b) Identifying methods of destruction.
c) sterility checks
d) keeping out Microorganisms

2. Delay in microbial decomposition can be achieved by -
a) asepsis b) filtration
c) radiation d) all the above

3. Prevention of self-decomposition can be accomplished by -
a) Blanching b) washing
c) chemicals d) heat

4. Which of the following is not a preservation factor -
a) to restrict oxygen
b) radiation
c) Heat
d) mechanical damage

5. The rapid & constant rate of multiplication of an organism occurs during the -
a) lag phase
b) exponential phase
c) stationary phase
d) survival phase

6. Microbial decomposition of foods can be prevented by -
a) Recontamination
b) killing microbes
c) scalding
d) none of above

7. Restriction of access of microorganisms to a product can not be achieved by using -
a) Heat
b) HCl
c) H_2O_2
d) H_2O

8. The widely used application of asepsis is -
a) clean handling
b) decontamination
c) Packaging
d) radiation

9. Heat is used to -
a) Inactivate microbes
b) Inhibit growth of microbes
c) kill microbes
d) restrict the growth of microbes

10. Bacteria proof filter is made up of -
a) sintered glass
b) Diatomaceous earth
c) Unglazed porcelain
d) all the above

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Department of Microbiology (PG)

Academic Year 2024-25

M. Sc. II Semester IV

Surprise test - Food and Dairy Microbiology

Attendance of students Date –28/03/2025

Sr. No.	Name of Student	Roll No.	Sign
1.	Attar Taisina Sajjan	5501	
2.	Bangodi Harsh kishor	5502	
3.	Basare Gayatri Pramod	5503	
4.	Bhavake Priyanka .B	5504	
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Smali

Dr. S.D.Mali

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur

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Department of Microbiology (PG)

Academic Year 2024-25

M. Sc. II Semester IV

Surprise test

Food and Dairy Microbiology

Date: 28/03/25 Marks - 20

Q. 1 Attempt any one 16

1. Discuss botulism
2. Discuss detection of pathogens in food

Q. 2 Attempt any one 4

1. Shigellosis
2. Prevention and control of food borne diseases

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

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Surprise test - Food and Dairy Microbiology

Mark sheet Date –28/03/2025

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VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

10/20

Name : Harshada Bajirao Bodake

Roll No : 5505

subject : food and dairy microbiology

class : MSc II (microbiology) sem - IV

- Botulism is a type of food borne disease, which caused by Clostridium botulinum.
- Clostridium botulinum is an Gram postive, anaerobic, bacteria.
- Morphology is rod shaped, spore forming, size 2x10 u, obligate anaerobic.
- It produce different Eight types of toxins i.e A, B, C, C_2, D, E, F, G from this some neurotoxins those are toxin - A, B, C, D, E, f, G.
- these are different strains of clostridium botulinum.
- It found to be present in soil and aquatic water.
- some strains are proteolytic.

• pathogenesis and clinical features :

- three types of botulism are recognised food borne botulism, infants or infectious botulism and wound botulism.
- Only in the first type is food invariably involved.
- food born botulism is an ~~exto~~ exotoxin produced by clostridium botulism growing in the food.
- The botulinum toxins are neurotoxins unlike enterotoxins, which act locally in the gut, they affect primarily.

The cholinergic nerves of the peripheral nervous system.

- Entry of pathogen through ingestion through mouth from food and water.
- Incubation period is 12-48 hrs and arrage range is 8 hrs to 8 days.

• Symptoms:
- Common symptoms like vometting, constipetion, urine retantion, difficultty in swollowing.
- these symptoms devlope due to neurotoxin
- Dry mouth, double vision, difficutty in speaking, weekness.
- last stage is respiratory faluiv or heart and finally death. can be occure.

• Toxin produced by clostridium botulinum:
Botulinum toxin -
- molecular weight is 150kd.
- It inactivate at 80°c in 10 min.
- This toxin produced by organism in log phase.
- It is an exotoxin.
- first it synthesized as protoxin it is an inactive in nature.
- In our intestine trypsine enzyme is present which active to the protoxin
- this protoxin which is a active to form/ responsible for symptoms.

• structure of toxin:
- toxin have two part
  ⓐ Heary part.
  ⓑ light part
- the molecular weight of heavy part is 100 kd.
- the molecular weight of light part is 50 kd.
- Heavy part also known as 'toxin binding' domain.
- After active toxin bind to heavy domain the disulphide bond break down by tripsin enzyme.
- In our nerve cell synthesis Acetylcholine. this acetylcholine blocked by toxin which leads to the devlopment of symptoms.

- **Dignosis of toxin / Disease :**

sample - patient stool , food, blood.

Procedure :

1) first enrichment of sample carried out to increase the no. of organim using enrichment media i.e cooked meat broth.
2) In sterile media sample add and incubate 30-37°c for 7 days.
3) Then isolation carry out loopfull sample streked on egg yolk agar. after incubation colony morphology observe.
4) Irregular shape, smooth colony , 2-3mm in size, show lipolytic activity colony surrounded by zone of precipitation.
5) Detection of toxin production
   - prepare agar mediam which contain antitoxin.
   - clostridium produce toxin is extracellular
   - on agar medium colony shows precipitation.
   - In this way we can diagnose the disease.

- **Treatment :**

① Administration of 4- aminopyridine
   - To increase release of Acetylcholine.

② Alkaline stomach wash
   - A solution of sodium carbonate (pH 8-10) to inactivate toxin.

③ Antitoxin.
   - specific polivalant antitoxin is recomanded.
   - polyvalant is a substance act ~~on~~ against all toxins for distroy the toxin.