

“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)

Continuous internal Evaluation

MSc-I Sem-I



Academic Year 2024-2025

Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur (Empowered Autonomous)
Department of Microbiology (PG)
Academic Year 2024-25

NOTICE

Date- 13-09-2024

All students of M.Sc.-I Microbiology are hereby informed that, the internal examination of semester I, is going to start from 26th September 2024. The examination will be conducted in room no. 61. The pattern and schedule of examination is given below.

Pattern of Examination

Sr. No.	Type	Marks
1.	Descriptive paper	
	Objective type questions	8
	Long question -1	8
	Short note-1	4
2.	Home assignment	10
3.	Seminar	10
Total		40

Schedule of Examination

Sr. No.	Date	Paper title	Time
1.	26/09/2024	Genetics and Molecular Biology	2.00-3.00 pm
2.	27/09/2024	Immunology	2.00-3.00 pm
3.	28/09/2024	Taxonomy and Microbial Diversity	2.00-3.00 pm
4.	30/09/2024	Research Methodology	2.00-3.00 pm



VIVEKANAND COLLEGE, KOLHAAPUR (EMPOWERED AUTONOMOUS)

M. Sc. I Part I (Microbiology) Sem I

Examination Oct.-Nov. 2024

Genetics and Molecular Biology

Date: 26/09/2024

Q.1 Select the most correct alternative from given alternatives

8

i. _____ speciation is also known as geographical speciation.

- a) Stmpatric b) Peripatric
- c) Allopatric d) Peripatric

ii. Initiation t-RNA binds with ribosome at _____ site.

- a) A b) D
- c) C d) None of these

iii. The use and disuse of organs postulate was given in _____

- a) Darwinism b) Lamareckism
- c) Neo-Darwinism d) Chemical synthetic theory

iv. Eukaryotic mRNAs are _____

- a) Polycistronic b) Multicistronic
- c) Dicistronic d) Monocistronic

v. In prokaryotes _____ enzyme is responsible for separation of double stranded DNA during DNA replication process.

- a) Polymerase b) Helicase
- c) Topoisomerase d) Ligase

vi. _____ inhibits binding of small and large subunits of 80s ribosome.

- a) eIF-2 b) eIF-3
- c) eIF-5 d) eIF-4



vii. The idea of natural selection was given by _____

- | | |
|------------|------------|
| a) Lamarck | b) Morgan |
| c) Darwin | d) Haldane |

viii. 28s rRNA is present in _____ subunit of ribosome.

- | | |
|--------|--------|
| a) 30s | b) 40s |
| c) 50s | d) 60s |

Q. 2 Attempt any ONE

8

- i. Explain in detail eukaryotic protein synthesis
- ii. Give a detail account on 'Darwinism'.

Q.3 Attempt any ONE

8

- i. Types of speciation
- ii. t-RNA



Vivekanand College Kolhapur (Empowered Autonomous)

PG Department of Microbiology

Academic Year 2024-25

M. SC. I Internal exam

Genetics and Molecular Biology

Date: 26.09.2024

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



Genetics and Molecular Biology

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1	Angaj Aishwarya Maruti	5401	8	10	19	37	19
2	Balekundri Dhanashri Raju	5402	8	10	17	35	18
3	Bhinge Revati Gajanan	5403	7	10	10	27	14
5	Bhosale Rasika Sanjay	5404	7	10	13	30	15
4	Bhosale Sharayu Pradeep	5405	10	10	20	40	20
6	Chandala Vaishnavi Vivek	5406	8	10	17	35	18
7	Chavan Sanika Sagar	5407	10	10	18	38	19
9	Chavan Sharvari Subhash	5408	Ab	Ab	06	06	03
8	Chavan Vaishnavi Vijay	5409	8	10	16	34	17
10	Ghodasara Sakshi Pankaj	5410	10	10	18	38	19
11	Gurav Atharva Ramdas	5411	7	10	09	26	13
12	Hande Pallavi Ravindra	5412	9	10	14	33	17
13	Kalamkar Asavari Anil	5413	9	10	15	34	17
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15	Kesarkar Prachi Chandrakant	5415	7	10	17	34	17
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18	Mane Yash Sanjay	5418	7	10	10	27	14
19	Mulani Samina Firoj	5419	9	10	13	32	16
20	Mulla Sanovar Salim	5420	9	10	18	37	19
21	Mullani Aasma Aameer	5421	Ab	Ab	Ab	Ab	Ab
22	Padaval Damini Mohan	5422	9	10	05	24	12
23	Pardeshi Shrutika Manik	5423	8	10	14	32	16
24	Patil Bhushan Dhanaji	5424	Ab	Ab	03	03	02
25	Patil Samruddhi Bhanudas	5425	7	10	09	26	13
26	Patil Samruddhi Sudhir	5426	8	10	13	31	16
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28	Powar Rushita Dinkar	5428	10	10	20	40	20
29	Sankpal Sourabh Rajaram	5429	7	10	17	34	17
30	Sawant Rohan Ravindra	5430	7	10	12	29	15
31	Surgali Shreesail Mallappa	5431	7	10	11	28	14
32	Tangade Priti Anil	5432	10	10	16	36	18
33	Thorbole Sanika Prakash	5433	9	10	16	35	18
34	Yadav Kalyani Dipak	5434	9	10	11	30	15



Vivekanand College Kolhapur (Empowered Autonomous)

PG Department of Microbiology

Academic Year 2024-25

M. SC. I Internal exam

Genetics and Molecular Biology

Date: 26.09.2024

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34	Yadav Kalyani Dipak	5434	Yadav



Balabita Dinkar Pawar

॥ ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ॥

- शिक्षणमहर्षी डॉ. बापूजी साबुळे

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VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature
of
Supervisor

[Signature]

Suppliment No. : 1

Roll No. : 5428

Class : M.Sc-I

Subject: Genetics & Molecular biology

Test / Tutorial No. : Internal exam

Div. Date - 26th Sep 2024

Q.1 Select the most correct alternative from given alternatives.

Speciation is also known as geographical speciation

A. Sympatric

C. Allopatric

B. Peripatric

D. Parapatric

1 C. Allopatric speciation

2

2 Initiation t-RNA binds ribosome at site

A. A

C. C

B. D

D. None of these

1 A. A

3 The postulates 'use and disuse of organ' was given in ...

A. Darwinism

C. Neo Darwinism

B. Lamarckism

D. Chemical synthetic theory

1 B. Lamarckism

4 Eukaryotic mRNAs are

A. Polycistronic

C. Dicistronic

B. Multicistronic

D. Monocistronic

1 A. Polycistronic



5. In prokaryotes _____ enzyme is responsible for separation of double stranded DNA during DNA replication process

A. Polymerase

C. Topoisomerase

B. Helicase

D. Ligase

→ B. Helicase

6. _____ inhibits binding of small & large subunits of 80s ribosome

A. eIF-2

C. eIF-5

B. eIF-3

D. eIF-4

→ B. eIF-3

7. The idea of Natural selection was given by

A. Lamarck

C. Darwin

B. Morgan

D. Haldane

→ C. Darwin

8. 28s rRNA is present in _____ subunit ribosome

A. 30s

C. 50s

B. 40s

D. 60s

→ D. 60s

Q. 2 Attempt any one

1. Explain in detail eukaryotic protein synthesis
2. Give detail account on Darwinism

Q. 3 Attempt any one

1. Types of speciation
2. t-RNA



2) Darwinism - Theory of Natural selection

This theory is given by Charles Robert Darwin.

It is also called as Theory of Natural selection

Darwin worked on galapagos island and studied on different species of finches.

He called galapagos island as living lab of evolution.

He studied that the different island on galapagos have different species of finches

Initially, it ~~was~~ suppose as they are same species.

But later on he realized that it is evolved into different species

- Firstly, The species of finches are same from same island, but later due to geographical barrier or in search of food it get isolated and form new species based on the food and environment.

- Alfred Russel Wessman also proposed theory which similar to darwinism

~~The~~ He gives some postulates

1. Over production

The population is increases continously without environment check or pressure.

The new offsprings number get increased in natural condition

- e.g. salmon fish lays 28,000,000 eggs in season

and other kind animals also gives birth to new population

Due to favourable condition the crowd on the earth increase

2. Struggle for existence



Due to increasing population, the interspecific and intraspecific competition is increases

This contest leads to active kill or killed struggle.

3. Natural Selection

Darwin believes that strongest population will survive and weak will die.

The strong survival of fittest organ explain that the organism is fit for survival in competition will live and weak one get eliminated.

4. Inheritance of useful variation

The acquired characters in their life of organism which leads to survive will get inherited to their offspring.

The not fit characters get eliminated before their reproduction.

5. Variation

The variation is the ^{main} character of plant and animal.

The variation is responsible for survival also.

Darwin & Wessman can't explain variation and assumed it is innate character.

6. Sexual selection

Female have right to choose the better mate.

Female choose the attractive male to mate for breeding.

e.g. Peacock tail, Tusk of elephant etc.

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- शिक्षणमहर्षी डॉ. बापूजी रावळुंगे

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SUPPLIMENT

Signature
of
Supervisor

Suppliment No. :

Roll No. : 5428

Class : M.Sc I

Subject : Genetics & molecular toxicology

Test / Tutorial No. : Internal exam

Div. : 28th sep 2024

Examples of Darwinism

1. Long necked Giraffe.

- Darwin said that there were short-necked giraffe & long-necked present in environment.
- But long-necked survive due to survival of fittest.

2. Darwin finches

- The adaptive radiation that is the new species is evolved from single ancestor.
- The finches are evolved from same species ancestor.
- They get evolved due to different type food and environmental condition.

3. ^{Modification} Adaptation in drug-resistance bacteria

- The ongoing evolution which had big impact on humans in modification in drug-resistance bacteria.
- When the organism grow on drug contain medium.
- The organism grows on drug means Antibiotic containing medium because they are resistance towards drug.

Then the drug-resistance bacteria get survive and other get eliminated.

4. Variation is always there.

Variation is abundant. The two individuals of same species are also not similar.

There 2 variation

1. Beneficial variation

This gives increases the survival chances

2. Bad variation

This reduces the survival chances

5. Mimicry & defense colouration

• These organism is product of evolution, it find out in certain animals.

• By this the prey gets escaped from their predators.

Criticisms for Darwinism

1. Darwin explain variation but failed to explain reason of variation.

2. Darwin explain survival of fittest but failed to explain arrival of fittest.

3. Darwin told that good character only inherited but failed to explain why the vestigial organs are present in human body.

4. The sexual selection is also get criticised that why only female get right to choose male mate? It is only applicable for small population

08 For example peacock tail, tusk of elephant & antler of deer.

Q3) Types of speciation.

There are three mode of speciation.

1. Phyletic speciation.
2. Quantum speciation
3. Gradual speciation.

Speciation -

It is the formation of new species on their environment due to

- (1) The splitting of homologous (genetically) species into two or more different species by genetically differentiation or reproductive isolation

1. Phyletic speciation

The speciation occurs with slow & steady changes over long period of time.

≠

2. Quantum speciation.

- (1) The speciation occurs due to rearrangement of chromosome.

The chromosomal aberration or change in chromosome number leads to Quantum Speciation.

3. Gradual speciation.

The speciation occurs due to minute gene changes & over long period of time.

There are types of Gradual Speciation.

- ① Allopatric
- ② Peripatric
- ③ Parapatric
- ④ Sympatric

1. Allopatric

Allo - means other and patra means land.

When the main population is separated due to geographical barrier then the new species are formed.

It is called as Geographical speciation.

Eg Darwin finches, Grand canyon squirrel.

2

2 Peripatric

When the large population is separated which is present at periphery or border due geographical barrier such as formation mountain, volcanos, earthquake.

e.g. Founder effect.

3 The new tiny population is migrated from main population & formed new population.

Bottle neck effect.

The large population is separated due to geographical barrier such as volcanos, earthquake.

Those who survived in these formed new population.

3 Parapatric

When the population present in intersame place formed new population.

e.g. The soil which contaminated with heavy metal have plant which is tolerant towards heavy metal.

The soil contaminated & uncontaminated plant fertilize with each other and form new species.

4. Sympatric.

When the population and environment is identical but don't interbreed with each other.



7. _____ is spore forming lactic acid bacterium.

a) *Lactobacillus*

b) *Bacillus*

c) *Sporolactobacillus*

d) *Pediococcus*

8. _____ is the primary function of bacteriorhodopsin.

a) ATP synthesis

b) Proton pumping

c) Light harvesting

d) Ion transport

Q.2. Write any one of following.

(8)

1. Discuss in detail high G + C group of Gram-positive bacteria.

2. Discuss in detail outline classification of Archaeobacteria.

Q.3. Write short note on any one.

(4)

1. Archaeobacterial lipid

2. History of Bergey's manual



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Department of Microbiology (PG)

Academic Year 2024-25

M. Sc, Part I (Microbiology) (Semester I) Internal Examination
Taxonomy & Microbial Diversity DSC20MIC11

Date: 28/09/2024

Sr. No.	Name of Student	Roll No.	Sign
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30.	Sawant Rohan Ravindra	5430	<i>Roh</i>
31.	Surgali Shreeshail Mallappa	5431	<i>Surg</i>
32.	Tangade Priti Anil	5432	<i>Hengade</i>
33.	Thorbole Sanika Prakash	5433	<i>Sanika</i>
34.	Yadav Kalyani Dipak	5434	<i>Dipak</i>



Taxonomy and Microbial Diversity

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Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

41607

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature
of
Supervisor

19
20



Suppliment No. : 1

Roll No. : 5407

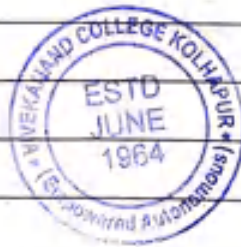
Class : M.Sc.T Sem I

Subject : Taxonomy and microbial diversity

Test / Tutorial No. : Internal exam 2024-25

Div. :

- Q. 2. 1) Discuss in detail High G+C group of Gram positive Bacteria
2) Discuss in detail Outline classification Archea Bacteria
- Q. 3. 1) Archeobacterial lipid
2) History of Bergey's manual.



Q.2

2. classification of Archea Bacteria.

1) Archea is the one domain out of three

Archea
Bacteria
Eukarya

2) Archea domain is classified in 5 phylum. They are

- A. Euryarchaeota
- B. Crenarchaeota
- C. Nanoarchaeota
- D. Thaumarchaeota
- E. Korarchaeota

A. Euryarchaeota have 7 class, 9 orders, 15 families.

Subgroups of Euryarchaeota →

- 1) Halophiles
- 2) Thermoplasmatales
- 3) Methanogens.

• Halophiles are extreme salt tolerant organism. They are placed in one family - Halo bacteriacea

They require optimum salt in Range 3.5 - 5.5 M.

They are ~~Thermophiles~~ or Mesophiles.

~~They are~~ Halophiles get disintegrate in salt concentration less than 1.5 M.



Methanogens →

They produce methane gas (CH_4)

Methanogens are strictly Anaerobic

They degrade organic matter into simpler form.

Methanogens are also live in High temperature.

Thermoplasmatales

This group contain both thermophilic and Acidophilic

They can live in both conditions i.e in High temperature and in High pH.

So they known as Thermoacidophiles.

Crenarchaeota

Crenarchaeota is Second largest phylum

They have only one class = Thermoprotei

They have 69 genera, But Thermoproteus and Sulfolobus are well studied genera.

Crenarchaeota have 3 orders.

Genera

Thermoproteus

They are chemolithotrophic

Thermoproteus are strictly Anaerobes

They oxidize glucose, Amino acids, Organic Acids.

They use CO and CO_2 as carbon source.

70° to 90° it's their optimum temperature Range.

In their cell wall, glycoprotein is their

• Sulfolobus

- They are Aerobic organism
- Sugar and amino acids are their energy source
- Sulfolobus are lithotrophic organism
- They use oxygen as final electron acceptor and may use Fe^{+3}

C) Nanoarchaeota (In Greek dwarf and old)

The organism from this phylum live at $90^{\circ}C$ temp. They are thermophiles.

Nanoarchaeota isolation is difficult

These organism divide on the surface of other Archaea - Bacteria

Nanoarchaeota's organisms are not yet detected in pure culture

Habitat - Hydrothermal vents, deep ocean, Hot Springs.

D) Thaumarchaeota: (In greek 'Wander')

Thaumarchaeota's organism able to oxidize ammonia. They have slow rate of division.

Because of slow rate they are not part of Nutrient competitions.

E) Korarchaeota:

Korarkore in Greek meaning 'youngman'.
Archaia in greek means 'Ancient'.

The study of its rRNA is done by organism which are isolated from Hot spring of yellow stone National park.

॥ ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ॥

- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

41654

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. : 1

Roll No. : 5407

Class : M.Sc. I sem

Signature
of
Supervisor

Subject : Taxonomy and Microbiology

Test / Tutorial No. : Internal exam - 2024-25

Div. :

- Their rRNA genes and metabolic genes are unique.

- Temperature Range is 10°C

- They are Anaerobic

1. Archaeobacterial lipid.

- 1) Archaeobacteria are those bacteria who live in extreme conditions
- 2) Such as High temperature, Varying pH, Anaerobic condition
- 3) So they have different compositions in their structure
- 4) Their structure provides them High protection from the extreme conditions.
- 5) Lipids are present in plasma membrane and plasma membrane protect cell from outer environment, gives rigidity and stability to cell, Also gives shape.

Archaeobacterial lipids are of two types → 1. phospholipid
2. Sulfolipid.

1. phospholipid -

- It contains phosphate group and these phospholipids are present in most of Archaeobacteria
- They give stability and membrane fluidity to Archaeobacteria

2. ~~Sulf~~ Sulfolipid -

Sulfolipid is present in some archaeobacteria which lives in extreme conditions. This helps to adapt in extreme condition.

Structure

There are 2 major things in lipid → 1) ether bond
2) Isoprenoid

Etherbond → lipids are linked by etherbond

Etherbond is resistant to Hydrolysis

Etherbond is present in glycerol and Hydrocarbons.

Etherbond prevents easy denaturation.

Isoprenoid →

It is like fatty acids

They are oily and waxy

They give flexibility

~~Isoprene~~ Hydrocarbon chain is composed of small units of Isoprenoid.

Common Forms

There are 2 types → 1) Diether
2) Tetraether.

Diether - The 2 isoprenoid chains are bound to glycerol.

Tetraether - The long chain present and connect to ends of glycerol and form monolayer.

(0.1)

Brevibacterium

1. The ~~Corynebacterium~~ genus of Gram positive Bacteria used in maturation of cheese.

→ ~~b. Corynebacterium~~ d. Brevibacterium

2. The cofactor F420 is the carrier of C1 unit during its reduction from CO_2 to CH_4

→ b) cofactor F420

3. Mycoplasma Organism are called as PPLO

→ b. Mycoplasma

4. In Thermoproteus Sulphur serve as terminal e^- acceptor.

→ c. Sulphur

6. ether lipid instead of ester^{lipid} is unique about Archaeobacterial cell membrane.

→ c. ether lipid instead of ester lipid.

67. Sporolactobacillus is a spore forming lactic acid Bacteria

→ c) Sporolactobacillus

5. Helicobacter genus have Bchl_a unusual component in their structure.

→ a) Bchl_a

8. Proton pumping is the primary function of Bacteriorhodopsin

→ b) proton pumping

Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur (Empowered Autonomous)
Department of Microbiology (PG)
Academic Year 2024-25

M. Sc. Part I (Microbiology) (Semester I) Internal Examination

ImmunologyDSC20MIC12

Day: Friday

Time: 2.00 pm to 3.00 pm

Date: 27/09/2024

Marks: 20

Q.1 Choose the correct alternative and rewrite the sentence

8

1) ----- has a chaperon activity during assembly of MHC class I molecule

- | | |
|---------------|-------------------|
| a) Tapason | b) Calnexin |
| c) Proteosome | d) Acid hydrolase |

2) ----- gives signal for the transport of foreign peptides into endoplasmic reticulum during assembly of MHC class I molecule.

- | | |
|---------------|-------------------|
| a) Tapasin | b) Calreticulin |
| c) Proteosome | d) Acid hydrolase |

3) MHC stands for -----.

- | | |
|-------------------------------------|-------------------------------------|
| a) Major histocompatibility complex | b) Minor histocompatibility complex |
| c) Major histocompatibility code | d) Minor histocompatibility code |

4) Assembly of MHC molecule occurs in -----.

- | | |
|--------------------|---------------------------|
| a) Golgi apparatus | b) Proteosome |
| c) Nucleus | d) Endoplasmic reticulum. |

5) ----- functions as a transcription factor in RAS MAP K pathway

- | | |
|--------|--------|
| a) ERK | b) RAF |
| c) SOS | d) MEK |

6) Costimulation of T4 cell is caused by binding of ----- receptor of T4 cell with B7 receptor of MHC class II molecule.

- | | |
|---------|---------|
| a) CD28 | b) CD50 |
| c) CD12 | d) CD24 |

7) ----- protein acts as a negative regulator of SOS protein in RAS MAP K pathway

- | | |
|--------|--------|
| a) RAS | b) RAF |
| c) RSK | d) ERK |

8) MEK protein involved in RAS MAP K pathway is a ----- type of kinase enzyme.

- | | |
|--------------|--------------|
| a) Tyrosine | b) Threonine |
| c) Histidine | d) Valine |



Q.2 Write any one of following

8

- 1) Describe RAS MAP Kinase pathway of signal transduction
- 2) Discuss assembly and presentation of MHC I molecule

Q.3 Write short note on any one

4

- 1) Structure of MHC class II molecule
- 2) Activation of T_4 cell



Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur (Empowered Autonomous)
Department of Microbiology (PG)
Academic Year 2024-25

M. Sc. Part I (Microbiology) (Semester II) Internal Examination
Immunology DSC20MIC12

Date: 27/09/2024

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



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VIVEKANAND COLLEGE, KOLHAPUR (EMPOWERED AUTONOMOUS)

Department of Microbiology (PG)
Seminars of M.Sc. I Sem I (2024-25)

Internal Exam Marks

Immunology (DSC20MIC12)

Sr. No.	Student Name	Roll No.	Seminar Marks (10)	Assignment Marks (10)	Internal Exam Marks (20)	Total Marks (40)	Marks converted (20)
1.	Angaj Aishwarya Maruti	5401	8	10	19	37	19
2.	Balekundri Dhanashri Raju	5402	8	10	19	37	19
3.	Bhinge Revati Gajanan	5403	7	10	19	36	18
4.	Bhosale Rasika Sanjay	5404	7	10	19	36	18
5.	Bhosale Sharayu Pradeep	5405	10	10	18	38	19
6.	Chandala Vaishnavi Vivek	5406	8	10	18	36	18
7.	Chavan Sanika Sagar	5407	10	10	20	40	20
8.	Chavan Sharvari Subhash	5408	Ab	Ab	Ab	Ab	Ab
9.	Chavan Vaishnavi Vijay	5409	8	10	20	38	19
10.	Ghodasara Sakshi Pankaj	5410	10	10	20	40	20
11.	Gurav Atharva Ramdas	5411	7	10	14	31	16
12.	Hande Pallavi Ravindra	5412	9	10	19	38	19
13.	Kalamkar Asavari Anil	5413	9	10	19	38	19
14.	Kandalkar Namrata Anil	5414	8	10	20	38	19



15.	Kesarkar Prachi Chandrakant	5415	7	10	19	36	18
16.	Koli Sakshi Deepak	5416	8	10	16	34	17
17.	Malavi Rahul Gautam	5417	7	10	16	33	17
18.	Mane Yash Sanjay	5418	7	10	12	29	15
19.	Mulani Samina Firoj	5419	9	10	19	38	19
20.	Mulla Sanovar Salim	5420	9	10	20	39	20
21.	Mullani Aasma Aameer	5421	Ab	Ab	Ab	Ab	Ab
22.	Padaval Damini Mohan	5422	9	10	19	38	19
23.	Pardeshi Shrutika Manik	5423	8	10	19	37	19
24.	Patil Bhushan Dhanaji	5424	Ab	Ab	02	02	01
25.	Patil Samruddhi Bhanudas	5425	7	10	11	28	14
26.	Patil Samruddhi Sudhir	5426	8	10	11	29	15
27.	Pawar Galaxy Sunil	5427	8	10	15	33	17
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34.	Yadav Kalyani Dipak	5434	9	10	16	35	18



VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)**SUPPLIMENT**19
20

Suppliment No. :

Roll No. : 5403

Class : Msc-I sem-I

Signature
of
Supervisor

Subject: Immunology

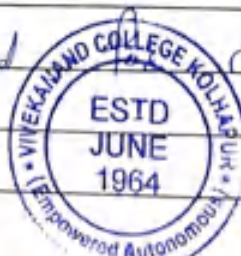
Test / Tutorial No.: Internal Exam

Div.: Date - 27-3-24

- Q2 Write any one of following
- Describe RAS-MAP kinase pathway of signal transduction
 - Discuss assembly & presentation of MHC class-II molecule.

- Q3 Write short on any one
- structure of MHC class-II molecule
 - Activation of T_H cell.

- Q2 RAS-MAP kinase pathway
- This pathway responsible for cell growth & cell division.
 - In this pathway nutrient molecule & growth factor act as signal molecule that are called ligand.
 - In this pathway three genes are activated i.e. c-fos c-jun gene, CREB gene & Myc gene.
 - genes are activated cell growth & cell division



- When gene get inactive, stop the cell growth & cell division
- Transcription factors of these pathway is C-FOS C-JUN Complex, ERK & RSK molecule

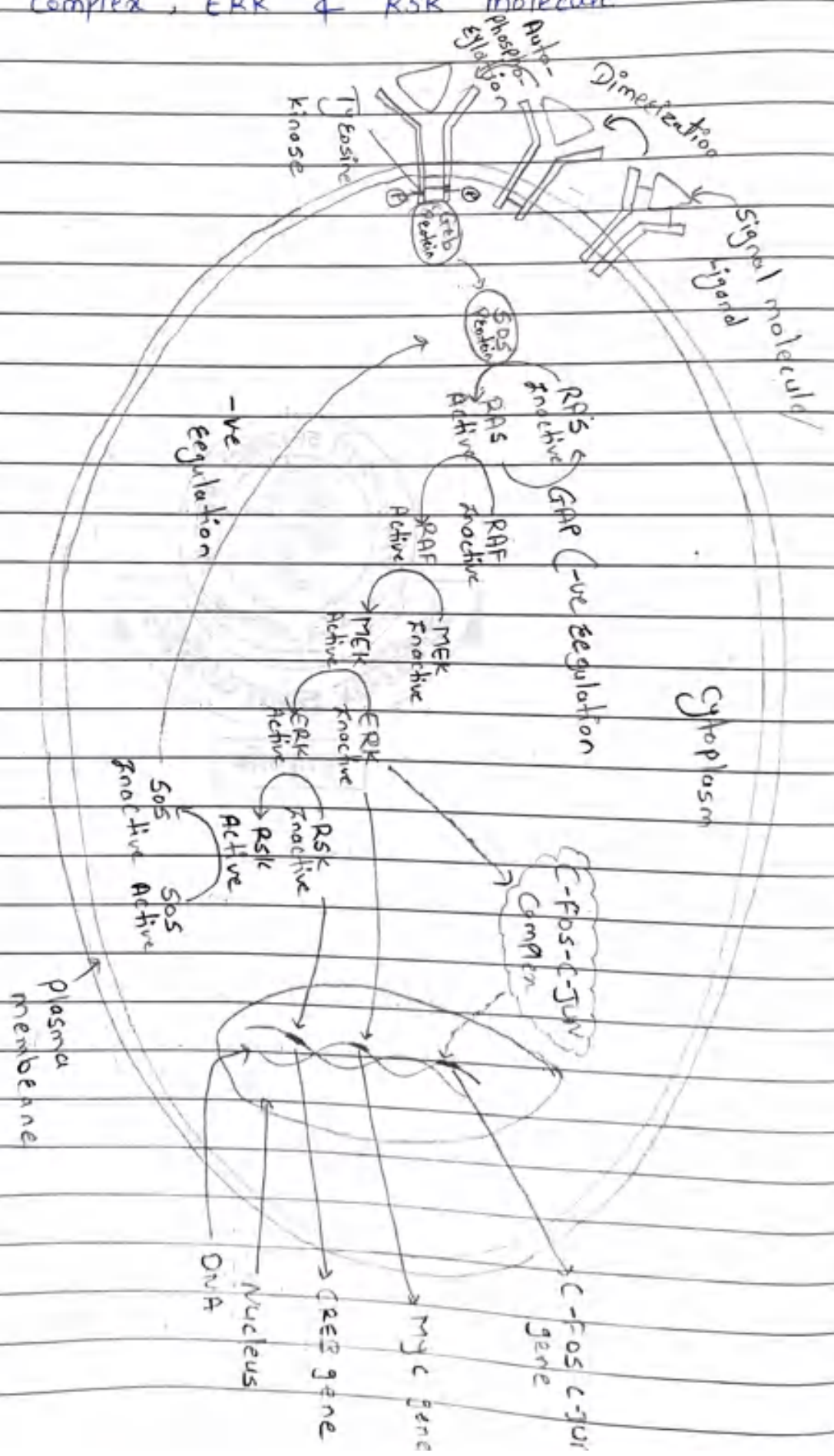


Fig. RAS-MAP kinase Pathway

a) Positive Regulation:-

- i] Signal molecule attaches to receptor & signal transfers to receptor tail.
- ii] Dimerization of tail occurs
- iii] Tyrosine kinase present on receptor tail.
- iv] Autophosphorylation of tyrosine kinase.
- v] Grb protein attaches to receptor tail & Tyrosine donate phosphate group to Grb protein then Grb protein get activated.
- vi] Grb protein attaches to SOS protein & SOS protein get activated.
- vii] Activated SOS protein attaches to RAS Inactive RAS protein molecule & converts RAS GDP to RAS GTP active protein molecule.
- viii] Then one by one all protein molecule get activated.
- ix] Active ERK attaches to C-FOS C-JUN complex & this complex then get activated.
- x] Activated complex C-FOS C-JUN complex then activates the gene C-FOS C-JUN gene.
- xi] Active ERK is responsible for ^{activation of} ~~myc~~ gene Myc gene.
- xii] Active RSK is responsible for CREB gene.
- xiii] All three genes are activated & transcription starts.

b) Negative Regulation:-

- i] stop the cell growth & cell division i.e. negative regulation.

- ii) RSK & GAP proteins act as negative regulators
- iii) RSK protein converts ~~ss~~ active SOS into inactive SOS.
- iv) GAP protein molecule converts ~~As~~ active RAS GTP to ~~s~~ inactive RAS GDP.

✓ All these three genes responsible

- Products of these three genes responsible for cell growth & cell division.

Q2. structure of MHC class II molecule.

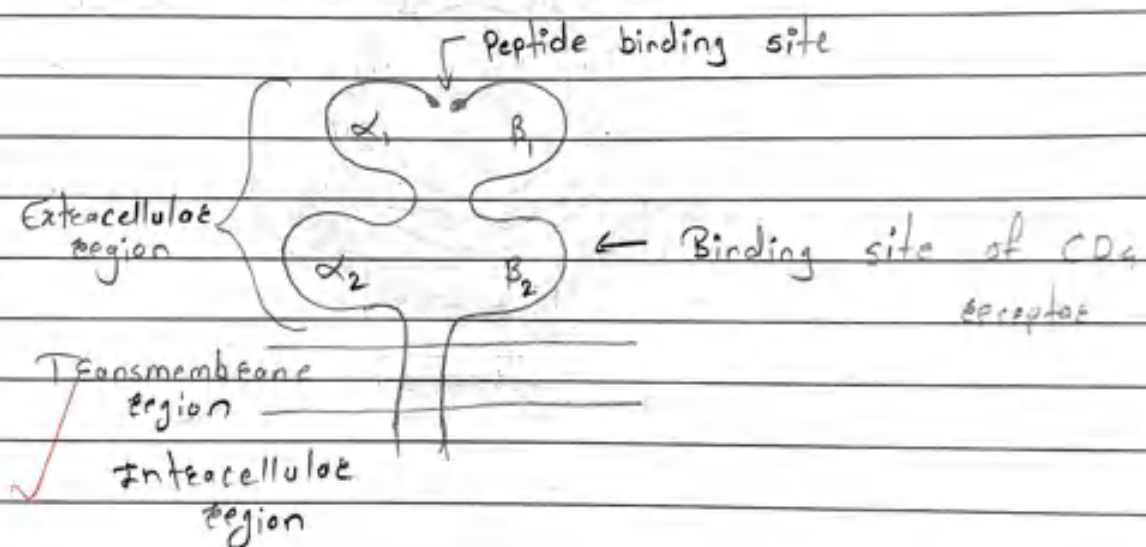


Fig: structure of MHC class II

1) MHC class-II molecule are heterodimers composed of two co-valently associated polypeptide chain i.e α & β

2) Domains :-

i) Extracellular domain :

- Each chain has two extracellular domain.

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. :

Roll No. :

Class :

Signature
of
Supervisor

Subject :

Test / Tutorial No. :

Div. :

- The α_1 & β_2 domain form peptide bind cleft while the α_2 & β_1 domain supports the structure.

ii] Transmembrane domain:

- Each chain has transmembrane domain.

iii] Cytoplasmic tail

- Each chain involved cytoplasmic tail inside the cell membrane.

3] Peptide cleft :

clefts are open both end, allowing to peptide binding.

4] β_2 domain is binding site of CD4 receptor.

Q1.

i] Tapasin has a chaperon activity during assembly of MHC class-I molecule.

a] Tapasin

b] Calnexin

c] Proteasome

d] Acid hydrolase

ii) Tapasin gives signal for the transport of foreign peptide into endoplasmic reticulum during assembly of MHC class-I molecule.

iii) MHC stands for Major Histocompatibility Complex.

a) Major Histocompatibility Complex

b) Minor " "

c) Major " Code

d) Minor " "

iv) Assembly of MHC molecule occurs in Endoplasmic Reticulum.

a) Golgi apparatus

b) Proteasome

c) Nucleus

d) Endoplasmic Reticulum

v) ERK functions as a transcription factor in RAS-MAP kinase pathway.

a) ERK b) RAF c) SOS d) MEK

vi) Co-stimulation of T_H cell is caused by binding of CD28 receptor of T_H cell with B₇ receptor of Antigen Presenting cell.

a) CD28 b) CD40 c) CD12 d) CD24

vii) RSK protein acts as a negative regulator of SOS protein in RAS-MAP kinase pathway.

a) RAS b) RAF c) RSK d) ERK

viii) MEK protein involved in RAS-MAP kinase pathway is a Threonine type of kinase enzyme.

a) Tyrosine kinase b) Threonine c) Histidine d) Valine

Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College Kolhapur (Empowered Autonomous)
Department of Microbiology (PG)

Class: M. Sc-I Sem-I

Name of Paper: RMD20MIC11 Research methodology

Date: 30/09/2024

Marks: 20 Marks

Q1. Choose the correct alternative and rewrite the sentence

8 M

1. The purpose of..... research is to form database from which to infer characteristics of population
 - a. Experimental
 - b. Simulation
 - c. Inferential
 - d. Qualitative
2. The person who takes primary responsibility for communication with journal during manuscript submission is.....
 - a. First author
 - b. Second author
 - c. Corresponding author
 - d. All of them
- 3.....includes surveys and fact-finding enquiries of different kinds
 - a. Fundamental
 - b. Descriptive
 - c. Applied
 - d. Analytical
4. In research process after formulating the research problem..... is done
 - a. Collecting the data
 - b. Preparing the research design
 - c. Extensive literature survey
 - d. Hypothesis testing
5. In research paper publication process the first step is.....
 - a. Manuscript communication
 - b. Journal selection
 - c. Manuscript revision
 - d. Finding aim and scope of journal



6. Following are the criteria of good research except.....

- a. Systematic
- b. Logical
- c. Empirical
- d. Non replicative

7. Deliberate sampling is.....

- a. Purposive sampling
- b. Simple random sampling
- c. Systematic sampling
- d. Stratified sampling

8. research is related to some abstract idea(s) or theory

- a. Empirical
- b. Conceptual
- c. Field setting
- d. Quantitative

Q 2. Attempt any one of the following

8 M

- 1. Discuss in detail research process
- 2. Explain in detail publication process

Q 3. Write short note on any one of the following

4 M

- 1. Research motivation
- 2. Research gate



Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College Kolhapur (Empowered Autonomous)
Department of Microbiology (PG)

Class: M. Sc-I Sem-I

Date: 30/09/2024

Name of paper: RMD20MIC11 Research methodology

Internal Exam Attendance

Sr. No	Student Name	Roll No.	Sign
1	Angaj Aishwarya Maruti	5401	Angaj...
2	Balekundri Dhanashri Raju	5402	Balekundri
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9	Chavan Sharvari Subhash	5408	Chavan
8	Chavan Vaishnavi Vijay	5409	Chavan
10	Dhanawade Ruchika Tanaji	5410	Dhanawade
11	Gurav Atharva Ramdas	5411	Gurav
12	Ghodasara Sakshi Pankaj	5412	Ghodasara
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16	Kesarkar Prachi Chandrakant	5416 5415	Kesarkar
17	Koli Sakshi Deepak	5417 5416	Koli
18	Malavi Rahul Gautam	5418 5417	Malavi
19	Mane Yash Sanjay	5419 5418	Mane
20	Mulani Samina Firoj	5420 5419	Mulani
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22	Mullani Aasma Aameer	5422	Mullani
23	Padaval Damini Mohan	5423 22	Padaval
24	Pardeshi Shrutika Manik	5424 5423	Pardeshi
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27	Patil Sanika Parashram	5428	Patil



29	Pawar Galaxy Sunil	5429	<i>[Signature]</i>
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36	Yadav Kalyani Dipak	5436	<i>[Signature]</i>



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Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE, KOLHAPUR (EMPOWERED AUTONOMOUS)

Department of Microbiology (PG)

Seminars of M.Sc. I Sem I (2024-25)

Internal Exam Marks

Research Methodology (RMD20MIC11)

Sr. No.	Student Name	Roll No.	Seminar Marks (10)	Assignment Marks (10)	Internal Exam Marks (20)	Total Marks (40)	Marks converted (20)
1.	Angaj Aishwarya Maruti	5401	8	10	15	33	17
2.	Balekundri Dhanashri Raju	5402	8	10	15	33	17
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9.	Chavan Vaishnavi Vijay	5409	8	10	16	34	17
10.	Ghudasara Sakshi Pankaj	5410	10	10	15	35	18
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12.	Hande Pallavi Ravindra	5412	9	10	14	33	17
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15.	Kesarkar Prachi Chandrakant	5415	7	10	14	31	16
16.	Koli Sakshi Deepak	5416	8	10	12	30	15
17.	Malavi Rahul Gautam	5417	7	10	13	30	15
18.	Mane Yash Sanjay	5418	7	10	08	25	13
19.	Mulani Samina Firoj	5419	9	10	11	30	15
20.	Mulla Sanovar Salim	5420	9	10	15	34	17
21.	Mullani Aasma Sameer	5421	Ab	Ab	Ab	Ab	Ab
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SUPPLIMENT

Signature
of
Supervisor

[Signature]

Suppliment No. :

17
20

Roll No. : 5405

Subject : Research Methodology :

Test / Tutorial No. : Internal Exam.

Class : M.Sc I. Sem I (Mime).

Date : - 30/09/24

Q.1.] Choose the correct alternative if possible.

1. The purpose of — Research is to form data base from which to infer the characteristic of population.

a) Experimental

c) Inferential

b) Simulation

d) Qualitative

⇒ Inferential

2. The person who takes primary responsibility for communication with journal during manuscript submission is —

a) 1st author.

c) Corresponding author.

b) 2nd author.

d) all of them.

⇒ 1st author.

3. — gives includes surveys and fact finding inquiries of different kinds.

a) Fundamental research

c) applied research.

b) Descriptive research

d) analytical research.

⇒ Descriptive research



4. In Research process after formulating the research problem — is done —
- a) Collecting the data
 - b) Preparing the research design
 - c) Extensive literature survey
 - d) Hypothesis testing
- ⇒ Extensive literature survey.

5. In research paper publication process the first step is —
- a) Manuscript communication
 - b) Journal selection
 - c) Manuscript revision
 - d) Finding aim & scope of journal
- ⇒ Journal selection.

6. Following are the criteria of good research except —
- a) Systematic
 - b) Logical
 - c) Empirical
 - d) Non replicative
- ⇒ Non replicative.

7. Deliberate sampling is —
- a) Purposive sampling
 - b) Simple Random sampling
 - c) Systematic sampling
 - d) Stratified sampling
- ⇒ Purposive sampling.

8. — Research is related to some abstract, Ideas or Theories
- a) Empirical
 - b) Conceptual
 - c) Field setting
 - d) Quantitative
- ⇒ Conceptual.

Attempt any 1.

1. Discuss in detail Research process.
2. Explain in detail publication process.

Short note on any 1.

1. Research Motivation.
2. Research gate.

Research is a scientific and systematic method to investigate a research problem.

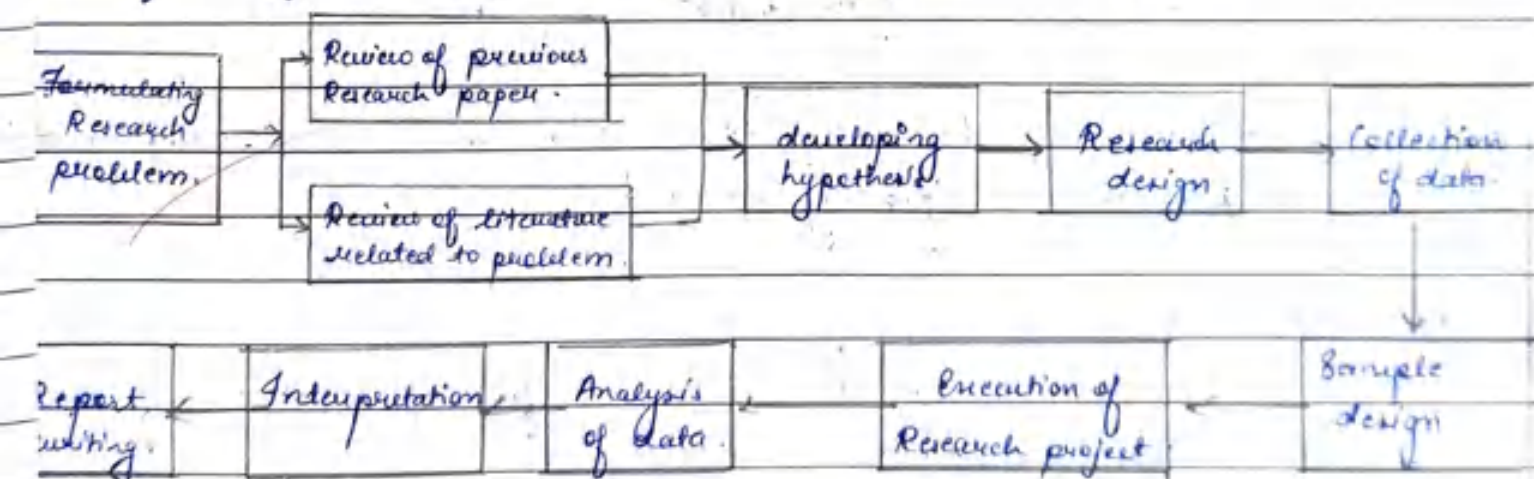
Research is also said to be journey from known to unknown.

It is pursuit of truth.

Research is voyage of discovery.

Research process is carried out in step wise manner to properly get the result and conclusion.

The following chart depicts the outline of research process.



Steps involved are:-

1. Formulating research problem.
2. Extensive literature survey.
3. Developing Hypothesis.
4. Prepare research design.
5. Collection of data.
6. Sample design.
7. Execution of the Research project.
8. Analysis of the data.
9. Hypothesis testing.
10. Interpretation and generalization of data.
11. Main report writing.

1. Formulating research problem.

- Researcher must decide the problem he will be working on for research.
- Researcher must develop the area of interest for research to proceed.
- Researcher can formulate the problem by discussing it with the colleagues.
- Researcher can also have a guide to guide him in developing research problem and figuring it out.

2. Extensive Literature Survey

- Once the Research problem is been finalized it can further be studied through various material.
- Literature survey is necessary to figure out about further research process.
- It will give us idea about the research area and knowledge about how should research be carried.
- Literature survey can be carried out from:
 1. Research paper related to topic.

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SUPPLIMENT

Signature
of
Supervisor

Suppliment No. :

Roll No. : 5405.

Class : M.Sc I Sem I (Micro).

Subject: Research Methodology.

Test / Tutorial No.: Internal Exam.

Date:- 30/09/24.

2. Review paper.

3. Conference proceedings.

4. Journal thesis

5. Book chapter.

6. Articles.

3. Developing Hypothesis

- After extensive literature survey we must develop hypothesis.
- Hypothesis is an assumption made to draw out conclusion and argument.
- It leads to the direction of research process and shows direction of research must proceed.
- Researcher after developing hypothesis gets an idea of how to carry out research.

4. Prepare the research design.

- Researcher must well plan the research process and determine how he wants to carry out research.
- This step is very necessary as it will maintain credibility and integrity of research process.
- Here the researcher decides the steps of research.

◦ Research design is based on:-

1. Availability of skill.
2. Observed and available data.
3. Time required.
4. Cost of all the process.

5. Collection of data.

◦ Researcher then collects data to help in research process.

◦ The data can be collected by:

1. Mailing
2. Phone calls or texting.
3. Schedules.
4. Books, chapter, articles etc.

6. Sample design.

◦ The Researcher will then fix the sample that is to be worked on during research.

◦ Various factors related to sample are taken into consideration
eg:- pH, Temp, preservation etc.

◦ Sample design is further of:

1. Deliberate sampling
2. Simple random sampling
3. Stratified sampling.
4. Quota sampling.
5. Class and area sampling.
6. Sequential sampling.
7. Multistage sampling.

7. Execution of Research project.

- Researcher now proceeds with research work that is the most important work to be done.
- Researcher has to calculate all the possibilities how good research work can be done.
- He has to ensure all the conditions and requirements are fulfilled for the research.
- He has also to ensure that each and every step is properly done and research work is completed on time.

8. Analysis of data.

- After the research work is completed, researcher now has to focus on analysis of the data obtained.
- The obtained data can be grouped in tabular charts or represented in such manner that it is easy to understand and analyse them.
- The analysis of data is carried by establishing a relationship between them.
- And if there is no relationship established that is also noted.

9. Hypothesis testing

- As the analysed data is obtained, researcher now matches it with his hypothesis.
- Whether the analysed data and hypothesis matches or not is observed.
- If the data matches with the hypothesis then the hypothesis comes true and if not hypothesis will be false.

10. Interpretation and generalisation of data.

- Without this step there is no use to do the research project.
- It is to draw out conclusion by interpreting the data and generalizing it.

11. Main Report writing.

- The whole research process now should be write down in systematic manner.
- There are 3 stages.
 1. A Initial stage.
 - Includes date, title and acknowledgment.

2. Main content.

- The whole research process is explained here.

3. End stage.

- Bibliography, and appendices is mentioned here.

83.]

1. ◦ Research is scientific and systematic way to investigate a new problem and to draw solutions.

◦ It is way of discovering truth and solutions to the problems.

◦ Research is also said as voyage of discovery.

◦ It is said to be the journey from known to unknown.

◦ Research is very important aspect of life as it is known to give various solutions to the problems.

◦ To carry out research there needs to be motivation.

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Class : M.Sc I (sem I) Micro.

Subject :

Test / Tutorial No. :

Div. :

Motivation of Research :-

1. People who are aspiring research as field of career, research is motivation to get phd degree.
2. Some people like to face challenges and research can give them challenge to solve a particular problem.
3. People can intellectual joy by conducting research as it provides abundance of knowledge.
4. Some have the motivation of serving the society as a research will solve a particular problem faced by society.
5. Research process will involve creativity in some researchers.
6. Gaining a research degree gives respect to the researcher, therefore respectability also is motivation.

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

Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur
(Empowered Autonomous)
PG Department of Microbiology

"Continuous Internal Evaluation"

M. Sc. II

Semester III



Academic Year: 2024-2025

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Empowered Autonomous)

Department of Microbiology (PG)

Academic Year 2024-25

NOTICE

Date- 13-09-2024

All students of M.Sc. part II Microbiology are hereby informed that, the internal examination of semester III, is going to start from 27th September 2024. The examination will be conducted in room no. 62. The pattern and schedule of examination is given below.

Pattern of examination

Sr. No.	Type	Marks
1.	Descriptive paper	Objective type questions
		Long question -I
		Short note-I
2.	Home assignment	10
3.	Seminar	10
	Total Marks	40

Schedule of examination

Date	Paper title	Time
27/09/2024	Agricultural Microbiology and Phytopathology	2.00-3.00 pm
28/09/2024	Enzymology and Enzyme Technology	2.00-3.00 pm
30/09/2024	Quality Control Microbiology - I	2.00-3.00 pm




Dr. G. K. Sontakke

HEAD
DEPARTMENT OF MICROBIOLOGY
VIVEKANAND COLLEGE, KOLHAPUR
EMPOWERED AUTONOMOUS

Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College Kolhapur (Empowered Autonomous)
Department of Microbiology (PG)

Class: M. Sc-II Sem-III

Date: 27/09/2024

Name of paper: DSC20MIC31- Agricultural Microbiology And Phytopathology Marks: 20

Q1. Choose the correct alternative from the following

8 M

1. For estimation of IAA produced by PGPG..... is used

- a. Salkowskys reagent
- b. Ammonium molybdate
- c. Potassium nitrate
- d. CAS reagent

2. Lichen indicates..... relationship

- a. Mutualistic
- b. Parasitism
- c. Predation
- d. Commensalism

3. Following are the characteristics of good carrier material except.....

- a. Neutral pH
- b. Low organic matter
- c. Non toxic
- d. Finely grounded

4. Azotobacteriaceae family have..... genera

- a. 1
- b. 2
- c. 3
- d. 4

5. During production of azolla biofertiliser insect controllers are applied after.....days following azolla inoculation

- a. 3
- b. 5
- c. 7
- d. 9



6. Normal flora of skin secretes fatty acid which is inhibitory to pathogen indicates.....
- Antagonism
 - Ammensalism
 - Parasitism
 - Predation
7. Ti plasmid used for construction of bt cotton is isolated from.....
- Bacillus thuringiensis*
 - Bacillus sphericus*
 - Agrobacterium tumificiens*
 - Agrobacteriu rhizogene*
8. CAS agar is used for detection of production ability of PGPB
- HCN
 - Ammonia
 - Siderophore
 - IAA

Q2. Attempt any one of the following

8M

- Discuss in detail production BGB fertiliser
- Explain in detail screening and selection of potent strain

Q3. Write short note on following (Any one)

4M

- Bt Cottton
- Parasitism



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Department of Microbiology (PG)

Class: M. Sc-II Sem-III

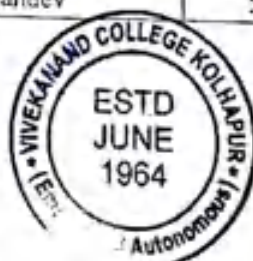
Date: 27/09/2024

Name of paper: DSC20MIC31- Agricultural Microbiology And Phytopathology

Marks: 20

Internal Exam Attendance

Sr. No.	Name of Student	Roll No.	Sign
1.	Attar Taisina Sajjan	5401	
2.	Bangodi Harsh kishor	5402	
3.	Basare Gayatri Pramod	5404	
4.	Bhavake Priyanka .B	5405	
5.	Bodake Harshada Bajirao	5406	
6.	Buva Akshata Krishnat	5407	
7.	Chavan Sanika Gorakhnath	5408	
8.	Chougule Sneha Balaso	5410	
9.	Desai Tammana Sulatan	5412	
10.	Gore Vishal Bapu	5413	
11.	Jadhav Apurva Uday	5414	
12.	Jangam Bhgyashree Sanjay	5415	
13.	Kadam Vijay Sanjay	5416	
14.	Kesare Ankita Bhagvan	5417	
15.	Khadake Aishwarya Amar	5418	
16.	Khatave Nikhil Anil	5419	
17.	Kumthekar Krinshnkant	5420	
18.	Lad Devdatta	5421	
19.	Lambe Sanika Krushna	5422	
20.	Madane Omkar Sanjay	5423	
21.	Magar Pratik Shrikant	5424	
22.	Momin Mubina Salim	5425	
23.	Mujawar Liza Naushad	5426	
24.	Naik Shalom Vishwas	5427	
25.	Parit Akshata Ananda	5428	
26.	Patil Niranjana Krishnatah	5430	
27.	Patil Pranav Anilkumar	5431	
28.	Patil Sakshi Bhauso	5432	
29.	Patil Shivani Tanaji	5433	
30.	Patil Vaishnavi Hanmant	5434	
31.	Patil Sakshi Anil	5435	
32.	Powar Shrutika Sambhaji	5437	
33.	Rajput Kedar Laxmansing	5438	
34.	Sakpal Samiksha Rajesh	5439	
35.	Vast Karishma Umesh	5440	
36.	Zunake Suyash Dnyande	5441	



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

M. Sc. Part II Semester III Internal Examination
Agricultural Microbiology and Phytopathology DSC20MIC3I

Date: 28/09/2024

Sr. No.	Name of Student	Roll No.	Seminar / 10	Home assignment / 10	Test / 20	Total / 40	Converted / 20
1.	Attar Taisina Sajjan	5501	8	10	13	31	16
2.	Bangodi Harsh kishor	5502	8	10	14	32	16
3.	Basare Gayatri Pramod	5503	9	10	17	36	18
4.	Bhavake Priyanka .B	5504	10	10	17	37	19
5.	Bodake Harshada Bajirao	5505	8	10	14	32	16
6.	Buva Akshata Krishnat	5506	8	10	14	32	16
7.	Chavan Sanika Gorakhnath	5507	9	10	13	32	16
8.	Chougule Snehal Balaso	5508	8	10	16	34	17
9.	Desai Tammana Sulatan	5509	9	10	14	33	17
10.	Gore Vishal Bapu	5510	9	10	13	32	16
11.	Jadhav Apurva Uday	5511	10	10	17	37	19
12.	Jangam Bhagyashree Sanjay	5512	8	10	12	30	15
13.	Kadam Vijay Sanjay	5513	8	10	14	32	16
14.	Kesare Ankita Bhagvan	5514	8	10	09	27	14
15.	Khadake Aishwarya Amar	5515	10	10	17	37	19
16.	Khatave Nikhil Anil	5516	10	10	07	27	14
17.	Kumthekar Krinshnkanth	5517	10	10	19	39	20
18.	Lad Devdatta	5518	10	10	12	32	16
19.	Lambe Sanika Krishna	5519	9	10	15	34	17
20.	Madane Omkar Sanjay	5520	10	10	14	34	17
21.	Magar Pratik Shrikant	5521	10	10	19	39	20
22.	Momin Mubina Salim	5522	9	10	15	34	17
23.	Mujawar Liza Naushad	5523	10	10	16	36	18
24.	Naik Shalom Vishwas	5524	8	10	13	31	16
25.	Parit Akshata Ananda	5525	8	10	15	33	17
26.	Patil Niranjan Krishnatah	5526	8	10	12	30	15
27.	Patil Pranav Anilkumar	5527	9	10	10	29	15
28.	Patil Sakshi Bhauso	5528	9	10	11	30	15
29.	Patil Shivani Tanaji	5529	10	10	18	38	19
30.	Patil Vaishnavi Hanmant	5530	8	10	12	30	15
31.	Patil Sakshi Anil	5531	8	10	13	31	16
32.	Powar Shrutika Sambhaji	5532	10	10	18	38	19
33.	Rajput Kedar Laxmansing	5533	9	10	15	34	17
34.	Sakpal Samiksha Rajesh	5534	9	10	19	38	19
35.	Vast Karishma Umesh	5535	9	10	16	35	18
36.	Zunake Suyash Dnyandev	5536	10	10	16	36	18



VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. : 1

Roll No. : 5420

Class :

Signature
of
Supervisor

[Signature]

Subject: Agricultural microbiology
and phytopathology

Test / Tutorial No. : Internal Exam

Div. :

Choose the correct alternative and Rewrite the sentence.

(i) For estimation of IAA produced by PGPB Salkowsky reagent is used.

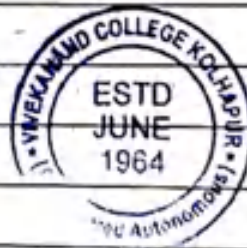
- (a) Salkowsky reagent (c) Potassium nitrate
(b) Ammonium molybdate (d) Cass reagent

(ii) Lichens indicates mutualistic Relationship

- (a) mutualistic (c) predation
(b) Parasitism (d) Commensalism

(iii) Following are the characteristics of good carrier material except low organic matter

- (a) Neutral pH
(b) Low organic matter
(c) Non-toxic
(d) Finely grounded



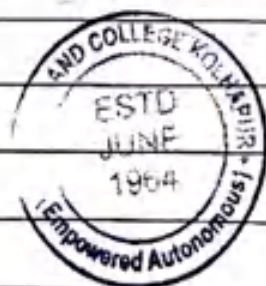
(iv) Azolobacteriaceae family have four genera. (Q2)
(a) one (c) Three
(b) Two (d) Four

(v) During production of Azolla biofertilizer
Insect controllers are applied after Seven days. Following Azolla inoculation. (Q3)
(a) Three (c) Seven
(b) Five (d) Nine

(vi) Normal flora of skin secrete fatty acids which is inhibitory to pathogen indicator Ammezialism. (Q2)
(a) Amagonism (c) Paracitism
(b) Ammesialism (d) predation

(vii) Ti Plasmid used for construction of Bt cotton is isolated from Agrobacterium tumefaciens.
(a) Bacillus thuringensis
(b) Bacillus spenicus
(c) Agrobacterium tumefaciens
(d) Agrobacterium rhizogenes

(viii) CAS Agar is used for detection of production ability of PCA Siderophore.
(a) HCL (c) Siderophore
(b) Ammonia (d) IAA



- Q2) Attempt any one of the Following (8m)
- (a) Discuss in detail product of BCB.
 - (b) Explain in detail production of Azotobacter fertilizer.

- Q3) Write short note on (any one)
- (a) Bt Cotton
 - (b) Parasitism.



Answers -

- Q2)
- (b) Production of Azotobacter Fertilizer -
Morphology

- Azobacter found in the soil or mainly in Rhizospheric region / soil.
- It is gram +ve organism.
- It helps plant for N_2 fixation.
- It fix N_2 ~~on~~ Nonsymbiotic way and no symbiotic association with plant.

Enrichment and Isolation:

- For Isolation of Azotobacter first enrichment is necessary for that medium used is ^{sterile} Asby's mannitol ^{broth} ~~Agar~~ or N_2 Free mannitol ^{broth} ~~Agar~~.
- For Enrichment N_2 Free mannitol broth is prepared and then 1gm rhizospheric soil sample is added in that broth.
- Then broth kept ~~as~~ it is for 4-5 day for enrichment.
- and after that loop full sample streaked on specific medium.

- Another way is that sterile dilution is taken and 1 gm soil sample serially diluted
- and 0.1 ml of proper dilution spread on specific agar medium

Isolation.

- Then enriched sample streaked on the Asby's mannitol agar plate or sterile N_2 free mannitol agar plate
- and again plate kept for the incubation for 4-5 days at RT
- and then plate observed for the isolated colony of the Azotobacter
- If necessary gram staining and biochemicals also performed to confirm the Azotobacter
- Then such isolated colony preserved for the biofertilizer production.

production of Biofertilizer-

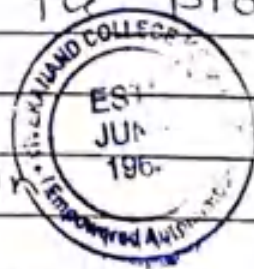
- After potent colony isolation such colony is used for the production of fertilizer.

2 ways of production

- ① Broth Culture
- ② Carrier based production

① Broth culture

- In this technique sterile Asby's or sterile N_2 free mannitol broth is prepared



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SUPPLIMENT

Suppliment No. : 2

Roll No. : 5420

Class :

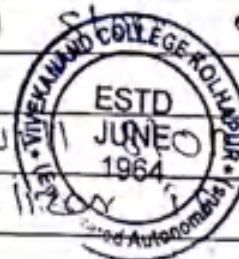
Signature
of
Supervisor

Subject : Agricultural micro.
& phytopathology

Test / Tutorial No. : Internal Exam

Div. :

- and sterilization of broth is done and then in that broth our isolated colony of Azotobacter is added.
- and then broth kept at RT for 4-5 days, and our inoculum is now ready for the large scale production.
- After that fermentor is taken and then medium which is specific for Azotobacter added in the fermentor.
- and then sterilization of medium is done and then our bioinoculum is added in the fermentor.
- and in the fermentor proper conditions required for the production like temp. Aeration is done, proper sampling is done and after proper testing fermentation process will start when $10^8/10^9$ cells/ml occurs.
- Then production will be done and packing of prod. biofertilizer is done in the bottles.



(2) carrier based inoculant production

(a) selection of carrier

- carrier used is cheap and easily available
- It should be non toxic to organism.
- It should have neutral pH.
- It should be finely grinded and easily pass through filter having pore size 50-120 micron.
- It should have high moisture content.
- It should not change property of the potent organism.

- carrier used is selected according to our properties or needs and finely grinded for use.

- After that if pH is not neutral then sodium bicarbonate treatment is given.

- and then sterilization is done.

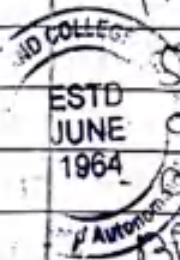
- Then our potent Azotobacter is mixed with carrier material.

- then carrier material added to in the trays and kept for 6-7 days in the shed for curing process (organism adapt themselves with carrier).

- and then after proper testing such Biofertilizer added in the bags.

- Packing is also done in proper ways i.e. 3/4th portion kept empty for the aeration process.

- and shelf life of biofertilizer should be 6 months.



- and during this period no of cell must be $10^8 / 10^9$ cells gm should be present

Use of Biofertilizer. (method of inoculation)

3 ways: ① seed treatment

② seedling dipping

③ soil inoculation

① seed treatment

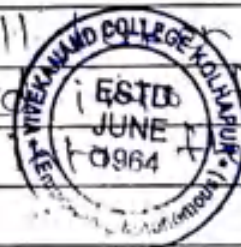
- Here first seed surface is sterilized by alcohol then such seed washed with PLW.
- and then 10% Jaggery solution will be prepared and in that solution our bioinoculant is added after cooling of Jaggery solution.
- and then sterile seeds are added in the solution and kept in trays and then sow in the field.

② seedling dipping

- Here first seeds are grown in the pots and when seed germination is taken place such seeds will directly dipped in the bioinoculant and then sowed in the field.

③ soil inoculation

- Here if we use carrier based inoculum directly added into soil and if inoculum is in liquid



then such inoculum mixed with di-
coaters and then spray on the field.

(Q3) (a) Bt Cotton

- Bt cotton is genetically modified plant or transgenic plant.
- Here as we know B. thuringiensis contain cry gene which is isolated from that organism
- and such gene added into the Ti plasmid and then such plasmid then added into specific organism i.e.
- Agrobacterium tumefaciens and such modified cell allows to infect plant and A. tumefaciens infect plant and then that org. plant gains ability to produce crystal protein which when engulfed by the insects of family lepidoptera, diptera i.e. flies, beetles then such protein undergoes into the gut of the insect and then
- It damages tissue and the starvation condition occurs in those insect and killing of insect is done.
- For such modification first gene or genetic material is isolated
- and with the help of endonuclease and exonuclease it is cutted into the fragment.
- then fragment which is our interest is allowed to combine with the Ti plasmid which shows restriction site where



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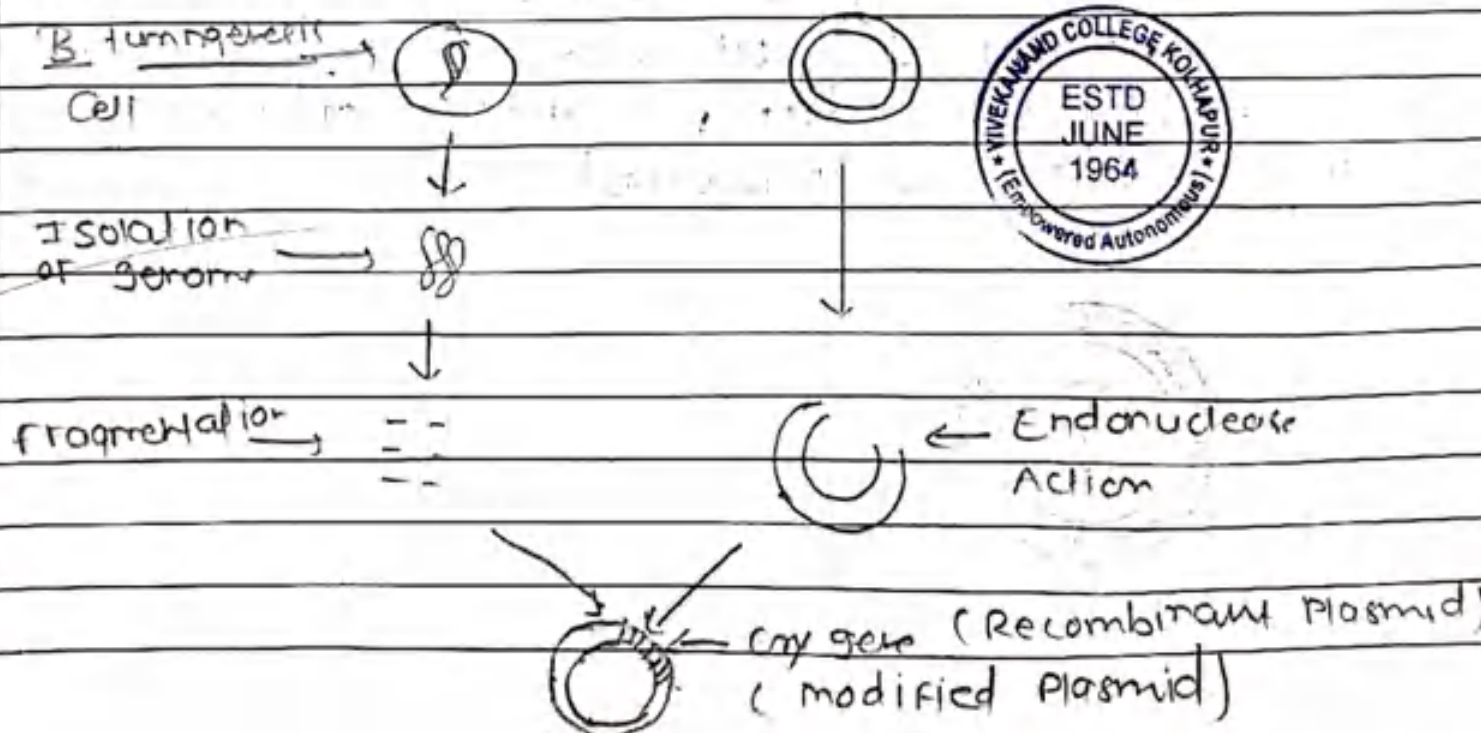
SUPPLIMENT

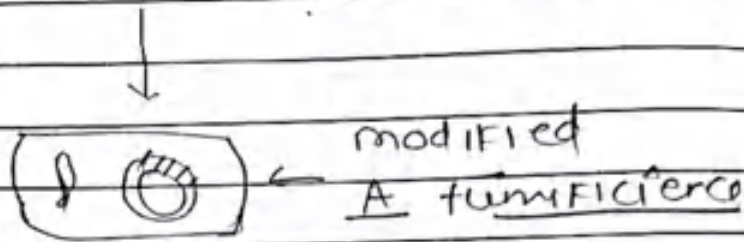
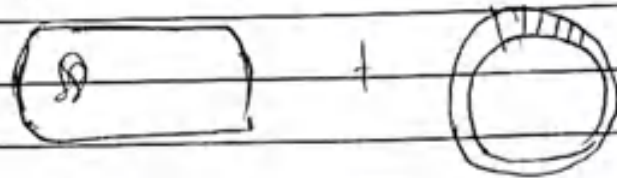
Suppliment No. : 3
Roll No. : 5420
Class :

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of
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Subject: Agricultural micro.
phytopathology.
Test / Tutorial No. : Internal exam
Div. :

- endonuclease make cut and then Fragment of Bacterial genome which contains cry gene is added in the plasmid and ligated by DNA ligase
- Then such modified plasmid allow to add in the B. tumefaciens cell and then such bacteria infect the cotton plant as they have ability to cause tumor in the plant stem due to presence of the Ti Plasmid.





Recombinant cell

Infect to Cotton plant (Bt cotton)

Protein

Protection from Insect

Transgenic Cotton Plant
(Bt Cotton)

- And In such a way we can produce Bt Cotton
- And another varieties of Bt / genetically modified plant also present like Bt brinjal, Bt tomato, Bt rice
- but in India production of such modified plants are banned.



Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Empowered Autonomous)

Department of Microbiology (PG)

Academic Year 2024-25

M. Sc. Part II (Microbiology) (Semester III) Internal Examination

Enzymology and Enzyme Technology DSC20MJC32

Day: Saturday

Time: 2.00 pm to 3.00 pm

Date: 28/09/2024

Marks: 20

Q. 1 Choose the correct alternative and rewrite the sentence

8

- 1) Lock and Key hypothesis of enzyme substrate reaction is proposed by _____
 - a) Fisher
 - b) Koshland
 - c) Buchner
 - d) Kuhne
- 2) Multiple forms of the same enzyme is referred to as _____
 - a) allosteric enzyme
 - b) biosensor
 - c) isoenzyme
 - d) effectors
- 3) Enzymes that are involved in the feedback inhibition are known as _____
 - a) Apoenzymes
 - b) Holoenzymes
 - c) Allosteric enzymes
 - d) Coenzymes
- 4) _____ is an example of multienzyme complex.
 - a) Fatty acid synthetase
 - b) Lysozyme
 - c) Catalase
 - d) Pyruvate kinase
- 5) Nitrogenase enzyme requires _____ as a cofactor for its catalytic activity
 - a) Magnesium
 - b) Molybdenum
 - c) Zinc
 - d) Manganese
- 6) Enzymes are made up of _____
 - a) Fats
 - b) Proteins
 - c) Nucleic acids
 - d) Vitamins
- 7) _____ shared a Nobel Prize for his discovery that enzymes can be crystallized
 - a) Fisher
 - b) Koshland
 - c) Sumner
 - d) Kuhne
- 8) Electron transferring enzymes belong to _____ class of enzymes.
 - a) Ligases
 - b) Hydrolases
 - c) Oxidoreductases
 - d) Isomerases



Q. 2 Write any one of following

8

- 1) Describe specificity of enzymes
- 2) Discuss MWC and KNF model of allosteric enzyme functioning

Q. 3 Write short note on any one

4

- 1) Active site of enzyme
- 2) Lactate dehydrogenase



"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)

Academic Year 2024-25

M. Sc. Part II (Microbiology) (Semester III) Internal Examination

Enzymology and Enzyme Technology DSC20MIC32

Date: 28/09/2024

Sr. No.	Name of Student	Roll No.	Sign
1.	Attar Taisina Sajjan	5401	
2.	Bangodi Harsh kishor	5402	
3.	Basare Gayatri Pramod	5403	
4.	Bhavake Priyanka B	54045	
5.	Bodake Harshada Bajirao	5406	
6.	Buva Akshata Krishnat	54067	
7.	Chavan Sanika Gorakhnath	5408	
8.	Chougule Snehal Balaso	5410	
9.	Desai Tammana Sulatan	5412	
10.	Gore Vishal Bapu	5413	
11.	Jadhav Apurva Uday	5414	
12.	Jangam Bhgyashree Sanjay	5415	
13.	Kadam Vijay Sanjay	5416	
14.	Kesare Ankita Bhagvan	5417	
15.	Khadake Aishwarya Amar	5418	
16.	Khatave Nikhil Anil	5419	
17.	Kumthekar Krintshkanth	5420	
18.	Lad Devdutta	5421	
19.	Lambe Sanika Krushna	5422	
20.	Madane Omkar Sanjay	5423	
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31.	Patil Sakshi Anil	5435	
32.	Powar Shrutika Sambhaji	5437	
33.	Rajput Kedar Laxmansing	5438	
34.	Sakpal Samiksha Rajesh	5439	
35.	Vast Karishma Unesh	5440	
36.	Zunake Suyash Dayandev	5441	



Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur
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 Enzymology and Enzyme Technology DSC20MIC32

Date: 28/09/2024

Sr. No.	Name of Student	Roll No.	Seminar / 10	Home assignment / 10	Test / 20	Total /40	Converted /20
1.	Attar Taisina Sajjan	5501	8	10	11	29	15
2.	Bangodi Harsh kishor	5502	8	10	11	29	15
3.	Basare Gayatri Pramod	5503	9	10	20	39	20
4.	Bhavake Priyanka .B	5504	10	10	19	39	20
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10.	Gore Vishal Bapu	5510	9	10	11	30	15
11.	Jadhav Apurva Uday	5511	10	10	20	40	20
12.	Jangam Bhgyashree Sanjay	5512	8	10	4	22	11
13.	Kadam Vijay Sanjay	5513	8	10	8	26	13
14.	Kesare Ankita Bhagvan	5514	8	10	7	25	13
15.	Khadake Aishwarya Amar	5515	10	10	20	40	20
16.	Khatave Nikhil Anil	5516	10	10	12	32	16
17.	Kumthekar Krinshnkanth	5517	10	10	20	40	20
18.	Lad Devdatta	5518	10	10	14	34	17
19.	Lamhe Sanika Krushna	5519	9	10	11	30	15
20.	Madane Omkar Sanjay	5520	10	10	12	32	16
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25.	Parit Akshata Ananda	5525	8	10	15	33	17
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28.	Patil Sakshi Bhauso	5528	9	10	18	37	19
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30.	Patil Vaishnavi Hanmant	5530	8	10	10	28	14
31.	Patil Sakshi Anil	5531	8	10	16	34	17
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33.	Rajput Kedar Laxmansing	5533	9	10	13	32	16
34.	Sakpal Samiksha Rajesh	5534	9	10	17	26	13
35.	Vast Karishma Umesh	5535	9	10	19	38	19
36.	Zunake Suyash Dnyande	5536	10	10	14	34	17



॥ ज्ञान, विज्ञान आणि सुरास्वर सार्वदा शिक्षण प्रसार ॥

- शिक्षणगृही डॉ. बापूजी साबुळे

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

41528

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)**SUPPLIMENT**

Suppliment No. : 1

Roll No. : 5420

Class :

20

20

5517

Signature
of
Supervisor

Subject : Enzymology & Enzyme technology

Test / Tutorial No. : Internal examination

Div. : MSc-II (sem III)

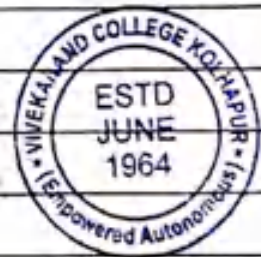
(Q2) Write any one of following : (8M)

- (1) describe specificity of enzyme Allosteric
 (2) Discuss MWC and KNF model of enzyme functioning.

(Q3) Write short note on (any one) (4M)

- (i) Active site of enzyme
 (ii) Lactate dehydrogenase.

Answers-



(Q2)

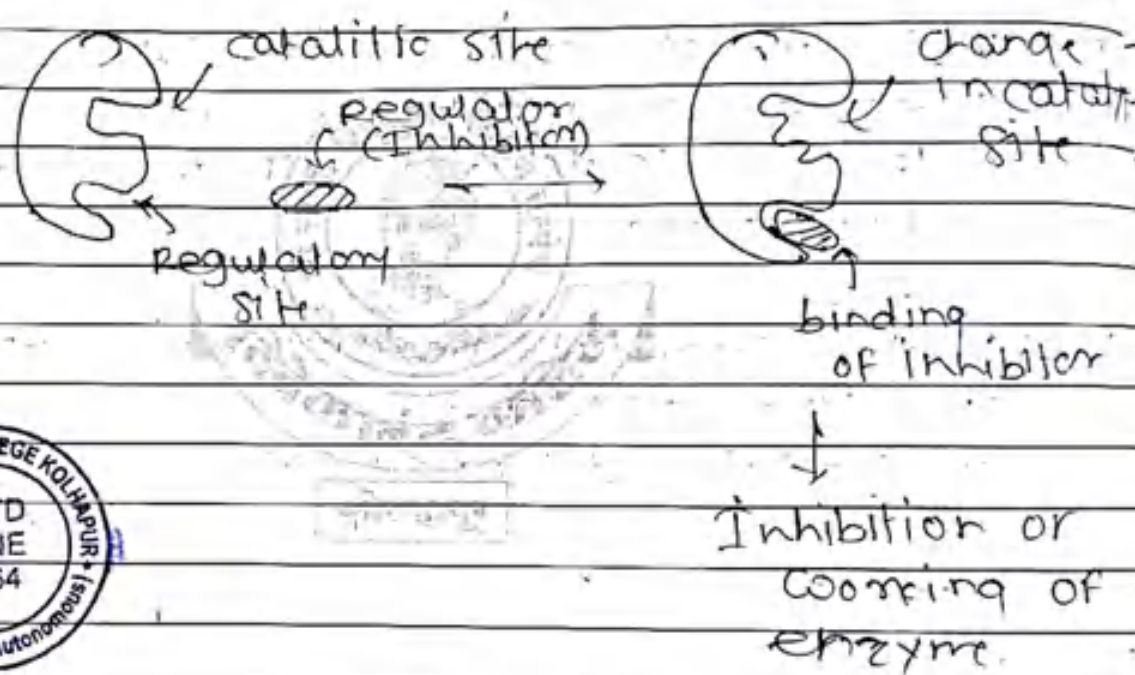
(2) Allosteric enzyme.

- Enzymes are the molecules which can enhance the rate of chemical reaction.
- They are made up of amino acids i.e. they contain A.A as building blocks.
- and enzyme shows presence of active site where substrate binds and is converted to the product.
- But some enzyme show regulatory site which is different from the normal enzyme.

- Allosteric enzyme shows Allosteric site & regulatory site where regulator binds to regulate enzyme activity.

-- There are two types of regulators

- (1) Activator - Which binds at regulatory site and activates enzyme
- (2) Inhibitor - It binds at regulatory site & can inhibit or change structure of active site of the enzyme and inhibit enzyme function.



- There are two models were proposed which give idea about the regulation of allosteric enzyme

- (I) KNF
- (II) MWC.

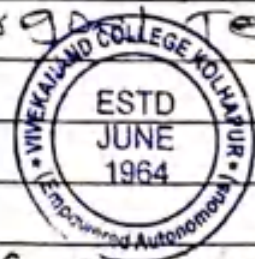
- These two models show how actually allosteric enzyme regulation is done

(1) KNF -

- also known as sequential model
- KNF indicates name of the scientist i.e. Koshland, Nimity and Filmer.
- This is first model proposed and then some changes also occur in this model
- According to this model subunits of Allosteric enzyme previously present in the tensed state i.e. T state.
- As we know enzymes ~~of~~ are sometimes made up of more than one subunit and these subunits are present in the T state.
- When subunits are in T state then at that time low affinity towards the substrate.
- and when substrate binds at one subunit then that undergoes conformational changes and also causes a change in the subunit present near to it and that subunit also undergoes the T state to R state (Relaxed State)
- and such sequentially one by one subunits of enzyme undergo from Tensed state to Relaxed state.

e.g.

- Suppose we have Allosteric enzyme with four subunits then at that time all subunits are present in T state.
- and when substrate binds to the T then T form is converted to R state.



- and one by one all subunit : sequence converted into T state to R state.

Loop affinity
for substrate

477777

Tensed
State

ITIR

R- Relaxed State

TTTR

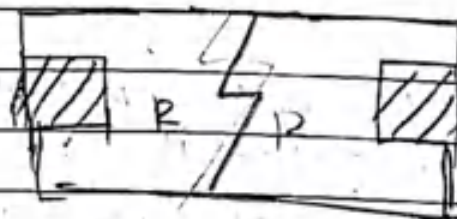
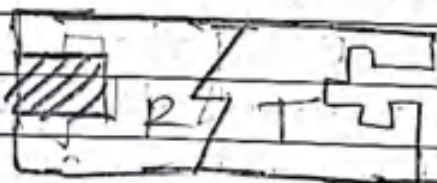
T R R R

RRRR ← High affinity for substrate.



← enzyme with 2 subunit

Binding of substrate



← Confirmational
Change in
2nd enzyme.

Fig. knf model

08/09/2024

॥ ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ॥

- शिक्षणमहर्षी डॉ. बापूजी साबुळे

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

41497

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature
of
Supervisor

Subject: Enzymology & Enzyme
Tech

Test / Tutorial No.:

Div: MSC II (Sem III)

Suppliment No. : 12

Roll No. : 5420

Class :

(c) MWC model

- After KNF mode 2nd model proposed to understand working of Allosteric enzyme is the MWC model.

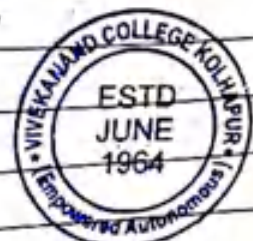
- This model was proposed by 3 scientists Monod, Wyman and Changeux and hence known as MWC.

- Also known as ~~concerned~~ concerted model of Allosteric functioning.

- In KNF mode sequentially subunits are converted to the T state to R state.

- But in this model at a time T subunits converted to the R state.

- When substrate binds at specific site then all subunits of enzyme at a time will convert Tensed state to relaxed state.



Allosteric enzyme
 TTTT $\leftarrow$ with 4 subunits
 (low affinity for substrate)
 ↓
 RRRR $\leftarrow$ All 4 subunits
 converted into R
 state

T = Tensed state
 R = Relaxed state

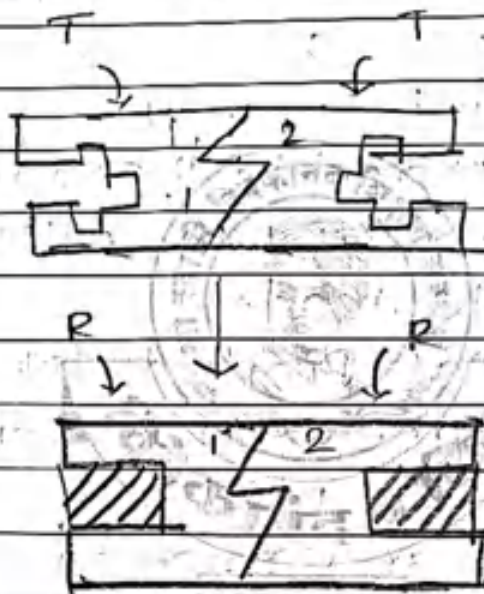


Fig. MWC model

- This is about KNF and MWC model which gives idea about the actual how conformational change occurs in subunits of the enzyme.



3)

2)

Lactate dehydrogenase - (LDH)

- Lactate dehydrogenase is and Isoenzyme found in heart, liver cell and also in muscle cell.
- Lactate dehydrogenase is tetramer i.e. found in 4 subunit and that may be homotetramer and heterotetramer.

- They show two types of polypeptide chain (i) H chain (ii) M chain.

- This enzyme is also helpful for the detection of the disease condition of liver, heart, etc.

- There are ^{five} ~~four~~ types are found or isoenzymes found.

$\square$ = H chain

$\bigcirc$ = M chain

$\text{HHHH} = \text{H}_4 = \text{Homotetramer} = \text{LDH}_1$

$\text{HHHM} = \text{H}_3\text{M} = \text{Heterotetramer} = \text{LDH}_2$

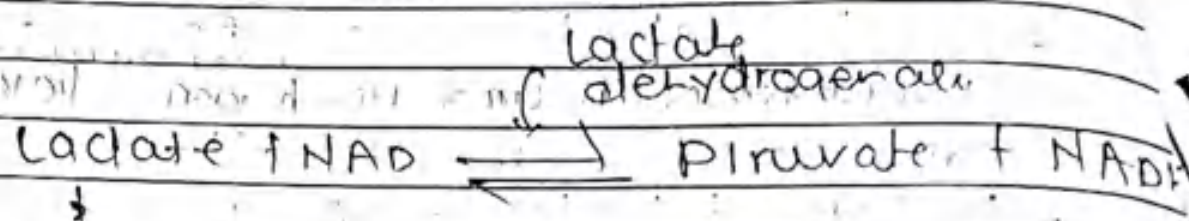
$\text{HHMM} = \text{H}_2\text{M}_2 = \text{Heterotetramer} = \text{LDH}_3$

$\text{HMMM} = \text{HM}_3 = \text{Heterotetramer} = \text{LDH}_4$

$\text{MMMM} = \text{M}_4 = \text{Homotetramer} = \text{LDH}_5$



- Lactate dehydrogenase convert Lactate to Pyruvate and vice versa.



- LDH enzyme work when our body doing exercise

- at that time our body O_2 level ↓ and due to that after glycolysis produced in our body Py is converted to PA and such PA is then converted to LA .

- and accumulation of LA in body is harmful.

- and hence such LA is transferred to the liver cell and converted into PA and again converted into glucose by the process called as gluconeogenesis.

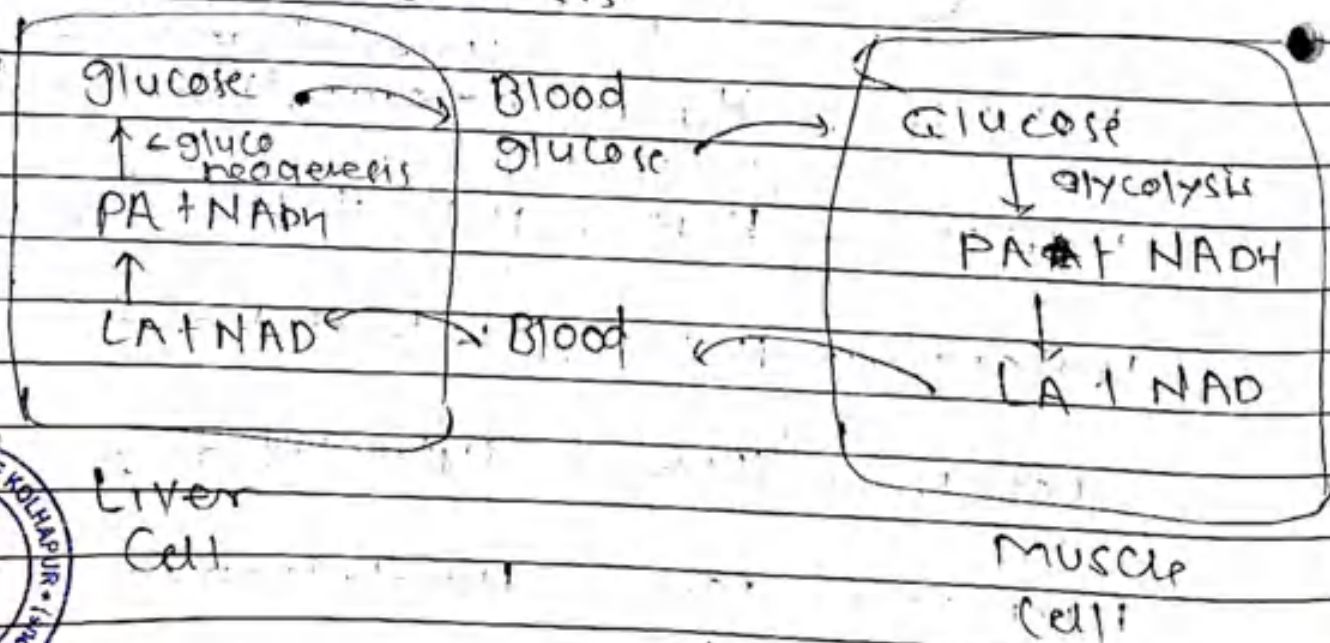


Fig - Functioning of LDH

28/09/2024.

॥ ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ॥

- शिक्षणमहर्षी डॉ. बापूजी साबुळे

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature
of
Supervisor

Suppliment No. : 3

Roll No. : 5420

Class :

Subject : enzymology & Enzyme
technology.

Test / Tutorial No. :

Div. : MSc II (Sem III)

- 4
- LDH work when our body doing exercise and O_2 supply is less.
 - $\uparrow$ conc of LDH in blood and other organs indicates the disease of liver cell or heart disease.
 - and hence LDH also used for diagnosis of disease also.

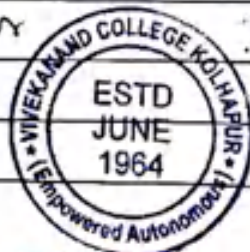
(Q1) Choose the correct alternative; and rewrite the sentence

(i) Lock and key hypothesis of enzyme substrate reaction is proposed by Fisher.

- (a) Fisher (c) Buchner
(b) Koshland (d) Kuhn

(ii) Multiple forms of same enzyme is referred as Isoenzyme

- (a) Allosteric enzyme (c) Isoenzyme
(b) biosensor (d) effectors



Enzymes that are involved in feedback inhibition are known as Allosteric enzymes

- (a) Apoenzyme (c) Allosteric enzyme
(b) Holoenzyme (d) Co-enzyme

Fatty acid synthetase is an example multienzyme complex.

- (a) Fatty acid synthetase
(b) Lysozyme
(c) Catalase
(d) Pyruvate kinase

Nitrogenase enzyme requires Molybdenum as a cofactor for its catalytic activity.

- (a) Magnesium (c) Zinc
(b) Molybdenum (d) Manganese

Enzymes are made up of proteins.

- (a) Fats (c) Nucleic Acids
(b) Proteins (d) Vitamins

Sumner shared a Nobel prize for his discovery that enzymes can be crystallised.

- (a) Fisher (c) Sumner
(b) Koshland (d) ~~Kuhne~~ Kuhne

Electron transferring enzyme belongs to oxidoreductase class of enzyme.

- (a) Ligase (c) Oxidoreductase
(b) Hydrolase (d) Isomerase

VIVEKAND COLLEGE (EMPOWERED AUTONOMOUS), KOLHAPUR.

PG DEPARTMENT OF MICROBIOLOGY

M.Sc. II INTERNAL EXAMINATION (SEMESTER II) 2024-25

Date – 30/09/2024

Question 1. Rewrite the sentence by selecting correct alternative. (8 Marks)

1. The laboratory -----should ensure that regular training in laboratory safety is provided.
a) Director b) Manager c) Supervisor d) Contractor
2. Equipment such as autoclaves and biological safety cabinets must be ----- with appropriate methods before being taken into use.
a) Validated b) Calibrated c) Moderated d) Monitored
3. The ----- is the preferred method for all decontamination process.
a) Radiation b) Steam autoclaving c) Gaseous sterilization d) Incineration
4. The BSL3 laboratory must be separated from the areas that are open to ----- traffic flow within the building.
a) Unrestricted b) Restricted c) All d) None of the above
5. Plastics should replace ----- wherever possible.
a) Metal b) Glass c) Alloy d) Silica
6. Freshly prepared hypochlorite solutions should contain available chlorine at ----- concentration for general use.
a) 1gm / lit b) 2gm / lit c) 3gm / lit d) 4gm / lit
7. All work must be carried out in the ----- part of the working surface of biological safety cabinets.
a) Upper b) Sub upper c) Middle d) Lower
8. Laboratories that receive ----- no of specimens should designate a particular room for this purpose.
a) Small b) Large c) Less d) Middle

Question 2. Long answer question (Attempt any One)

(8 Marks)

1. Describe in detail code of practice for BSL 1 and 2 laboratory.
2. Describe in detail about safe handling of specimens in the laboratory and how to use pipettes in the laboratory.

Question 3. Short note (Attempt any One)

(4 Marks)

1. Waste handling in biosafety laboratories.
2. Standard precautions taken with blood and body fluids in biosafety labs



Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Empowered Autonomous)

Department of Microbiology (PG)

Academic Year 2024-25

M. Sc. Part II (Microbiology) (Semester III) Internal Examination

Quality Control Microbiology I DSE20MIC31

Date: 30/09/2024

Sr. No.	Name of Student	Roll No.	Sign
1.	Attar Taisina Sajjan	5501	<i>Attar</i>
2.	Bangodi Harsh kishor	5502	<i>Bangodi</i>
3.	Basare Gayatri Pramod	5503	<i>Basare</i>
4.	Bhavake Priyanka B	5504	<i>Bhavake</i>
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6.	Buva Akshata Krishnat	5506	<i>Buva</i>
7.	Chavan Santika Gorakhnath	5507	<i>Chavan</i>
8.	Chougule Snehal Balaso	5508	<i>Chougule</i>
9.	Desai Tammana Sulatan	5509	<i>Desai</i>
10.	Gore Vishal Bapu	5510	<i>Gore</i>
11.	Jadhav Apurva Uday	5511	<i>Jadhav</i>
12.	Jangam Bhagyashree Sanjay	5512	<i>Jangam</i>
13.	Kadam Vijay Sanjay	5513	<i>Kadam</i>
14.	Kesare Ankita Bhagvan	5514	<i>Kesare</i>
15.	Khadake Aishwarya Amar	5515	<i>Khadake</i>
16.	Khatave Nikhil Anil	5516	<i>Khatave</i>
17.	Kumthekar Krishnakanth	5517	<i>Kumthekar</i>
18.	Lad Devdatta	5518	<i>Lad</i>
19.	Lambe Sanika Krushna	5519	<i>Lambe</i>
20.	Madane Omkar Sanjay	5520	<i>Madane</i>
21.	Magar Pratik Shrikant	5521	<i>Magar</i>
22.	Momin Mubina Salim	5522	<i>Momin</i>
23.	Mujawar Liza Naushad	5523	<i>Mujawar</i>
24.	Naik Shalom Vishwas	5524	<i>Naik</i>
25.	Parit Akshata Ananda	5525	<i>Parit</i>
26.	Patil Niranjan Krishnatah	5526	<i>Patil</i>
27.	Patil Pranav Anilkumar	5527	<i>Patil</i>
28.	Patil Sakshi Bhauso	5528	<i>Patil</i>
29.	Patil Shivani Tanaji	5529	<i>Patil</i>
30.	Patil Vaishnavi Hanmant	5530	<i>Patil</i>
31.	Patil Sakshi Anil	5531	<i>Patil</i>
32.	Powar Shruti Sambhaji	5532	<i>Powar</i>
33.	Rajput Kedar Laxmansing	5533	<i>Rajput</i>
34.	Sakpal Samiksha Rajesh	5534	<i>Sakpal</i>
35.	Vast Karishma Umesh	5535	<i>Vast</i>
36.	Zunake Suyash Dnyande	5536	<i>Zunake</i>

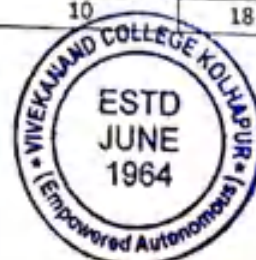


Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)
Department of Microbiology (PG)
Academic Year 2024-25

M. Sc. Part II Semester III Internal Examination
Quality Control Microbiology I DSE20MIC31

Date: 30/09/2024

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15.	Khadake Aishwarya Amar	5515	10	10	17	37	19
16.	Khatave Nikhil Anil	5516	10	10	14	34	17
17.	Kumthekar Krishnakant	5517	10	10	16	36	18
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26.	Patil Niranjana Krishnatah	5526	8	10	12	30	15
27.	Patil Pranav Anilkumar	5527	9	10	08	27	14
28.	Patil Sakshi Bhauso	5528	9	10	11	30	15
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30.	Patil Vaishnavi Hanmant	5530	8	10	12	28	14
31.	Patil Sakshi Anil	5531	8	10	16	34	17
32.	Powar Shrutika Sambhaji	5532	10	10	14	34	17
33.	Rajput Kedar Laxmansing	5533	9	10	13	32	16
34.	Sakpal Samiksha Rajesh	5534	9	10	14	33	17
35.	Vast Karishma Umesh	5535	9	10	14	33	17
36.	Zunake Suyash Dnyande	5536	10	10	18	38	19



2024-25

Name - Aishwarya Amar Khadake

॥ ज्ञानं विज्ञानं आणि सुसंस्कारे यांसाठी शिक्षण प्रसार ॥

- शिक्षणमहर्षी डॉ. बापूजी साठुंबे

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

40957

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)**SUPPLIMENT**

17

Signature
of
Supervisor

V.N. more

Suppliment No. :

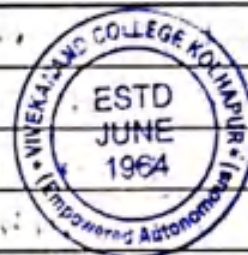
Roll No. : 5418

Class : M.Sc II Sem. III

Subject: Quality control - Microbiology
DSE 20MIC31

Test / Tutorial No. : Internal exam

Div. : 4



(1)

Bio-safety :-

Bio safety is the prevention of loss of biological integrity focussing on both ecology and human health.

Biosafety level 1 and 2 are designed to work with risk group micro-organisms 1 and 2.

Code of practice for Biosafety level 1 and Biosafety level 2

(i) The code is essential requirement for laboratory practices and procedures which are basic to the good microbiological techniques.

(ii) The code of practice may be used to develop written practices and procedures in laboratory.

(iii) The laboratory should adopt a safety

manual for potentially hazardous material or organism.

(iv) It is an listening and written down which provides laboratory procedure & practices.

To avoid hazards -

1. Access -

(i) The international warning signs and symbols must be displayed on the door of the room handle while using risk group 2 organisms.

(ii) Only authorised person should be allowed to enter in laboratory.

(iii) children are not allowed to enter in laboratory.

(iv) Doors of laboratory should be kept closed because there is chance of entry of arthropods & rodents.

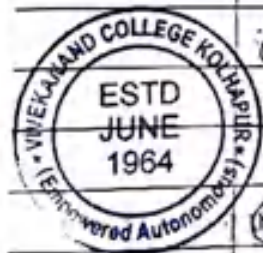
2. Personal protection -

(i) Person should wear a protective clothing such as lab coats / apron, one-piece gown, coverall and covering head.

(ii) Gloves should be worn when handling with infectious material and contact with direct and indirect.

(iii) Proper hand washing should be necessary when handling or work with infectious material.

(iv) Face shield, mask should be worn during



handling chemicals.

3. Use of pipettes

(i) Avoid mouth pipetting.

(ii) The hypodermal needles and syringes should not be used.

(iii) Pipettes which is in use, they have proper cotton plug.

(iv) There should be same pipettes are used.

(v) Material which we pipetted, that material should not be expelled outside.

(vi) Breakable pipettes are discharged in decontaminated containers.

4. Procedures

(i) Use of pipettes & pipetting aids - Mouth pipetting is prohibited.

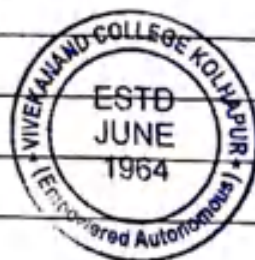
(ii) Laboratory protective clothing should not be worn outside the laboratory.

e.g. canteens, libraries, staff rooms, washrooms.

(iii) The hypodermal needles & syringes should not be used.

(iv) All instruments are monitored.

(v) Person / worker should wear protective clothing while working in the laboratory.



Laboratory equipment -

(i) Laboratory equipment designed to prevent contact between individual and infectious material.

(ii) It is constructed which have resistance to chemicals.

(iii) Laboratory equipment should be wiped by using disinfectant before and after using.

(iv) The respiratory protective equipment should be provided.

for e.g. working with animals.

Laboratory working areas -

The laboratory working areas should be kept neat, clean, free soil material that are pertinent.



VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature
of
Supervisor

Suppliment No. : 1

Roll No. : 5418

Class : M. Sc. II

Subject : Quality control I

Test / Tutorial No. : Internal exam

Div. : -



Q. 3

(2)

↳ standard precautions taken with blood & body fluids in BSL.

① Standard precautions are designed to prevent risk of infection.

collection, handling, transport of blood

① For collection of blood, body fluids, we should use glass or plastic.

② Handling of such fluids as blood, body fluids should be properly.

③ Gloves, laboratory protective gown should be worn while handling with blood or body fluids.

④ Face shield, covering head, mask should be worn.

⑤ Trained staff should be employed for this work.

⑥ There is no material remain outside the bottle.

(viii) Precautions must be taken while collection or handling of sample. such as blood serum, or body fluids.

(viii) Tissue -

Formalin fixative we should use.

(ix) Decontamination -

In case of decontamination, we should use hypochlorite which is strong decontaminating agent.

(x) Glutaraldehyde we should use for the decontamination of any material.

(xi) Container (decontamination container) should be used for discharging breakable, likable material.



1. The laboratory supervisor should ensure that regular training in laboratory safety is provided;

- a) Director
- b) Manager
- c) Supervisor
- d) contractor

2. Equipment such as autoclave and biological safety cabinets must be calibrated with appropriate methods before being taken into use.

- a) validated
- b) calibrated
- c) moderated
- d) monitored

3. The steam autoclaving is the preferred method for all decontaminant on process.

- a) radiation
- b) steam autoclaving
- c) Gaseous sterilization
- d) Incineration

4. The biosafety level 3 laboratory must be separated from the areas that are open to unrestricted traffic flow within the building

- a) Unrestricted
- b) restricted
- c) all
- d) none of above

5. Plastic should replace glass material whenever possible.

- a) Metal
- b) Glass
- c) Alloy
- d) silica



6. Freshly prepare hypochlorite solⁿ should contain
sodium hypochlorite 1 gm / lit concentration for general
use.

a) 1 gm / lit

b) 2 gm / lit

c) 3 gm / lit

d) 4 gm / lit

7. All work must be carried out in middle
part of working surface of biological safety
cabinet.

a) Upper

b) sub-upper

c) middle

d) lower

8. Laboratories that receive large number
of specimen should designate a particular
room for collection.

a) small

b) Large

c) medium

d) middle



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-Shikshanmahrshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE, KOLHAPUR
(AN EMPOWERED AUTONOMOUS INSTITUTE)

Department of Microbiology (PG)

Academic year 2024-2025

Continuous Internal Evaluation

MSc-I Sem-II



Academic Year 2024-2025

Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur (An Empowered Autonomous Institute)
Department of Microbiology (PG)
Academic Year 2024-25

NOTICE

Date- 12-02-2025

All students of M.Sc.-I Microbiology are hereby informed that, the internal examination of semester II, is going to start from 17th March 2025. The examination will be conducted in room no. 413. The pattern and schedule of examination is given below.

Pattern of Examination

Sr. No.	Type		Marks
1.	Descriptive paper	Objective type questions	8
		Long question -I	8
		Short note-I	4
2.	Home assignment		10
3.	Seminar		10
Total			40

Schedule of Examination

Sr. No.	Date	Paper title	Time
1.	17/03/2025	Techniques in Microbiology	2.00-3.00 pm
2.	18/03/2025	Microbial Physiology, Biochemistry and Metabolism	2.00-3.00 pm
3.	19/03/2025	Medical Microbiology	2.00-3.00 pm




Dr. T. C. Gaupale

IPC HEAD
DEPARTMENT OF MICROBIOLOGY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (An Empowered Autonomous Institute)
M. Sc. Part I (Semester II) Internal Examination: March - 2025

Course Name: Techniques in Microbiology

Course Code: DSC20MIC21

Date: 17/03/2025

Time: 2pm to 3 pm

Marks: 20

Instructions:

1. All the questions are compulsory
2. Figures to the right indicates full marks
3. Draw neat and labelled diagram wherever necessary.

Q.1 Select the most correct alternative from the given alternatives.

[8]

i. _____ is used to remove metal ion from reagent.

- | | |
|-------------------|---------------------|
| a) cationic resin | b) anionic resin |
| c) dextran | d) aromatic dextran |

ii. To separate _____ dextran exchanger is used.

- | | |
|--------------|-------------------|
| a) cellulose | b) amino acid |
| c) protein | d) polysaccharide |

iii. For separation of strong basic group _____ is used.

- | | |
|----------------------|-----------------------|
| a) anionic exchanger | b) cationic exchanger |
| c) cellulose beads | d) porous beads |

iv. In _____ separation of molecule is based only on molecular size.

- | | |
|--------------------------------|----------------------------------|
| a) ion exchange chromatography | b) gel filtration chromatography |
| c) SDS PAGE | d) isoelectric focusing |

v. To convert non-polarized light into polarized light _____ is used in polarization microscopy.

- | | |
|---------------|----------------------|
| a) phase plat | b) polarizer |
| c) analyser | d) annular diaphragm |

vi. _____ method of preservation uses liquid nitrogen.

- | | |
|---------------------|----------------------|
| a) Lyophilization | b) Serial subculture |
| c) Cryopreservation | d) Freeze drying |



vii. In _____ microscopy, laser light is used.

- a) polarization
- b) confocal
- c) phase plate
- d) fluorescent

viii. To select single wavelength of light _____ is used in fluorescent microscopy.

- a) barrier filter
- b) reflector
- c) excitation wavelength filter
- d) ocular lens

Q. 2 Attempt any one

[8]

- i. Explain in detail principle, parts, working and applications of ion exchange chromatography.
- ii. Describe in detail methods of preservation of microorganisms.

Q.3 Attempt any one

[4]

- i. Gel exclusion chromatography
- ii. Phase contrast microscopy



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Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College Kolhapur (An Empowered Autonomous Institute)

PG Department of Microbiology

Academic Year 2024-25

M. Sc. I Internal Exam (Semester II)

Techniques in Microbiology

ATTENDANCE

Date: 17/03/2025

Sr No	Student Name	Roll No.	Signature
1	Angaj Aishwarya Maruti	5401	<i>Angaj...</i>
2	Balekundri Dhanashri Raju	5402	<i>Balekundri...</i>
3	Bhinge Revati Gajanan	5403	<i>Bhinge</i>
4	Bhosale Rasika Sanjay	5404	<i>Bhosale..</i>
5	Bhosale Sharayu Pradeep	5405	<i>Bhosale</i>
6	Chandala Vaishnavi Vivek	5406	<i>Chandala</i>
7	Chavan Sanika Sagar	5407	<i>Chavan</i>
8	Patil Sharvari Subhash	5408	<i>Sharvari</i>
9	Chavan Vaishnavi Vijay	5409	<i>Chavan</i>
10	Ghodasara Sakshi Pankaj	5410	<i>Ghodasara</i>
11	Gurav Atharva Ramdas	5411	<i>Gurav</i>
12	Hande Pallavi Ravindra	5412	<i>Hande</i>
13	Kalamkar Asavari Anil	5413	<i>Kalamkar</i>
14	Kandalkar Namrata Anil	5414	<i>Namrata</i>
15	Kesarkar Prachi Chandrakant	5415	<i>Kesarkar</i>
16	Koli Sakshi Deepak	5416	<i>Koli</i>
17	Mahavi Rahul Guntam	5417	<i>Mahavi</i>



18	Mane Yash Sanjay	5418	<u>Yash</u>
19	Mulani Samina Firoj	5419	<u>Samina</u>
20	Mulla Sanovar Salim	5420	<u>Shrub</u>
21	Mullani Aasma Aameer	5421	<u>AL</u>
22	Padaval Damini Mohan	5422	<u>Damini</u>
23	Pardeshi Shrutika Manik	5423	<u>Smk</u>
24	Patil Bhushan Dhanaji	5424	<u>AB</u>
25	Patil Samruddhi Bhanudas	5425	<u>Salu</u>
26	Patil Samruddhi Sudhir	5426	<u>sspatil</u>
27	Pawar Galaxy Sunil	5427	<u>Galaxy</u>
28	Powar Rushita Dinkar	5428	<u>Powar</u>
29	Sankpal Sourabh Rajaram	5429	<u>sps</u>
30	Sawant Rohan Ravindra	5430	<u>RR</u>
31	Surgali Shreeshail Mallappa	5431	<u>Shreeshail</u>
32	Tangade Priti Anil	5432	<u>Tangade</u>
33	Thorbole Sanika Prakash	5433	<u>Sanika</u>
34	Yadav Kalyani Dipak	5434	<u>Kalyani</u>



Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE, KOLHAPUR (AN EMPOWERED AUTONOMOUS INSTITUTE)

Department of Microbiology (PG)

M.Sc. I Sem II (2024-25)

Internal Exam Marks

Techniques in Microbiology (DSC20MIC22)

Sr. No.	Student Name	Roll No.	Seminar Marks (10)	Assignment Marks (10)	Internal Exam Marks (20)	Total Marks (40)	Marks converted (20)
1.	Angaj Aishwarya Maruti	5401	8	10	18	36	18
2.	Balekundri Dhanashri Raju	5402	8	10	17	35	18
3.	Bhinge Revati Gajanan	5403	9	10	19	38	19
4.	Bhosale Rasika Sanjay	5404	7	10	14	31	16
5.	Bhosale Sharayu Pradeep	5405	7	10	18	35	18
6.	Chandala Vaishnavi Vivek	5406	9	10	16	35	18
7.	Chavan Sanika Sagar	5407	10	10	17	37	19
8.	Chavan Sharvari Subhash	5408	7	10	06	23	12
9.	Chavan Vaishnavi Vijay	5409	9	10	16	35	18
10.	Ghudasara Sakshi Pankaj	5410	10	10	18	38	19
11.	Gurav Atharva Ramdas	5411	7	10	13	30	15
12.	Hande Pallavi Ravindra	5412	10	10	16	36	18
13.	Kalamkar Asavari Anil	5413	10	10	14	34	17
14.	Kandalkar Namrata Anil	5414	9	10	15	34	17



15.	Kesarkar Prachi Chandrakant	5415	7	10	15	32	16
16.	Koli Sakshi Deepak	5416	9	10	17	36	18
17.	Malavi Rahul Gautam	5417	7	10	15	32	16
18.	Mane Yash Sanjay	5418	7	10	12	29	15
19.	Mulani Samina Firoj	5419	9	10	18	37	19
20.	Mulla Sanovar Salim	5420	9	10	19	38	19
21.	Mullani Aasma Sameer	5421	Ab	Ab	Ab	Ab	Ab
22.	Padaval Damini Mohan	5422	9	10	19	38	19
23.	Pardeshi Shrutika Manik	5423	9	10	17	36	18
24.	Patil Bhushan Dhanaji	5424	Ab	Ab	Ab	Ab	Ab
25.	Patil Samruddhi Bhanudas	5425	7	10	13	30	15
26.	Patil Samruddhi Sudhir	5426	8	10	15	33	17
27.	Pawar Galaxy Sunil	5427	8	10	15	33	17
28.	Powar Rushita Dinkar	5428	10	10	15	35	18
29.	Sankpal Sourabh Rajaram	5429	7	10	18	35	18
30.	Sawant Rohan Ravindra	5430	7	10	13	30	15
31.	SurgaliShreeshailMallappa	5431	7	10	12	29	15
32.	Tangade Priti Anil	5432	10	10	18	38	19
33.	Thorbole Sanika Prakash	5433	10	10	17	37	19
34.	Yadav Kalyani Dipak	5434	10	10	17	37	19



॥ ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ॥

- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

41702

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature
of
Supervisor

[Signature]

Suppliment No. :

Roll No. : 5403

Class : MSc-I Sem-II

Subject : Technique in microbiology

Test / Tutorial No. : Internal exam

Dir. Date : 17-3-2025

Q1. Rewrite the sentence by choosing alternative:

1) Cationic resin is use to remove metal ions from reagents.

a) Cationic resin

b) Anionic resin

c) Dextean

d) Aromatic resin

To separate protein dextean exchanger is used

a) cellulose

b) Amino Acid

c) Protein

d) Polysaccharide

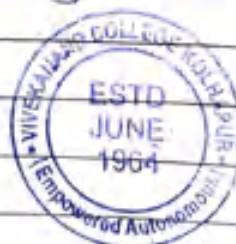
3) For separation of strong basic group Anion exchanger is used.

a) Anion exchanger

b) Cation exchanger

c) cellulose beads

d) Porous beads



4) In Gel filtration chromatography separation of molecule is based only on molecular size.

- a) Ion exchange chromatography
- b) Gel filtration chromatography
- c) SDS-PAGE
- d) Isoelectric focusing

Q2.

5) To convert non-polarized light into polarized light Polarizer is used in polarization microscopy.

- a) Phase plate
- b) Polarizer
- c) Analyzer
- d) Annular diaphragm

Q3.

6) Lyophilization method of preservation uses liquid nitrogen.

- a) Lyophilization
- b) Serial subculture
- c) Cryopreservation
- d) Freeze-drying

Q2.

7) In Confocal microscopy lesser light is used.

- a) Polarization
- b) Confocal
- c) Phase-contrast
- d) Fluorescent



8) To select single wavelength of light excitation wavelength is used in fluorescent microscopy.

- a) Barrier filter

- b) reflector
- c) excitation wavelength filter
- d) ocular lens.

Q2. Attempt any 1 (8M)

- 1) Explain in detail Principle, Parts, working & Applications of Ion exchange chromatography.
- 2) Describe in detail methods for preservation of microorganism.

Q3. Attempt any one (2M)

- 1) Gel exclusion chromatography
- 2) Phase-contrast microscopy.

Q2

1) **Ion exchange chromatography:**

Chromatography is the separation technique, which separates the particular components from mixture of components.

Ion exchange chromatography is type of chromatography, in which separation of component based on ions.

Principle :-

Charged molecule which present in the sample are separated by the electrostatic force of attraction.

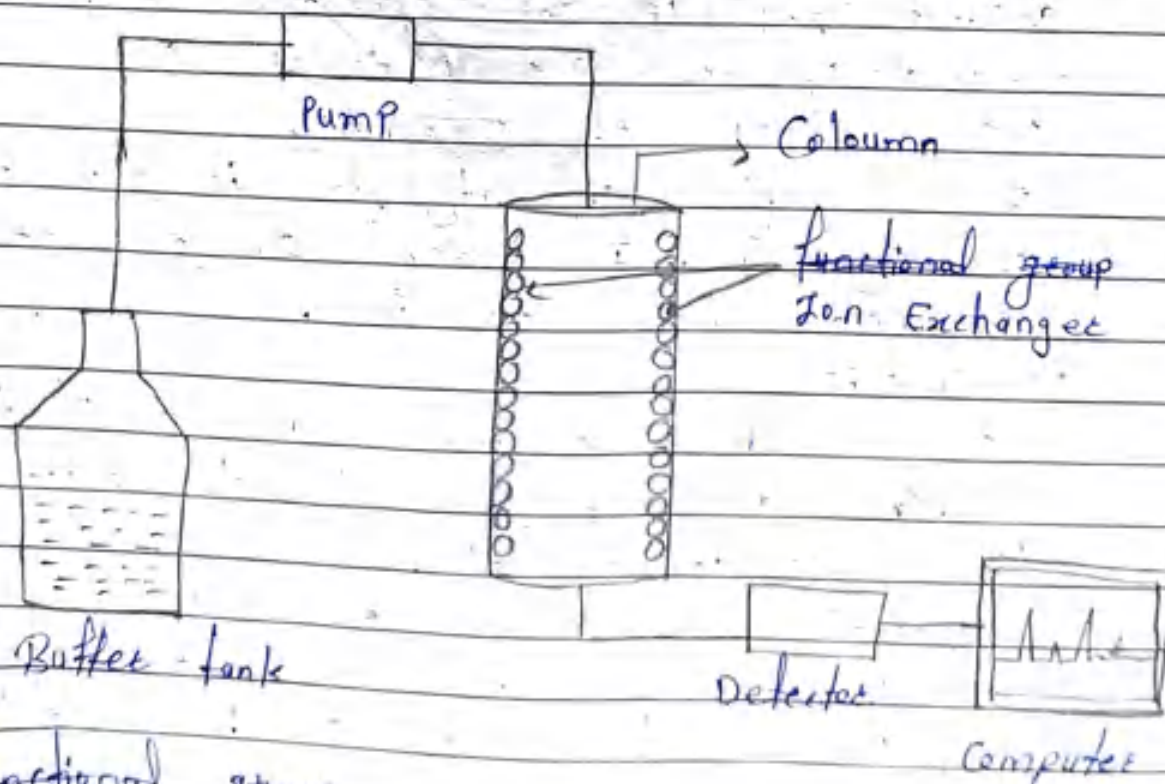
Separation occurs by reversible exchanges of ions present in the ions of the solution & those present in their ion exchanger.

Any - charged molecule like protein, amino acid are separated.

In Ion exchange chromatography anion are attached towards the cations & mobile phase can run off fast, so they anion or analyte have tendency to attach the Cationic region, so they elute last & mobile phase are really faster.

Parts :-

- 1) Buffer tank
- 2) Flow Rate Controller Pump
- 3) Sample injector
- 4) Column
- 5) ~~Column~~ ~~area~~
- 6) Detector
- 7) Computer



- functional group
- Ion exchangers are two types cation exchanger & anion exchanger.

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of
Supervisor

Suppliment No. :

Roll No. : 5403

Class : Msc-I Sem-II

Subject :

Test / Tutorial No. :

Div. :

Working :-

1) Equilibrium :-

In the buffer tank carry buffer solution, which is firstly passes through the column for detecting the proper working of instrument i.e the equilibrium.

2) Loading :-

After passing buffer solution then load the sample into the buffer & mixed with buffer solution. load sample in the column through pump, pump pushed to sample towards column. Ion charged molecule which present in sample are attracts towards the ion exchanger based on their charge.

3) Washing :-

Then wash the all other components which collect in column or which is not attached to the ion exchanger.

4) Elution :-

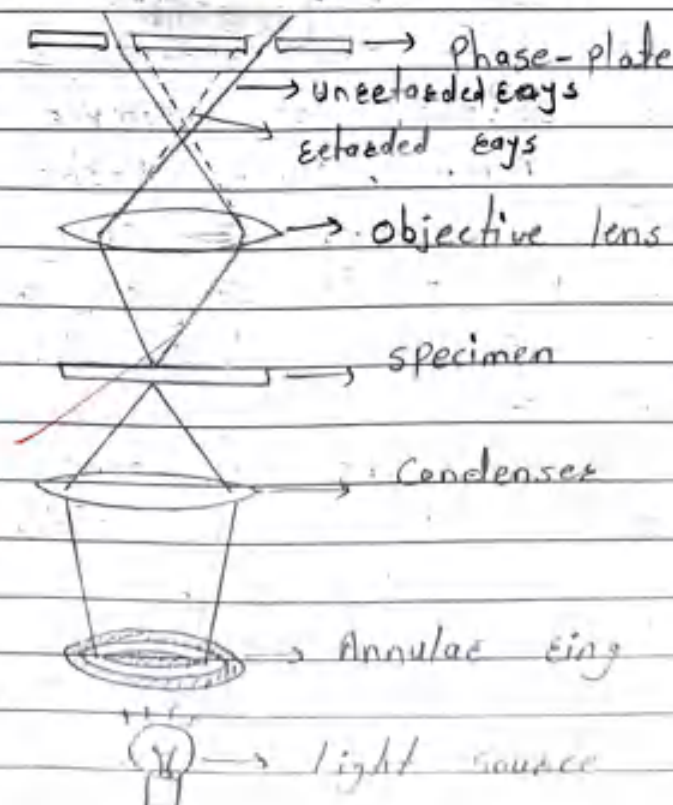
The process in which relative ions are remove from the ion exchanger. is

known as elution. In elution process eluent is used, eluent is the solution which is used in elution process. Then the detector is detect & passes all information to the recorder or computer.

Application:-

- ① Used to separate Ca & Mg - cation exchanger are used.
- ② Used to desalting of protein.
- ③ Used to deionized to water, mostly metal are present in the water so cation exchanger are used.
- ④ Used to separate & purify the proteins.
- ⑤ Used to separate amino acid & vit.

Q3. Phase-contrast microscopy:



Working:-

- ① Light transfers through the light source.
(white light generated).
- ② Light passes through the annular ring in the one manner as one rays.
- ③ Then condensers collect the light rays from annular ring & transmitted to specimen.
- ④ specimen then two ways transmitted to objective lens i.e. retarded & unretarded ways.
- ⑤ Unretarded rays passes through the phase plate to eye-piece & retarded rays are strike to phase-plate.
- ⑥ Image are formed in eye-piece by both rays.

Applications:-

- ① observe living cells
- ② microorganisms
- ③ Bacteria, fungus & virus are also observed.

03



Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur (An Empowered Autonomous Institute)
Department of Microbiology (PG)
Internal examination 2024-25

Class: M. Sc-I Sem II

Date: 19/03/2025

Name of paper: DSC20MIC21-Medical Microbiology

Marks: 20M

Q1. Choose the correct alternative from the following

8M

1. In aryl sulphatase test.....is added

- a. 1 N NaOH
- b. 2 N NaOH
- c. 1 N HCL
- d. 2 N HCL

2. Leptospire are sensitive to.....

- a. Penicillin
- b. Tetracycline
- c. Streptomycin
- d. Penicillin & Tetracycline

3.is pleomorphic, Gram -ve, coccobacilli and obligate intracellular pathogen

- a. *M. tuberculosis*
- b. *R. burnetti*
- c. *L. icterohaemorrhagiae*
- d. *S. mutans*

4.is one who harbours the pathogen but has never suffered from disease caused by pathogen

- a. Covalent carrier
- b. Healthy carrier
- c. Paradoxal carrier
- d. Contact carrier

5. refers to the ability of pathogen to spread in the host tissue after establishing infection

- a. Adhesion
- b. exaltation



c. Invasiveness

d. Infection

6.are the attributes of Microorganisms that help them to cause disease

a. Exotoxin

b. Endotoxin

c. Extracellular enzymes

d. All of them

7. The pyrazinamidase enzyme is detected by addition of.....

a. Sodium sulphate

b. Ferric ammonium sulphate

c. Sodium chloride

d. Ferrous ammonium sulphate

8. Derrick in 1935 investigated outbreak of.....

a. Q fever

b. Leptospira

c. Tuberculosis

d. Dental caries

Q2. Attempt any one of the following

8M

1. Explain in detail laboratory diagnosis of *M. tuberculosis*

2. Discuss pathogen survival mechanism in detail

Q3. Write short note on following (Any one)

4M

1. Pathogenicity of leptospira

2. Inhalation



Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE, KOLHAPUR
(AN EMPOWERED AUTONOMOUS INSTITUTE)

Class: M. Sc-I Sem II

Name of paper: DSE20MIC21 -Medical Microbiology

Date: 19/03/2025

Marks: 20M

Internal Examination Attendance

Sr. No.	Student Name	Roll No.	Sign
1	Angaj Aishwarya Maruti	5401	<i>Angaj...</i>
2	Balekundri Dhanashri Raju	5402	<i>Balekundri</i>
3	Bhinge Revati Gajanan	5403	<i>Bhinge</i>
5	Bhosale Rasika Sanjay	5404	<i>Bhosale</i>
4	Bhosale Sharayu Pradeep	5405	<i>Bhosale</i>
6	Chandala Vaishnavi Vivek	5406	<i>Chandala</i>
7	Chavan Sanika Sagar	5407	<i>Chavan</i>
9	Chavan Sharvari Subhash	5408	<i>Chavan</i>
8	Chavan Vaishnavi Vijay	5409	<i>Chavan</i>
10	Gurav Atharva Ramdas	5410	<i>Gurav</i>
11	Ghodasara Sakshi Pankaj	5411	<i>Ghodasara</i>
12	Hande Pallavi Ravindra	5412	<i>Hande</i>
13	Kalamkar Asavari Anil	5413	<i>Kalamkar</i>
14	Kandalkar Namrata Anil	5414	<i>Kandalkar</i>
15	Kesarkar Prachi Chandrakant	5415	<i>Kesarkar</i>
16	Koli Sakshi Deepak	5416	<i>Koli</i>
17	Malavi Rahul Gautam	5417	<i>Malavi</i>
18	Mane Yash Sanjay	5418	<i>Mane</i>
19	Mulani Samina Firoj	5419	<i>Mulani</i>
20	Mulla Sanovar Salim	5420	<i>Mulla</i>
21	Mullani Aasma Aameer	5421	
22	Padaval Damini Mohan	5422	<i>Padaval</i>
23	Pardeshi Shrutika Manik	5423	<i>Pardeshi</i>
24	Patil Bhushan Dhanaji	5424	



28	Patil Samruddhi Bhanudas	5425	<i>Sam</i>
25	Patil Samruddhi Sudhir	5426	<i>Patil</i>
26	Pawar Galaxy Sunil	5427	<i>Sunil</i>
27	Powar Rushita Dinkar	5428	<i>Powar</i>
29	Sankpal Sourabh Rajaram	5429	<i>Sankpal</i>
30	Sawant Rohan Ravindra	5430	<i>RS</i>
31	Surgali Shreeshail Mallappa	5431	<i>Surgali</i>
32	Tangade Priti Anil	5432	<i>Tangade</i>
33	Thorbole Sanika Prakash	5433	
34	Yadav Kalyani Dipak	5434	<i>Yadav</i>
35	Angaj Aishwarya Maruti	5401	<i>Angaj</i>
36	Balekundri Dhanashri Raju	5402	



Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE, KOLHAPUR (AN EMPOWERED AUTONOMOUS INSTITUTE)

Department of Microbiology (PG)

M.Sc. II Sem I (2024-25)

Internal Exam Marks

Medical Microbiology (DSE20MIC21)

Sr. No.	Student Name	Roll No.	Seminar Marks (10)	Assignment Marks (10)	Internal Exam Marks (20)	Total Marks (40)	Marks converted (20)
1.	Angaj Aishwarya Maruti	5401	8	10	15	33	17
2.	Balekundri Dhanashri Raju	5402	9	10	11	30	15
3.	Bhinge Revati Gajanan	5403	9	10	12	31	16
4.	Bhosale Rasika Sanjay	5404	7	10	10	27	14
5.	Bhosale Sharayu Pradeep	5405	7	10	16	33	17
6.	Chandala Vaishnavi Vivek	5406	9	10	11	30	15
7.	Chavan Sanika Sagar	5407	10	10	17	37	19
8.	Chavan Sharvari Subhash	5408	7	10	08	25	13
9.	Chavan Vaishnavi Vijay	5409	9	10	15	34	17
10.	Ghudasara Sakshi Pankaj	5410	10	10	13	33	17
11.	Gurav Atharva Ramdas	5411	7	10	11	28	14
12.	Hande Pallavi Ravindra	5412	10	10	13	33	17
13.	Kalamkar Asavari Anil	5413	10	10	15	35	18
14.	Kandalkar Namrata Anil	5414	9	10	16	35	18
15.	Kesarkar Prachi Chandrakant	5415	7	10	13	30	15



16.	Koli Sakshi Deepak	5416	9	10	12	31	16
17.	Malavi Rahul Gautam	5417	7	10	14	31	16
18.	Mane Yash Sanjay	5418	7	10	08	25	13
19.	Mulani Samina Firoj	5419	9	10	13	32	16
20.	Mulla Sanovar Salim	5420	9	10	14	33	17
21.	Mullani Aasma Aameer	5421	Ab	Ab	Ab	Ab	Ab
22.	Padaval Damini Mohan	5422	9	10	16	35	18
23.	Pardeshi Shrutika Manik	5423	9	10	13	32	16
24.	Patil Bhushan Dhanaji	5424	Ab	Ab	Ab	Ab	Ab
25.	Patil Samruddhi Bhanudas	5425	7	10	12	29	15
26.	Patil Samruddhi Sudhir	5426	8	10	09	27	14
27.	Pawar Galaxy Sunil	5427	8	10	10	28	14
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30.	Sawant Rohan Ravindra	5430	7	10	12	29	15
31.	Surgali Shreeshail Mallappa	5431	7	10	06	23	12
32.	Tangade Priti Anil	5432	10	10	15	35	18
33.	Thorbole Sanika Prakash	5433	10	10	17	37	19
34.	Yadav Kalyani Dipak	5434	10	10	12	32	16





(अधिकारमय स्वायत्त)
कोल्हापूर

॥ ज्ञान, विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार ॥

- शिक्षणमहर्षी डॉ. बापूजी साबुंखे

VIVEKANAND COLLEGE, KOLHAPUR.
(Empowered Autonomous)

SUPPLIMENT

17/20

Jr. Supervisor's Sign. :

Students Sign. : *Answer*

Seat No. : 5407

Seat No. in words : Five Four zero Seven

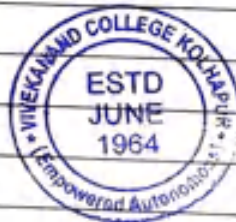
Suppliment No. : Internal Exam.

Medical Microbiology

Centre

प्र. क्र.
Q. No.

- Q. 1. Attempt any one question of the following
1. Explain in detail laboratory diagnosis of Mycobacterium tuberculosis
 2. Discuss in detail pathogen survival mechanism
- Q. 3. Write short Note on any one
1. pathogenicity of Leptospira
 2. Inhalation.



प्र. क्र.
Q. No.

Q. 2.

• Mycobacterium Tuberculosis

1. Mycobacterium Tuberculosis resembles with fungi
2. In liquid media they form mycelia
3. Mycobacteria classified into 3 groups → Mycol
 1. opportunistic pathogen
 2. Saprophytes
 3. obligate parasite
4. Mycobacterium tuberculosis come under opportunistic pathogen. obligate parasite
5. Mycobacterium Tuberculosis develops tuberculosis disease in humans.
6. Morphology:
Mycobacterium Tuberculosis is a Nonmotile organism
7. They are short rods
They are slightly curved at the end.

Mycobacterium tuberculosis is Acid fast microorganism

प्र. क्र.
Q. No.

• Laboratory diagnosis

As it causes pulmonary infection the sputum is collected as a clinical sample.

17 The treatment of clinical sample is essential to avoid the contamination of other bacteria.

18 • Treatment to clinical sample:
Take a equal amount of Sputum and 40% KOH and incubate it for 30 mins.
For 3000 rpm centrifuge it at 20 mins.
This will avoid bacterial contamination.

19 Take a sputum sample and add NaOH
Incubate it and centrifuge, and then Neutralize it with ~~Na~~ HCl.
This will also avoid bacterial contamination.

20 • Treated Sputum then take for staining.
As it is Acid fast organism, it will be stain by Zeil Neelson carbol fuchsin.

21 Take a treated sputum
Take a grease free slide
Make a uniform smear
Air dry it and heat fix by vapour
Add carbol fuchsin
and decolorize it with sulphuric Acid.



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- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Jr. Supervisor's Sign. :

Students Sign. : Anan

Seat No. : 5407

Seat No. in words : five four zero seven

Suppliment No. : Internal Exam

Medical Microbiology 36247

Centre Vivekanand college

VIVEKANAND COLLEGE, KOLHAPUR.
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SUPPLIMENT

क्र. नं.
Q. No.

22. streak treated smear on lowstein Jensen medium
23. Mycobacterium tuberculosis colony characters : 1) White
2) Rough
3) Wrinkled
4) Dry
5) It become yellow after few days.
24. • Inoculation in animals:
Inoculate Mycobacterium tuberculosis into guinea pig (it should be 12 weeks older)
25. observe for lesions and By autopsy we can observe lesions/symptoms in the body parts
26. There are two types of lesion: Exudative lesions
Productive lesions
27. • Tubercal bacilli produces tubercal protein, so it causes delay hypersensitivity, by using that protein we can test for allergic Reaction.

प्र. क्र.

Q. No.

Auramine Rhodamine Test Method:

It is a fluorescent dye.
Mycobacterium tuberculosis is stained with
Auramine Rhodamine dye and observe under
microscope.

29 • Biochemical Tests:

Niacin Test

Neutral Red Test

Twin 80 Test

T₂H₂ Test

Catalase Test

These are the test which is performed.

30 Niacin Test: Clinical sample inoculated in egg embryo
and then the lysis of cells are observed.

31. Catalase Test: Clinical sample is dip into H₂O₂
solution and observed for effervescence.

Inhalation:

2. Inhalation from the ~~pathog~~ transmission of pathogen point.

So, if patient surviving from any kind of disease like pneumonia, tuberculosis, Normal viral infection They should take some care while coming or in contact with anyone.

Diseases can spread to each other, if patient is talking with someone or He/she coughing, sneezing in front of any healthy human being.

While coughing, sneezing droplets and droplet nuclei come out and mix in air.

So those droplet nuclei and droplet may inhale by any healthy patient person.

Then healthy person may get infected by same pathogen.

So if disease is related to pulmonary infection there are more chances of transmission of disease by inhalation of droplet and droplet nuclei.

Droplet are those drops in which pathogen is present and those drops present in air.

04

Section

Q. No.

Marks

प्र. क्र.
Q. No.

3. Droplet Nuclei are those drops which are present and settle down on the surface of any object.

10. We can avoid by transmission through inhalation by wearing mask when suffering from any kind of disease.

12. Maintain less communicability is easy way to maintain or overcome transmission of disease.

12. Do not spit anywhere, there will be also risk of transmission by inhalation.

W



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VIVEKANAND COLLEGE, KOLHAPUR.
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SUPPLIMENT

Jr. Supervisor's Sign. :

Students Sign. : Anhan

Seat No. : 5407

Seat No. in words : Five Four zero Seven

Suppliment No. : Internal Exam

Medical Microbiology 36279

Centre vivekanand college

क्र.
Q.No.

- Q.1. choose the correct alternative from the following
1. In aryl sulphatase test 1 N ~~HCl~~ NaOH is added.
A. 1 N NaOH C. 1 N HCl
B. 2 N NaOH d. 2 N HCl
 2. leptospira is sensitive to penicillin and tetracycline.
A. penicillin C. Streptomycin
B. Tetracycline d. penicillin and tetracycline
 3. Rickettsia burnetti is pleomorphic gram negative coccobacilli and obligate intracellular pathogen.
A. Mycobacterium tuberculosis C. leptospira enter hemorrhagih
B. Rickettsia burnetti d. streptococcus mutans
 4. Healthy carrier is one who harbors the pathogen but has never suffered from disease caused by pathogen.
A. Covalent carrier C. Paradoxal carrier
B. Healthy carrier d. contact carrier

02

Section

Q. No.

Marks

प्र. क्र.
Q. No.

5. Invasiveness refers to the ability of pathogen to spread in host tissue after establishing infection

A. adhesion

✓ Invasiveness

B. ~~Exemplation~~
Exaltation

d. infection

6. All of them are the attributes of microorganism that help them for disease

A. Exotoxin B. Extracellular enzyme

C. Endotoxin D. All of them

7. The pyrazinamidase enzyme production is detected by addition of Ferrous ammonium sulphate

A. Sodium Sulphate

C. Sodium chloride

B. Ferric ammonium Sulphate

✓ D. Ferrous ammonium

Sulphate

8. Derric in 1935 ~~investig~~ investigated outbreak of "leptospirosis" "Q" fever

A. leptospirosis

✓ Q fever

B. tuberculosis

d. dental carrier infection.



Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)
PG Department of Microbiology
Academic Year 2024-25

M. Sc. Part I Microbiology (Semester II)

Internal Examination

Microbial Physiology, Biochemistry and Metabolism DSC20MIC22

Day: Tuesday

Time: 2.00 pm to 3.00 pm

Date: 18/03/2025

Marks: 20

Q.1 Choose the correct alternative and rewrite the sentence

8

- 1) During each cycle of beta- oxidation, ----- carbons are removed from the fatty acid chain.
 - a) 1
 - b) 2
 - c) 3
 - d) 4
- 2) The ability of organisms to produce their own food using external energy sources is called as -----.
 - a) heterotrophy
 - b) autotrophy
 - c) chemotrophy
 - d) organotrophy
- 3) The citric acid cycle begins with the condensation of acetyl Co A and ----- to form citrate.
 - a) pyruvate
 - b) oxaloacetate
 - c) fumarate
 - d) malate
- 4) Malate aspartate shuttle system carries out transfer of ----- from cytoplasm to mitochondrial matrix..
 - a) NADH
 - b) FADH₂
 - c) Coenzyme Q
 - d) Cytochrome
- 5) ----- enzyme is primarily responsible for the formation of reactive oxygen species (ROS) during normal cellular metabolism.
 - a) Superoxide dismutase
 - b) Catalase
 - c) Peroxidase
 - d) NADPH oxidase



6) Complex I in mitochondrial ETC is -----.

- | | |
|--------------------------|----------------------------|
| a) NADH-Q-oxidoreductase | b) Cytochrome-C'-reductase |
| c) Succinate-Q-reductase | d) Cytochrome-C-oxidase |

7) Palmitic acid is a fatty acid with a ----- carbon chain.

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

8) β ketoadipate pathway is a chromosomally encoded pathway for degradation of ----- hydrocarbons.

- | | |
|--------------|----------------|
| a) aliphatic | b) nonaromatic |
| c) aromatic | d) saturated |

Q.2 Write any one of following

8

- 1) Discuss citric acid cycle and anaplerotic reactions of TCA
- 2) Discuss oxygen toxicity and mechanisms to overcome it

Q.3 Write short note on any one

4

- 1) Autotrophy
- 2) Glycerol phosphate shuttle



Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur

(An Empowered Autonomous Institute)

Department of Microbiology (PG)

Academic Year 2024-25

M. Sc. Part I (Microbiology) (Semester II) Internal Examination
Microbial Physiology, Biochemistry and Metabolism DSC20MIC22

Attendance of students

Date: 18/03/2025

Sr. No.	Name of Student	Roll No.	Sign
1.	Angaj Aishwarya Maruti	5401	Amargaj...
2.	Balekundri Dhanashri Raju	5402	Balekundri
3.	Bhinge Revati Gajanan	5403	Bhinge
4.	Bhosale Rasika Sanjay	5404	Bhosale
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10.	Ghodasara Sakshi Pankaj	5410	Ghodasara
11.	Gurav Atharva Ramdas	5411	Gurav
12.	Hande Pallavi Ravindra	5412	Hande
13.	Kalamkar Asavari Anil	5413	Kalamkar
14.	Kandalkar Namrata Anil	5414	Kandalkar
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16.	Koli Sakshi Deepak	5416	Koli
17.	Malavi Rahul Gautam	5417	Malavi
18.	Mane Yash Sanjay	5418	Mane
19.	Mulani Samina Firoj	5419	Mulani
20.	Mulla Sanovar Salim	5420	Mulla
21.	Mullani Aasma Sameer	5421	Mullani
22.	Padaval Damini Mohan	5422	Padaval
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32.	Tangade Priti Anil	5432	Tangade
33.	Thorbole Sanika Prakash	5433	Thorbole
34.	Yadav Kalyani Dipak	5434	Yadav



Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE, KOLHAPUR (AN EMPOWERED AUTONOMOUS INSTITUTE)

Department of Microbiology (PG)

M.Sc. II Sem I (2024-25)

Internal Exam Marks

Microbial physiology, Biochemistry and metabolism (DSC20MIC22)

Sr. No.	Student Name	Roll No.	Seminar Marks (10)	Assignment Marks (10)	Internal Exam Marks (20)	Total Marks (40)	Marks converted (20)
1.	Angaj Anshwarya Maruti	5401	8	10	19	37	19
2.	Balekundri Dhanashri Raju	5402	9	10	19	38	19
3.	Bhinge Revati Gajanan	5403	9	10	17	36	18
4.	Bhosale Rasika Sanjay	5404	7	10	19	36	18
5.	Bhosale Sharayu Pradeep	5405	7	10	19	36	18
6.	Chandala Vaishnavi Vivek	5406	9	10	17	36	18
7.	Chavan Sanika Sagar	5407	10	10	20	40	20
8.	Chavan Sharvari Subhash	5408	7	10	10	27	14
9.	Chavan Vaishnavi Vijay	5409	9	10	18	37	19
10.	Ghudasara Sakshi Pankaj	5410	10	10	19	39	20
11.	Gurav Atharva Ramdas	5411	7	10	15	32	16
12.	Hande Pallavi Ravindra	5412	10	10	16	36	18
13.	Kalamkar Asavari Anil	5413	10	10	19	29	15
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22.	Padaval Damini Mohan	5422	9	10	17	36	18
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24.	Patil Bhushan Dhanaji	5424	Ab	Ab	Ab	Ab	Ab
25.	Patil Samruddhi Bhanudas	5425	7	10	14	31	16
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32.	Tangade Priti Anil	5432	10	10	18	38	19
33.	Thorbole Sanika Prakash	5433	10	10	19	39	20
34.	Yadav Kalyani Dipak	5434	10	10	16	36	18



॥ ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ॥

- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. : 2024-25

Roll No. : 5407

Class : M.Sc.T Sem II

Signature
of
Supervisor

Microbial physiology
Subject : Biochemistry and metabolism

Test / Tutorial No. : Internal Exam

Div. : 18/3/25

8 M

1. Discuss citric acid cycle and anapleotic reactions of TCA
2. Discuss oxygen toxicity and mechanisms to overcome it.

Q.3. (4 M) Write short Note on any one

1. Autotrophy
2. Glycerol phosphate shuttle.



Q 7.
1. TCA

TCA - Tricarboxylic acid cycle

It is also known as Krebs cycle and citric acid cycle.

It is ATP generating cycle.

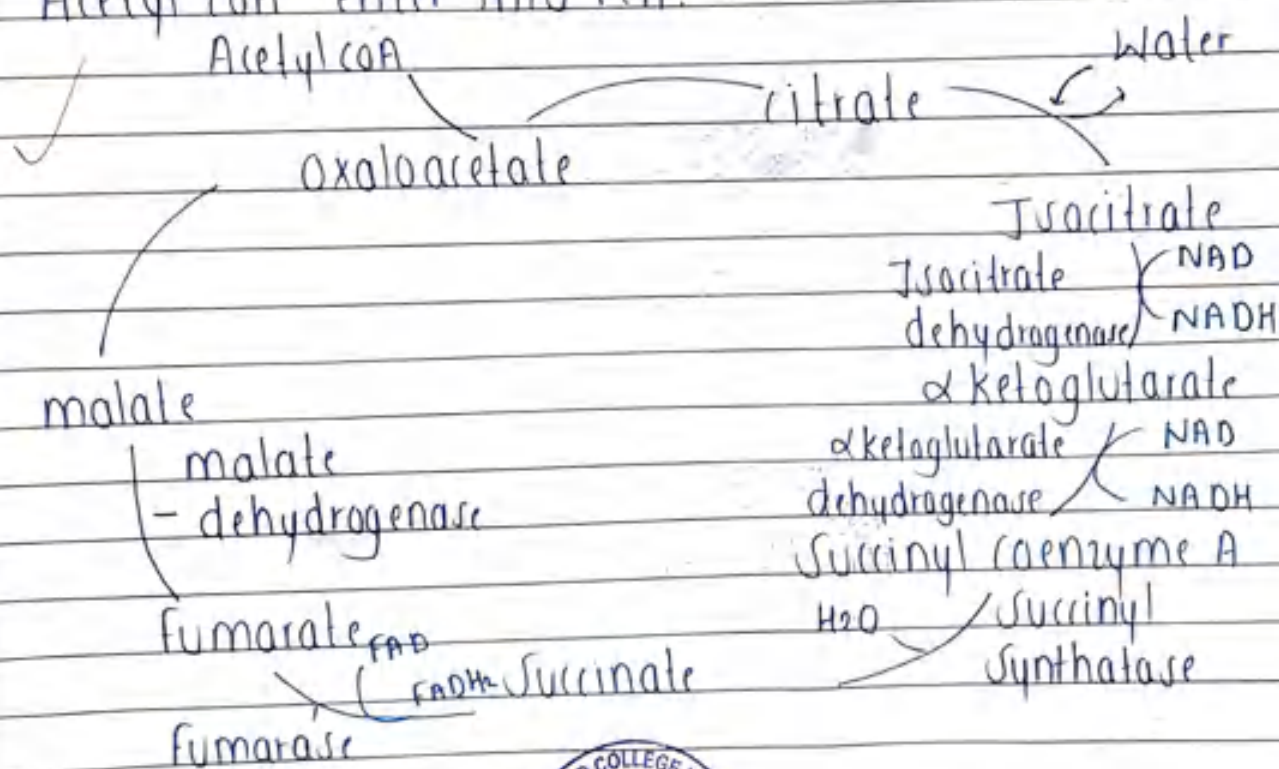
Enzymes involved in citric acid cycle are soluble.

This is the secondary stage of cellular respiration.

This TCA occurs in mitochondria.

Glycolysis: Carbohydrates breakdown into smaller parts and it gets utilized and pyruvate is formed.

conversion: pyruvate is converted into Acetyl coenzyme A.
Acetyl coA enters into TCA.



Steps involved in TCA.

1. Firstly Acetyl CoA enter the TCA cycle after its entry it combine with oxaloacetate and form citrate
2. citrate converted to isocitrate by isomerization reaction.
3. Isocitrate converted to α ketoglutarate through oxidation reaction.
This reaction is catalyzed by Isocitrate dehydrogenase.
In this reaction NADH and CO_2 are formed.
4. Succinyl coenzyme is converted to Succinate by hydrolysis reaction.
This reaction is catalyzed by Succinyl Synthetase enzyme.
5. Succinate enzyme is converted to fumarate through oxidation reaction.
FADH₂ and CO_2 are formed.
This reaction is catalyzed by fumarase enzyme.
6. Fumarate is converted to malate through oxidation reaction.
This reaction is catalyzed by malate dehydrogenase.
7. Malate converted to oxaloacetate and cycle runs to Synthesis ATP

ATP is currency of Energy production which is then used in various process of cells

Anapleurotic Reactions:

This is a reaction where only anabolism occurs.

Sometimes components formed during TCA like citrate, Isocitrate, ~~malate~~, & ketoglutarate, Succinyl coenzyme A, Succinate, fumarate, malate are goes to form some biosynthesis of macromolecules.

So Anapleurotic reactions are filling up reactions of those components. Where anabolism means formation of new product by combining two components.

Those components of TCA get move on to synthesis macromolecules so there will be depletion, so to filling their depletion anapleurotic reactions are important.

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Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

41190

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. : 2024-25

Roll No. : 5407

Class : M.Sc. Sem II

Signature
of
Supervisor

Subject : microbial physiology, biochemistry
and metabolism
Test / Tutorial No. : Internal exam

Div. : 18/3/25

Q.3.

★ 1.

Autotrophy

The organisms which produce their own food by using air, sunlight, water are called Autotrophs.

There are two types of autotrophs → 1. photoautotrophs
2. chemoautotrophs.

- photoautotrophs: plants are photoautotrophs.

- plants produce their own food by using solar energy (sunlight) and carbon dioxide.

By assembling carbon dioxide they form glucose.

plants are producers on terrestrial and aquatic ecosystems. All heterotrophs are depend on them for food.

plant has chlorophyll pigment. chlorophyll pigment is responsible for the transduction of solar energy into cells.

solar energy then converted into cellular energy.

There are two types of photoautotrophs →

1. Aerobic / oxygenic photoautotroph
2. Anaerobic / anoxygenic photoautotroph

1. Aerobic photoautotroph / oxygenic photoautotroph

plants use water as reducing power

They use both photosystem I and photosystem II

They depend on solar energy

They produce oxygen.

2. Anaerobic photoautotroph / anoxygenic photoautotroph

plants do not use water as reducing power

They only use photosystem I

They do not ~~req~~ produce oxygen as a waste product.

• chemoautotrophs:

Organism which produce their own food ~~from the~~ by using energy from chemical reactions. These are called as chemoautotrophs.

They do not require solar energy

✗ They belong from archae and bacteria domain.

They live in very extreme conditions like sea vents
sea hot springs

chemoautotroph example- chemolithoautotrophic microorganisms. They are present on rocks, minerals and derive ions like ferrous ions.

3. Choose the correct alternative and rewrite the sentence.

1. During which cycle of β Beta oxidation 2 carbons are removed from fatty acid chain

A. 1 B. 2 C. 3 D. 4

→ B. 2

2. The ability of organisms to produce their own food using external energy source is called as autotrophy

A. Heterotrophy B. Autotrophy C. Chemotrophy D. Organotrophy

→ B. Autotrophy

3. The citric acid cycle begins with the condensation of acetyl coenzyme A and oxaloacetate to form citrate

A. pyruvate B. oxaloacetate C. fumarate D. malate

→ B. oxaloacetate

4. Malate aspartate shuttle system carries out transfer of NADH from cytoplasm to mitochondrial matrix

A. NADH B. $FADH_2$ C. coenzyme Q D. cytochrome

→ A. NADH

5. NADPH oxidase enzyme is primarily responsible for the formation of reactive oxygen species during normal

A. cellular metabolism

A. Superoxide dismutase B. catalase C. peroxidase D. NADPH oxidase

→ D. NADPH oxidase

6. complex I in mitochondrial ETC is NADH oxidoreductase

A. NADH oxidoreductase C. Succinate reductase

B. cytochrome c reductase D. cytochrome c oxidase

→ A. NADH oxidoreductase

7. palmitic acid is a fatty acid with a 12 carbon chain

A. 18 B. 12 C. 14 D. 16

→ B. 12

8. Betaketo adipate pathway is a chromosomally encoded pathway for degradation of aromatic hydrocarbon

1. aliphatic 2. Nonaromatic 3. aromatic 4. Saturated

→ 3. aromatic

8



"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)
PG Department of Microbiology

"Continuous Internal Evaluation"

M. Sc. II

Semester IV



Academic Year: 2024-2025

Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)
Department of Microbiology (PG)
Academic Year 2024-25

NOTICE

Date- 15-02-2025

All students of M.Sc. part II Microbiology are hereby informed that, the internal examination of semester IV, is going to start from 17th March 2025. The examination will be conducted in room no. 412. The pattern and schedule of examination is given below.

Pattern of examination

Sr. No.	Type		Marks
1.	Descriptive paper	Objective type questions	8
		Long question -1	8
		Short note-1	4
2.	Home assignment		10
3.	Seminar		10
	Total Marks		40

Schedule of examination

Date	Paper title	Time
17/03/2025	Food And Dairy Microbiology	2.00-3.00 pm
18/03/2025	Industrial Waste Management	2.00-3.00 pm
19/03/2025	Recombinant DNA Technology	2.00-3.00 pm



Gaupale
Dr. F. C. Gaupale

HC HEAD
DEPARTMENT OF MICROBIOLOGY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)
Department of Microbiology (PG)
Academic Year 2024-25

M. Sc. Part II (Microbiology) (Semester IV) Internal Examination

Food and Dairy Microbiology DSC20MIC41

Day: Monday

Time: 2.00 pm to 3.00 pm

Date: 17/03/2025

Marks: 20

Q.1 Choose the correct alternative and rewrite the sentence

8

- 1) The 'Father of canning' is -----
a) Spallanzani
b) Nicholas Appert
c) Lopez
d) Peter Durand
- 2) Propellant gas used for pressurized packaged foods include -----
a) oxygen
b) carbon dioxide
c) hydrogen sulfide
d) sulfur gas
- 3) Sauerkraut is classified as -----
a) high-acid foods
b) acid foods
c) medium-acid foods
d) low-acid foods
- 4) Chilling storage enables the preservation of products for -----
a) a longer period of time
b) a limited period of time
c) a period of two months
d) none of them
- 5) Thermotolerant streptococci are predominant in -----
a) dried milk
b) fruits and nuts
c) spoiled eggs
d) vegetables
- 6) The protein present in milk is called as -----
a) Keratin
b) Casein
c) Gelatin
d) Trypsin
- 7) ----- is commonly used in the production of cucumber pickle for its distinctive flavor
a) Spinach
b) Cabbage
c) Dill
d) Lettuce
- 8) ----- is an example of Indian fermented food.
a) Amboli
b) Yogurt
c) Sauerkraut
d) Kimchi



Q.2 Write any one of following

8

- 1) Describe cold preservation of food
- 2) Discuss biochemical activities during microbial spoilage of milk

Q.3 Write short note on any one

4

- 1) Jalebi
- 2) Canning of food



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 Internal Examination
Food and Dairy Microbiology DSC20MIC41
Attendance of students

Date: 17/03/2025

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	
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 Bhagyashree Sanjay	5512	
13.	Kadam Vijay Sanjay	5513	
14.	Kesare Ankita Bhagvan	5514	
15.	Khadake Aishwarya Amar	5515	
16.	Khatave Nikhil Anil	5516	
17.	Kumthekar Krinshnkanth	5517	
18.	Lad Devdatta	5518	
19.	Lambe Sanika Krushna	5519	
20.	Madane Omkar Sanjay	5520	
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 Niranjana 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 Dnyandeo	5536	



Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)
Department of Microbiology (PG)
Academic Year 2024-25

M. Sc. Part II Semester IV Internal Examination
Food And Dairy Microbiology DSC20MIC41

Date: 17/03/2025

Sr. No.	Name of Student	Roll No.	Seminar / 10	Home assignment / 10	Test / 20	Total / 40	Converted / 20
1.	Attar Taisina Sajjan	5501	8	10	9	27	14
2.	Bangodi Harsh kishor	5502	8	10	12	30	15
3.	Basare Gayatri Pramod	5503	8	10	15	33	17
4.	Bhavake Priyanka .B.	5504	10	10	14	34	17
5.	Bodake Harshada Bajirao	5505	8	10	11	29	15
6.	Buya Akshata Krishnat	5506	7	10	7	24	12
7.	Chavan Sanika Gorakhnath	5507	9	10	17	36	18
8.	Chougule Snehal Balaso	5508	8	10	13	31	16
9.	Desai Tammana Sulatan	5509	8	10	16	34	17
10.	Gore Vishal Bapu	5510	8	10	12	30	15
11.	Jadhav Apurva Uday	5511	10	10	16	36	18
12.	Jangam Bhagyashree Sanjay	5512	8	10	10	28	14
13.	Kadam Vijay Sanjay	5513	9	10	17	36	18
14.	Kesare Ankita Bhagvan	5514	7	10	4	21	11
15.	Khadake Aishwarya Amar	5515	10	10	16	36	18
16.	Khatave Nikhil Anil	5516	10	10	9	29	15
17.	Kumthekar Krunshokanath	5517	10	10	17	37	19
18.	Lad Devdatia	5518	8	10	8	26	13
19.	Lambe Sanika Krushna	5519	8	10	7	25	13
20.	Madane Omkar Sanjay	5520	10	10	14	34	17
21.	Magar Pratik Shrikant	5521	10	10	17	37	19
22.	Momin Mubina Salim	5522	9	10	12	31	16
23.	Mujawar Liza Naushad	5523	10	10	19	39	20
24.	Naik Shaloni Vishwas	5524	8	10	13	31	16
25.	Parit Akshata Ananda	5525	8	10	14	32	16
26.	Patil Niranjan Krishnatah	5526	8	10	12	30	15
27.	Patil Pranav Anilkumar	5527	8	10	12	30	15
28.	Patil Sakshi Bhauso	5528	8	10	12	30	15
29.	Patil Shivani Tanaji	5529	10	10	16	36	18
30.	Patil Vaishnavi Hanmant	5530	8	10	13	31	16
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33.	Rajput Kedar Laxmansing	5533	9	10	17	36	18
34.	Sakpal Samiksha Rajesh	5534	9	10	18	37	19
35.	Vast Karishma Umesh	5535	9	10	17	36	18
36.	Zunake Suyash Dnyandeav	5536	9	10	18	37	19



VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature
of
Supervisor

Year
Supplement No.: 2024-2025 19
Roll No.: 5523 20
Class: MSC II sem 4

Subject: food & Dairy microbiology

Test / Tutorial No.: Internal examination

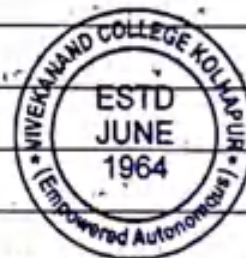
~~Exam date~~
Date: R. ~~17~~ 17/03/25

Q2. write any 1 or more of following 8 marks

- 1] Describe cold preservation of food
- 2] Discuss Biochemical activities during microbial spoilage of milk

Q3] Short note on any 1 8 marks

- 1] Jalebi
- 2] Canning of food



A2. MILK =

Milk is a highly nutritious food. And it can be used as a culture medium for many organism.

- Milk is a perishable food
- Many nutrients, vitamins that are fat soluble & water soluble, minerals, etc are present in milk
- Spoilage of milk occur due to spoilage causing micro-organisms

- Streptococcus pyogenes is responsible. In milk, sterile milk is present, when milk is drawn, the first milk obtained is thrown.
- If the udder is already contaminated by milk, then it can spoil our ~~at~~ ^{milk} organism responsible is Streptococcus pyogenes.

Biochemical activities carried out are

① Acid forming organisms :-

Obviously, the milk is highly nutritious. And the main sugar present in lactose, which is a disaccharide (glu. + gal.). An org. will utilize this sugar present in milk & convert this into acid.

- Due to this acid formation, the taste of milk changes; it tastes somewhat sour.
- Lactose is converted into lactic acid.
- Along with this acid, gas is also produced. Gas is CO_2 , H_2 , which can cause swelling or bursting of can.

∴ Sugar $\rightarrow$ Acid + Gas

- Streptococcus fermentum

For gas forming Clostridium is responsible.

② Lipolytic organisms :-

They will act on lipid, which is nothing but a fat.

- Organisms will act on fatty substance, fat, which is present in milk. Then, spoilage of

milk occur which gives rancid taste

Proteolytic organisms

This org will act on

The major protein present in milk is casein
protein is converted into peptides & peptides
are converted into ammonia acids

This ammonia acids will form ammonia gas
foul smelling gas (CO₂, H₂S, etc)

which will give unpleasant odour to our
milk.

Along with this many defects & spoilage are there
in milk like

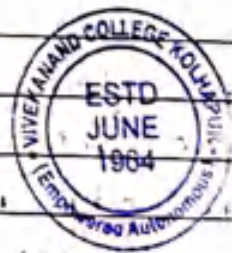
- 1] Blue milk = organism produces pigment which
give blue color to milk Pseudomonas synanthra
- 2] Red milk = org responsible is Serratia marcescens
- 3] Yellow milk = org responsible is Pseudomonas
synanthra

Q2]

A] Jalebi

1] Jalebi is a traditional sweet dish which is
prepared throughout the India during festivals,
or any special occasions.

2] Jalebi is the sweet dish which we
can prepare at home as well as it is
it is fermented food.

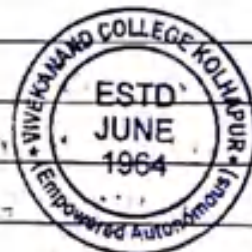


available in shops also.

- It is very simple to prepare but having lengthy process to make this Talebi.
- We have to keep for fermentation & then next preparation is done.

Ingredients (1st)

- ① 1 cup maida (All purpose flour)
- ② 2 tbsp bengal gram
- ③ $\frac{3}{4}$ th cup yoghurt
- ④ Melted ghee or butter
- ⑤ 3-4 threads of saffron
- ⑥ Food color (optional)



Procedure

- At the very first, take a bowl then add one by one our ingredients like first we have to add 1 cup maida then 2 tbsp of bengal gram & $\frac{3}{4}$ th cup of yoghurt here we are using plain yoghurt not any flavoured one.
- Then after addition of all this give a proper mix / whisk so as to mix properly.
- Then add melted ghee or clarified butter, 3-4 threads of saffron, this saffron will change little bit of colour like light yellow, then food color is optional in your own choice orange or yellow color mostly we are adding.
- After this mix properly & make the consistency.

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Year.
Supplement No.: 2024-2025

Roll No.: SS23

Class: MSc II sem IV

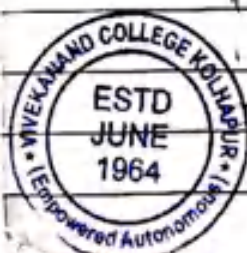
Signature
of
Supervisor

Subject: food + Dairy microbiology

Test / Tutorial No.: Internal examination

Div.: Date :- 17/03/25

- It should be a runny batter for not so thick medium consistency should be there.
- Then keep it aside for fermentation for atleast 12 hrs.
- After fermentation our jalebi batter is ready: which is doubled in volume then fill into squeeze bottles or plastic rolls are made.
- By using this squeeze bottles squeeze into round jalebi shape in oil.
- And along with this we have to prepare sugar syrup in which we dip this jalebis for this water is taken, and sugar is added & boil it until it get thread like consistency.
- Once this consistency is obtained switch off flame, don't over boil it otherwise it will solidify.
- Then after frying jalebis immediately dip into this sugar syrup.
- So, in this our delicious Jalebis are ready. Thankfully it's not hard to prepare Jalebis.



Microbiology behind this Talebi

- Actually ~~that~~ ~~we~~ we carry out fermentation we have to keep our batter for fermentation during this period many mo's come to start their function
- Like Streptococcus fermentum, Lactobacillus sp.
✓ S. faecalis, Leuconostoc, which grows at int
↳ stage producing acid. L. plantarum, L. brevis

Q1] choose the correct alternative if rewrite the sentences :

1] The father of canning is Nicolas Appert

- A) Spallanzani C) Lopez
✓ B) Nicolas Appert D) Peter Durand

2] Propellant gas used for pressurized packed foods include Carbon dioxide

- A) oxygen C) Hydrogen sulfide
B) Carbon dioxide D) sulfur gas

3] Sauerkraut is classified as High acid food

- A) High acid food C) Medium acid food
✓ B) Acid food D) Low acid food

4] chilling storage enables the preservation of products for limited period of time

- A) A longer period of time C) A period of 2 months
✓ B) A limited period of time D) none of them

Thermophilic Streptococci are predominant in
Dried milk

- A] Dried milk
B] Fruits & nuts
C] Spoiled eggs
D] Vegetables

The protein present in milk is called as
Casein

- A] Keratin
B] Casein
C] Gelatin
D] Trypsin

Dill is commonly used in the
production of cucumber pickle for its distinctive
flavour

- A] Spinach
B] Cabbage
C] Dill
D] Lettuce

Amboli is example of Indian fermented
food

- A] Amboli
B] Yoghurt
C] Sauerkraut
D] Kimchi



Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College Kolhapur (An Empowered Autonomous Institute)
Department of Microbiology (PG)

Class: M. Sc-II Sem IV

Date: 18/03/2025

Name of paper: DSC20MIC42-Industrial Waste Management

Marks: 20M

Q1. Choose the correct alternative from the following

8M

1. The septic sewage has.....colour
 - a. Dark grey
 - b. Slight grey
 - c. Black
 - d. Dark grey or black
2. Standard BOD is expressed as.....
 - a. BOD^{20}_5
 - b. BOD^{5}_{20}
 - c. BOD^{30}_5
 - d. BOD^{5}_{30}
3. High biodegradation factor & good indication of biological treatment suggest of effluent
 - a. High COD/ BOD_5 ratio
 - b. Intermediate COD/ BOD_5 ratio
 - c. Low COD/ BOD_5 ratio
 - d. All of them
4. Metallurgy and lead recycling industries are source of metal contaminant in effluent
 - a. Cadmium
 - b. Lead
 - c. Mercury
 - d. Zinc
5. method guarantees oxygenation and allow all solids to be maintained in suspension in liquid
 - a. Maturation pond
 - b. Facultative pond
 - c. Complete mix aerated lagoons-sedimentation tank



- d. facultative aerated lagoons
6. In..... gas is collected in upper part of separator in gas compartment from where it can be removed for reuse
- a. Septic tank
- b. UASB reactor
- c. Low rate trickling filter
- d. High rate trickling filter
7. It is essential to have zone in treatment for biological removal of phosphorous using activated sludge
- a. Aerobic
- b. Acidic
- c. Aerobic and anaerobic
- d. Acidic and anaerobic
8. Turbidity of sewage water is due to.....
- a. Color
- b. Temperature
- c. Suspended solids
- d. Odour

Q2. Attempt any one of the following

8M

1. Discuss in detail high rate trickling filters and rotating biological contactors
2. Explain degradation and active decomposition zone of self purification system

Q3. Write short note on following (Any one)

4M

1. Facultative ponds
2. Total nitrogen of sewage



Sri Swami Vivekanand Shikshan Sanstha's
Vivekanand College Kolhapur (An Empowered Autonomous Institute)
 Department of Microbiology (PG)

Class: M. Sc-II Sem IV

Name of paper: DSC20MIC42-Industrial Waste Management

Date: 18/03/2025

Marks: 20M

Internal Exam Attendance

Sr. No.	Name of Student	Roll No.	Sign
1	Attar Taisina Sajjan	5501	
3	Bangodi Harsh kishor	5502	
2	Basare Gayatri Pramod	5503	
4	Bhavake Priyanka .B	5504	
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16	Khatave Nikhil Anil	5516	
17	Kumthekar Krushnakant Surendra	5517	
18	Lad Devdatta	5518	
19	Lambe Sanika Krushna	5519	
20	Madane Omkar Sanjay	5520	
21	Magar Pratik Shrikant	5521	



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



Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur

(An Empowered Autonomous Institute)

Department of Microbiology (PG)

Academic Year 2024-25

M. Sc. Part II Semester IV Internal Examination
Industrial Waste Management DSC20MIC42

Date: 18/03/2025

Sr. No.	Name of Student	Roll No.	Seminar / 10	Home assignment / 10	Test / 20	Total / 40	Converted / 20
1.	Attar Taisina Saijan	5501	8	10	14	32	16
2.	Bangodi Harsh kishor	5502	8	10	13	31	16
3.	Basare Gayatri Pramod	5503	8	10	14	32	16
4.	Bhavake Priyanka .B	5504	10	10	15	35	18
5.	Bodake Harshada Bajirao	5505	8	10	10	28	14
6.	Buva Akshata Krishnat	5506	7	10	11	28	14
7.	Chavan Sanika Gorakhnath	5507	9	10	14	33	17
8.	Chougule Snehal Balaso	5508	8	10	11	29	15
9.	Desai Tammana Sulatan	5509	8	10	12	28	14
10.	Gore Vishal Bapu	5510	8	10	12	28	14
11.	Jadhav Apurva Uday	5511	10	10	14	34	17
12.	Jangam Bhgyashree Sanjay	5512	8	10	11	29	15
13.	Kudam Vijay Sanjay	5513	9	10	14	33	17
14.	Kesare Ankita Bhagvan	5514	7	10	10	27	14
15.	Khadake Aishwarya Amar	5515	10	10	16	36	18
16.	Khatave Nikhil Anil	5516	10	10	16	36	18
17.	Kumthekar Krishnkanth	5517	10	10	17	37	19
18.	Lad Devdatta	5518	8	10	10	28	14
19.	Lambe Sanika Krushna	5519	8	10	13	31	16
20.	Madane Omkar Sanjay	5520	10	10	11	31	16
21.	Magar Pratik Shrikant	5521	10	10	12	32	16
22.	Momin Mubina Salim	5522	9	10	13	32	16
23.	Mujawar Liza Naushad	5523	10	10	15	35	18
24.	Naik Shalom Vishwas	5524	8	10	10	28	14
25.	Parit Akshata Ananda	5525	8	10	12	30	15
26.	Patil Niranjan Krishnkatah	5526	8	10	09	27	14
27.	Patil Pranav Anilkumar	5527	8	10	10	28	14
28.	Patil Sakshi Bhauso	5528	8	10	09	27	14
29.	Patil Shivani Tanaji	5529	10	10	15	35	18
30.	Patil Vaishnavi Hanmant	5530	8	10	10	28	14
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32.	Powar Shrutiika Sambhaji	5532	9	10	11	30	15
33.	Rajput Kedar Laxmansing	5533	9	10	10	29	15
34.	Sakpal Samiksha Rajesh	5534	9	10	10	29	15
35.	Vast Karishma Umeshi	5535	9	10	13	32	16
36.	Zunake Suyash Dnyandev	5536	9	10	13	32	16



VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)**SUPPLIMENT**17
20

Suppliment No. :

Roll No. : 5517

Class : msc II (sem IV)

Signature
of
Supervisor

Subject : Industrial waste management

Test / Tutorial No. : Internal Examination

Date : 18/03/25

Long Answer

(Q1) Any one (8M)

(i) Discuss in detail High rate trickling filter and Rotating biological contactor.

(ii) Explain degradation and active decomposition zone of self purification system.

(Q2) Write short Note on (Any one) (4M)

(i) Facultative Pond

(ii) Total N₂ of sewageAnswers

(i) High rate Trickling filter:

- Trickling Filters are to processes in which effluent is treated with the help of Biofilm produced by the microorganism.

- In trickling filter we use different bed of different material like sand, gravel, stones etc.

and effluent that we want to treat is spread through sprinklers in dropwise manner.



Construction and working.

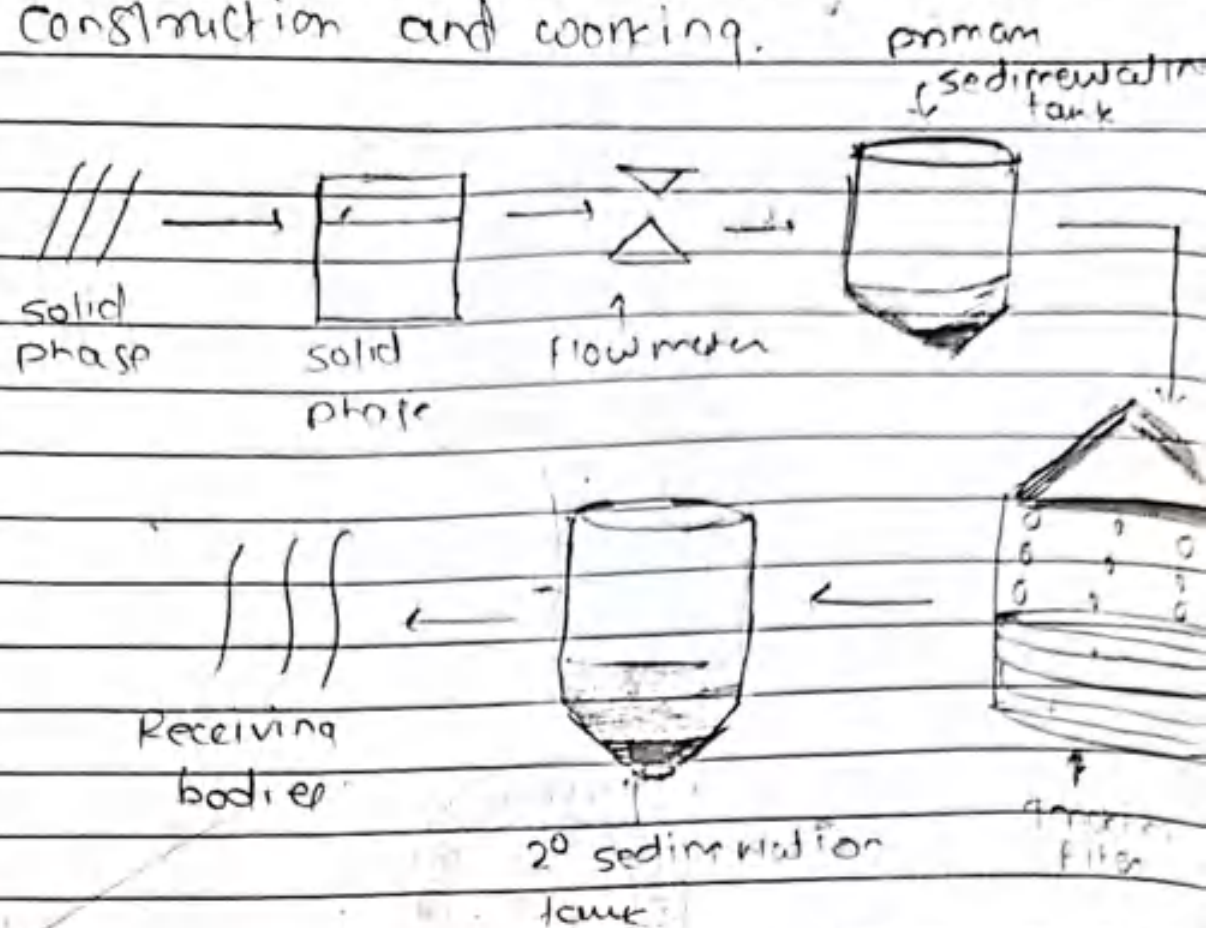
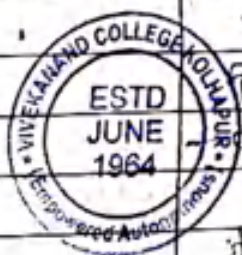


Fig. High rate trickling filter

- Effluent that we want to treat is added firstly in the primary sedimentation tank and kept for some period of time after some time solid material, suspended particles settle at the bottom of the tank and then effluent present at upper layer of the tank is transported to the trickling filter.

Trickling filter contains a bed of stones, gravels, sand etc. and through the sprinklers effluent we want to treat is added from upper layer and then effluent pass through the bed of stones, gravel and organic matter gets attached to the surface of stones.



and $\odot$ that will ~~atta~~ acts as a growth medium for the microorganisms.

- Then microorganisms grow and produce biofilm around the surface of the bed or stones and gravel.

- which $\odot$ use organic matter and degradation of organic matter takes place and growth and no. of mos' increases which produce biofilm.

- Now through sprinklers continuous and uniform sprinkling of effluent takes place and that effluent contains organic matter.

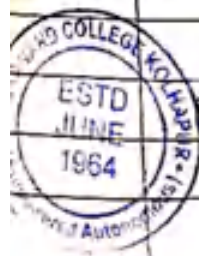
- and such organic matter is used by organism present in the biofilm and treatment of waste is done.

- after some time growth of biofilm increases and which blocks passage for the transport of waste so continuous washing of effluent biofilm from bed is necessary.

- after that effluent is transported to next tank which is ~~so~~ secondary tank where sedimentation of remaining waste $\odot$ is done and then effluent is released to water bodies.

(B) Rotating biological contactor.

- principle of this method is similar like production of biofilm takes place which helps for the treatment of the effluent.



- But here we use specific device
Rotating biological contactor

Construction and Working.

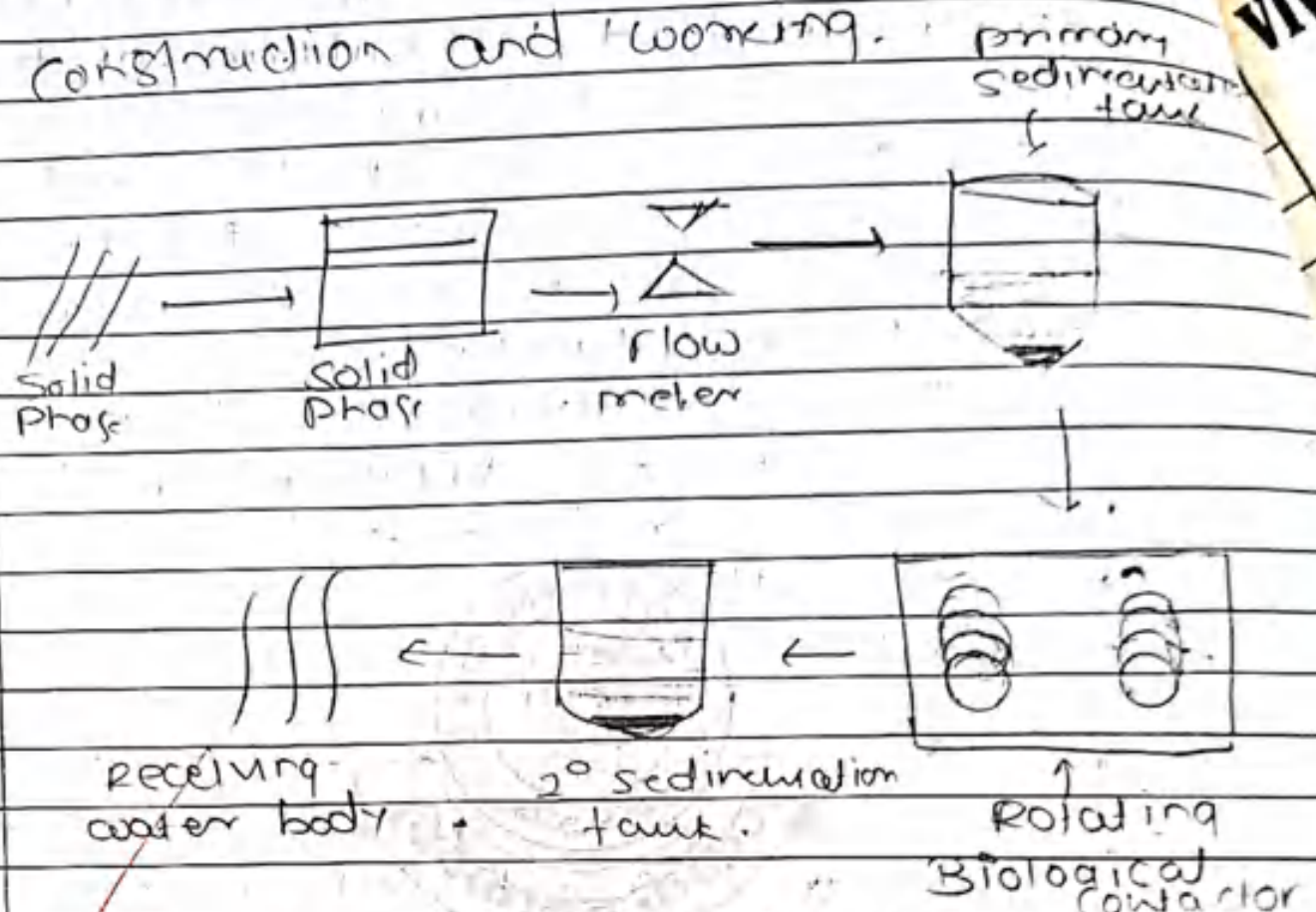


Fig. Rotating Biological contactor

- Here effluent that we want to treat is first in solid phase removal of large solid waste takes place.
- Then effluent pass to the primary sedimentation tank and here effluent kept for some period of time so solid present in the effluent settle at the bottom of the tank.
- Then effluent transfers to the Rotating Biological contactor, which act as a supporting medium. It is made up of No. of Disk having

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature
of
Supervisor

Suppliment No. :

Roll No. : 5517

Class : Msc II

Subject : Industrial waste
management

Test / Tutorial No. : Internal exam

Date : 18/03/2024

Diameter : 3-4 meter

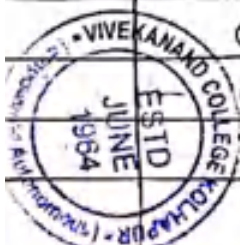
- The effluent water comes in contact with disc. Then disk starts rotating and half portion of disk exposed to air and half portion is in the effluent.

- When disk rotate organic matter attach to disk and act as a nutrient and growth or production of the biofilm at the surface takes place.

- and then when disk rotate biofilm expose to air and use or absorb O_2 and growth of organism takes place.

- and when biofilm comes in contact with effluent then degradation of organic matter takes place. and when biofilm increases biofilm detached and mixed in the effluent which also carry decomposition of waste

and then effluent transported to go sedimentation tank and then finally



effluent added to the Receiving body

(Q2) Facultative Pond:-

- It is made up of single Pond in which ~~organic matter~~ ^{organic matter} that we want to degrade is decomposed by using Facultative Ponds.
- The effluent that we want to treat is added into the pond and then after some time all organic matter is present in the effluent is settled at the bottom of tank.
- and at upper layer or Effluent contains dissolved oxygen which is helpful for growth of Facultative organism.
- which start to degrade organic matter present in the effluent at the bottom.

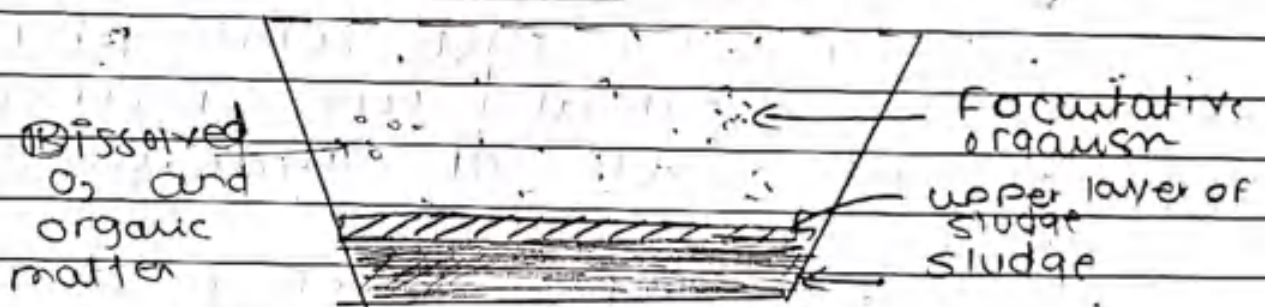


Fig : Facultative Pond

- When organic matter settle at the Base there is also degradation occurs at the surface growth of Facultative Aerobic or Aerobic organism are

- grown which carry degradation of the organic matter.
- and at depth anaerobic reactions occurs which are responsible for the foul odour and production of unwanted gases.
 - as it ~~life~~ does not have aeration system after depletion of dissolved O_2 only anaerobic reactions will take place after depletion of O_2 .
 - and due to that complete decomposition of organic matter does not take place.

Advantages-

- easy to maintain
- simple process / simple to construct.

Disadvantages-

- Required large area.
- slow decomposition rate at no aeration.
- Foul odour at single pond is there
- No aeration so no complete degradation of the organic matter.

4



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Suppliment No. :

Roll No. : 5517

Class : MSc II

Signature
of
Supervisor

Subject : Industrial waste management

Test / Tutorial No. : Internal exam

Date : 18/03/2025

(Q1) Choose the correct alternative from the following and rewrite the sentence.

Dark grey or.

(i) The septic sewage has Black colour.

(A) Dark grey

(C) Black

(B) Slight grey

(D) Dark grey or Black

(ii) Standard BOD is expressed as BOD₅²⁰

(A) BOD₅²⁰

(C) BOD₅³⁰

(B) BOD₂₀⁵

(D) BOD₃₀⁵

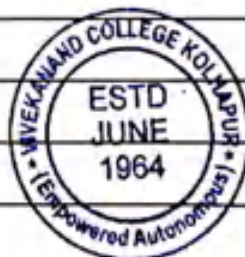
(iii) High biodegradation factor and good indication of Biological treatment suggest High COD / BOD ratio of effluent

(A) High COD / BOD ratio

(B) Intermediate COD / BOD ratio

(C) Low COD / BOD ratio

(D) All of them



(IV) Metallurgy and lead recycling industries are source of lead acetate contaminant in effluent.

- (A) Cadmium (C) zinc
(B) Mercury (D) Lead acetate

(V) ~~Maturation~~ complete mix aerated lagoons & sedimentation tank method guarantees oxygenation and allow all solid to be maintain in suspension for liquid

- (A) Maturation pond (C) complete mix aerated lagoon
(B) Facultative pond sedimentation tank
(D) Facultative aerated lagoons.

(VI) In UASB reactor gas is collected in upper part of separator in gas compartment from where it can be removed for re use.

- (A) septic tank (C) low rate trickling filter
(B) UASB reactor (D) high rate trickling filter

(VII) It is essential to have Aerobic and anaerobic zone in treatment of biological remove of phosphorous using activated sludge

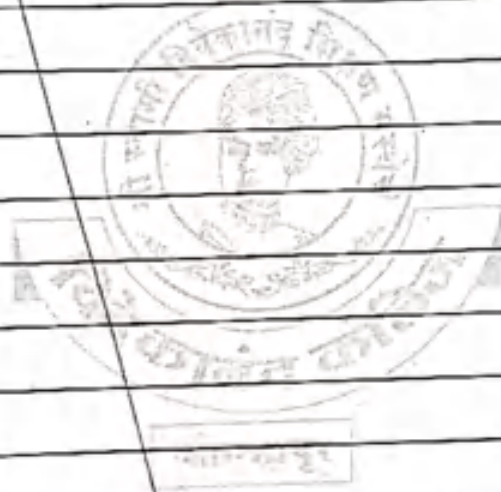
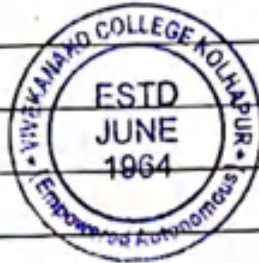
- (A) Aerobic (B) Aerobic and anaerobic
(C) Acidic (D) Acidic and anaerobic



Q.11) Turbidity of sewage or water is due to Suspended Solid

(A) Colour (C) Suspended Solid

(B) Temperature (D) odour.



Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)
Department of Microbiology (PG)
Academic Year 2024-25

DSE20MIC41 Recombinant DNA Technology

Day: Wednesday

Time: 2.00-3.00 pm

Date: 19/03/25

Marks: 20

Q.1. Select the correct alternative from the given alternatives and rewrite the sentence. (8)

1. The ----- technique is commonly used for radioactive labeling of DNA probes.
a) HRP method b) Nick translation c) Biotin-streptavidin system d) DIG labeling system
2. The ----- type of restriction endonucleases are most commonly used in genetic engineering.
a) Type I b) Type II c) Type III d) Type IV
3. Enzymes that remove nucleotides one at a time from the end of a DNA molecule are called -----
a) Ligases b) Exonucleases c) Endonucleases d) Modifying enzymes
4. ----- is an example of Phagemid vector.
a) λ gt10 b) pJBD219 c) EMBL 3 d) pBlue script II ks/sk
5. ----- is an example of λ insertional vector.
a) λ gt 10 b) λ EMBL c) λ pUC d) pBR 322
6. The ----- is not the technique used for probe preparation.
a) Random primer labeling b) Nick Translation
c) Base Insertion d) End labeling
7. Linkers are -----.
a) Short synthetic double stranded DNA sequence b) Short oligonucleotide sequence of host
c) Short oligonucleotide sequence of vector d) Short synthetic single stranded DNA sequence
8. The function of a polynucleotide kinase is -----.
a) Removal of the phosphate group from 5' end
b) Removal of the phosphate group from 3' end
c) Addition of phosphate group on 5' end
d) Addition of phosphate group on 3' end



Q.2. Attempt any ONE

(8)

- i) Discuss in detail methods of non-radioactive labelling of probes.
- ii) Discuss in detail alkaline phosphatase and DNA polymerase.

Q.3. Attempt any ONE

(4)

- 1. Write a note on adapters.
- 2. Write a note on pBR322 plasmids.



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

M. Sc. II Semester IV Internal Examination
rDNA Technology DSE20MIC41
Attendance of students

Date: 19/03/2025

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	
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 Bhagyashree Sanjay	5512	
13.	Kadam Vijay Sanjay	5513	
14.	Kesare Ankita Bhagvan	5514	
15.	Khadake Aishwarya Amar	5515	
16.	Khatave Nikhil Anil	5516	
17.	Kumthekar Krishnakant	5517	
18.	Lad Devdatta	5518	
19.	Lambe Sanika Krushna	5519	
20.	Madane Omkar Sanjay	5520	
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 Shirutika Sambhaji	5532	
33.	Rajput Kedar Laxmansing	5533	
34.	Sakpal Samiksha Rajesh	5534	
35.	Vast Karishma Umesh	5535	
36.	Zunake Suyash Dnyande	5536	



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Vivekanand College, Kolhapur

(An Empowered Autonomous Institute)

Department of Microbiology (PG)

Academic Year 2024-25

M. Sc. Part II Semester IV Internal Examination
Recombinant DNA Technology DSE20MIC41

Date: 19/03/2025

Sr. No.	Name of Student	Roll No.	Seminar / 10	Home assignment / 10	Test / 20	Total /40	Converted /20
1.	Attar Taisina Sajjan	5501	8	10	10	28	14
2.	Bangodi Harsh kishor	5502	8	10	12	28	14
3.	Basare Gayatri Pramod	5503	8	10	14	32	16
4.	Bhavake Priyanka .B	5504	10	10	19	39	20
5.	Bodake Harshada Bajirao	5505	8	10	14	32	16
6.	Buva Akshata Krishnat	5506	7	10	12	29	15
7.	Chavan Sanika Gorakhnath	5507	9	10	14	33	17
8.	Chougule Snehal Balaso	5508	8	10	14	32	16
9.	Desai Tammana Sulatan	5509	8	10	17	35	18
10.	Gore Vishal Bapu	5510	8	10	16	34	17
11.	Jadhav Apurva Uday	5511	10	10	17	37	19
12.	Jangam Bhgyashree Sanjay	5512	8	10	12	30	15
13.	Kadam Vijay Sanjay	5513	9	10	16	35	18
14.	Kesare Ankita Bhagvan	5514	7	10	09	26	13
15.	Khadake Aishwarya Amar	5515	10	10	19	39	20
16.	Khatave Nikhil Anil	5516	10	10	12	32	16
17.	Kumthekar Krinshnkanti	5517	10	10	19	39	20
18.	Lad Devdatta	5518	8	10	08	26	13
19.	Lambe Sanika Krushna	5519	8	10	11	29	15
20.	Madane Omkar Sanjay	5520	10	10	14	34	17
21.	Magar Pratik Shrikant	5521	10	10	17	37	19
22.	Momin Mubina Salim	5522	9	10	13	32	16
23.	Mujawar Liza Naushad	5523	10	10	19	39	20
24.	Naik Shalom Vishwas	5524	8	10	13	31	16
25.	Parit Akshata Ananda	5525	8	10	12	30	15
26.	Patil Niranjan Krishnatah	5526	8	10	11	29	15
27.	Patil Pranav Anilkumar	5527	8	10	11	29	15
28.	Patil Sakshi Bhauso	5528	8	10	12	30	15
29.	Patil Shivani Tanaji	5529	10	10	16	36	18
30.	Patil Vaishnavi Hanmant	5530	8	10	12	30	15
31.	Patil Sakshi Anil	5531	9	10	16	35	18
32.	Powar Shrutika Sambhaji	5532	9	10	13	32	16
33.	Rajput Kedar Laxmansing	5533	9	10	10	29	15
34.	Sakpal Sumiksha Rajesh	5534	9	10	13	32	16
35.	Vast Karishma Umesh	5535	9	10	15	34	17
36.	Zunake Suyash Dnyandev	5536	9	10	18	37	19





(अधिकारपदाल स्वायत्त)
कोल्हापूर

॥ ज्ञान, विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार ॥

- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

VIVEKANAND COLLEGE, KOLHAPUR.
(Empowered Autonomous)

19
20

SUPPLIMENT

Jr. Supervisor's Sign. : V.N. more

Students Sign. : Frank

Seat No. : Roll No = 5504

Seat No. in words : Internal examination

Supplement No. : Date - 19/3/2025

ME & II sem IV 36053

Centre - R-DNA Technology

प्र. क्र.

Q. No.

Q.2 Attempt any one 8 mark

- 1] Discuss in detail methods of non-radioactive labelling of probes
- 2] Discuss in detail alkaline phosphatase & DNA Polymerase

Q.3 Attempt any one

write a note on adaptors

write a note on PBR322 plasmid



Q.2

2] Alkaline phosphatase :-

It is an enzyme that enzyme is cleave the 3' end of phosphate bond.

प्र. क्र.
Q. No.

① calf intestinal alkaline phosphatase (CIP)
It is a collect utenstinal.
This enzyme is used in laboratory techniques.

This is source of E. coli

- It is a Thermostable enzyme
- It is used in excess of double stranded DNA.

③ Shrimp alkaline phosphatase :-
The source of enzyme is cold shrimp water
It is a 60°C Temp is required.

* DNA polymerase :-

DNA polymerase :-
The DNA polymerase is discovered by Kornberg 1958

① E. coli DNA polymerase enzyme & -

प्र. क्र.
Q. No.

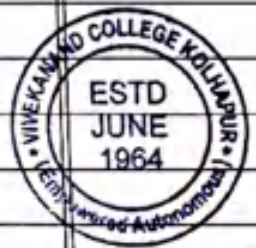
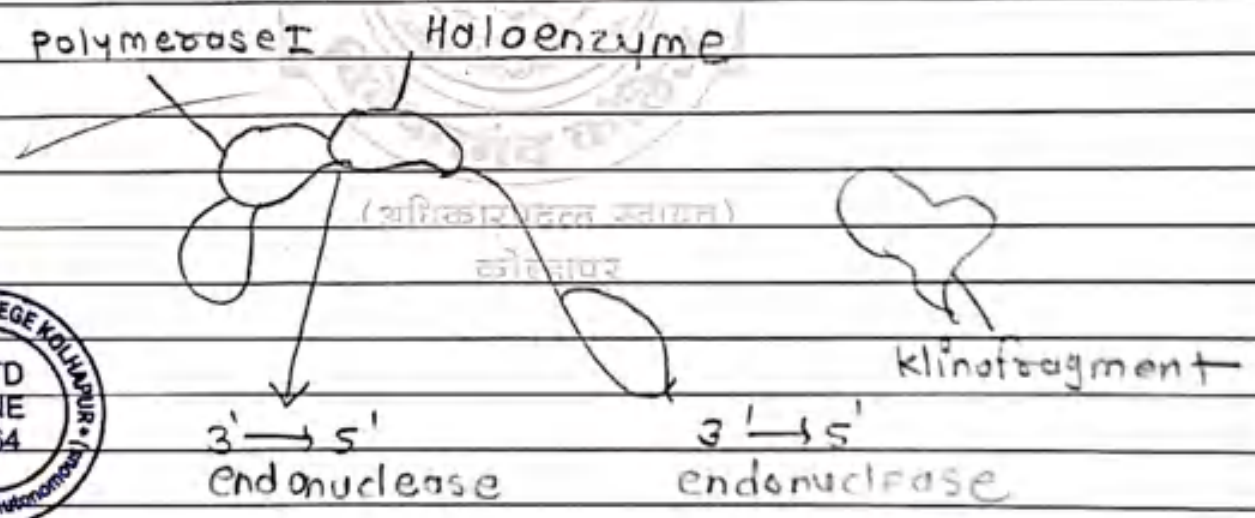
The Direction $5' \rightarrow 3'$ the polymerase activity and the $3' \rightarrow 5'$ is exonuclease activity it is a known as DNA mapping.

The source is E. coli

This enzyme used in DNA sequencing method

② Klinofragment

It is a enzyme that cleave the $3' \rightarrow 5'$ and $5' \rightarrow 3'$ is in exonuclease reductase.



Application :-

- It is used in Nick Translation
- It is used in Recombinant DNA Technology
- Its 3' end is excess.

DNA Polymerase I enzyme is used diagnosis.

T4 DNA polymerase -

This enzyme same is a klnofragment enzyme

This enzyme is endonuclease activity
the is the digest

T7 DNA polymerase

This enzyme is same is klnofragment

Thermostable DNA polymerase

This enzyme is discovered for yellowish
national part

Thermal aquatic organism is isolate.

It is grow in high temperature.

This is known as taq polymerase.

T9 DNA polymerase :-

This enzyme is game like klnofragment

Application

DNA polymerase enzyme used in Recombinant DNA technology

It is used in expression

It is a unidirectional next d. nexted
ditions





॥ ज्ञान, विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार ॥

- शिक्षणमहर्षी डॉ. बापूजी साबुंखे

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SUPPLIMENT

Jr. Supervisor's Sign. :

Students Sign. :

Seat No. : 5504

Seat No. in words :

Suppliment No. :

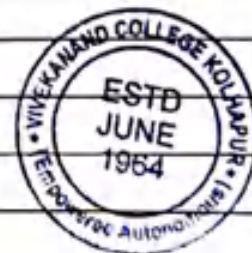
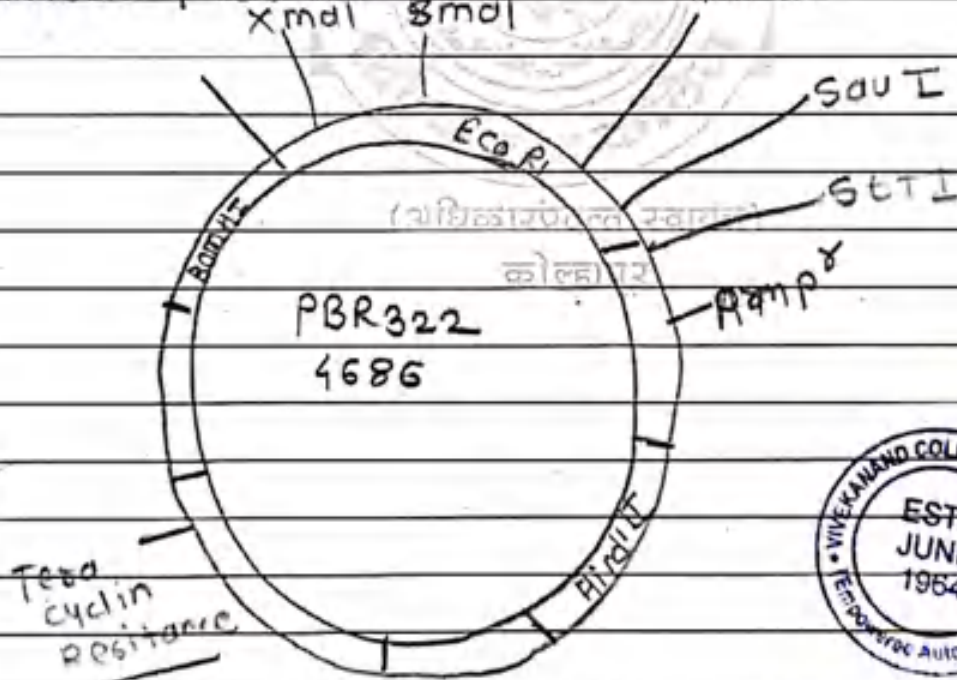
36063

Centre

प्र. क्र.
Q. No.

Q.3

2] PBR322 plasmid :-



plasmid :-

The plasmid it is copy of DNA, copy of organism.

The foreign DNA is a copy.

02

Q. No.

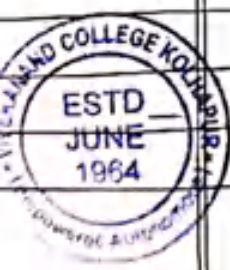
Marks

प्र. क्र.

Q. No.

The no diffⁿ types of plasmid is present
PBR322, PUC19, PBR320, PUC18, 9, 8, 18

- The PBR322 is a faux site is present like Bam HI, Eco RI, Hind III, Sau 31
- The Recognition site.
- The marker gene is present in PBR322 plasmid
- Ampicillin resistance and Tetracycline is present marker
- The ampicillin resistant marker gene is insert into DNA
- Ampicillin marker the sites is Bam HI, Sau T, Sst I, Xma I, Sma I
- The Tetracycline resistance is site in Eco RI, Hind II, Not I
- The PBR322 plasmid discovered the Boverney
- This plasmid is important in vector method
- This plasmid used in Recombinant DNA Technology
- The marker gene is attached to the plasmid vector
- This plasmid is 4366 bp. and 664 amino acid is present.
- The foreign DNA is a copy not without own DNA.



प्र. क्र.
Q. No.

Q.2]

1] probe

- It is a genetic nucleotide specific to the DNA molecule.

There are two types radio labelling probe

1] radio active labelling or non radioactive labelling probe

① non radio-active labelling probe.

1] HRP

2] DTG

3] Biotine streptomidine system.

कोल्हापुर

1] HRP

Horseradish Peroxidase

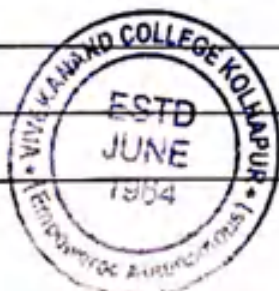
- It is a blue colour

- The enzyme is peroxidase, dismutase, catalase

The inactive the pos

The enzyme is washed

Then it is a removed
and Blue colour is form



प्र. क्र.
Q. No.

Dig - Dioxenin

It is a Blue or purple colour.

3] Biotine streptomidine systeme.

Biotine it is a vitamin H

Streptomide is a egg white protein

It is a act a enzyme alkaline phos
phatase and colour is develop Blue colour





(अधिकारप्रदत्त स्वायत्त)
कोल्हापूर

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SUPPLIMENT

॥ ज्ञान, विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार ॥

- शिक्षणमहर्षी डॉ. बापूजी साबुळे

Jr. Supervisor's Sign. :

Students Sign. :

Seat No. : 5504

Seat No. in words :

Suppliment No. :

36170

Centre R.D.T

प्र. क्र.
Q. No.

Q.1 select the correct alternative rewrite sentence

this

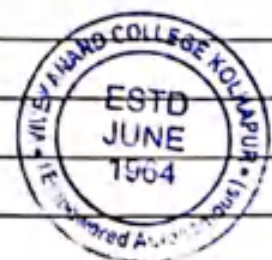
1) This nick translation tech is commonly used in or Radioactive labelling of DNA probe.

(अभिलिखित प्रश्न उत्तर)

- a) HRP method ~~b) nick translation~~
c) Biotine streptomidin system d) DTG labelling system

2) The Type II type of Restriction endonuclease are most commonly used in genetic engineering.

- a) Type I ~~b) Type II~~
c) Typ III d) Typ IV



प्र. क्र.
Q. No.

3] Enzyme that remove nucleotides one at a time from ^{end} the DNA of molecule
exonuclease

a) ligases

b) ~~exonucleases~~

c) Endonuclease

d) modified enzymes

4) p blue script Π KSI6 is an example of
phagemid vectors

a) λ gt 10

b) pGBd 219

c) FMBL 3

d) ~~p blue script Π KSI/~~(अधिकार Π KSI स्वामित्व)

कोल्हापुर

5) λ gt 10 is an example of inser
tional vector

a) ~~λ gt 10~~b) λ FMBLc) λ puc

d) PBR322

6) The Base insertion is not the technique
used for probe preparation

a) Random primer labelling

b) nick translation



7) linkers are short synthetic double stranded DNA sequence

- a) ~~short synthetic double stranded DNA sequence~~
- b) short short oligonucleotide sequence of host
- c) oligonucleotide sequence of vector
- d) short synthetic single stranded DNA sequence

8) The function of a polynucleotide kinase is Removal of phosphate group on 5' end
addition

- a) Removal of phosphate group from 5' end
- b) Removal of phosphate group from 3' end
- c) ~~addition of phosphate group on 5' end~~
- d) addition of phosphate group on 3' end

