

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Sc. (Honours) (Microbiology) (Sem-2)

BACTERIOLOGY

Subject Code : BSMB201-19

M.Code : 79872

Date of Examination : 23-11-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Define the following :

- a) Flagella
- b) Fluorescence Microscope
- c) Archaeobacteria
- d) Nucleoid
- e) Chemically defined media
- f) Gram-positive cell walls
- g) Specific growth rate
- h) General characteristics of Non-culturable bacteria
- i) Plating methods
- j) Desiccation.



SECTION-B

2. Explain asexual methods of reproduction in Bacteria.
3. Discuss in brief cultivation of anaerobic bacteria and accessing non-culturable bacteria.
4. Describe morphology, ecological significance and economic importance of Gram Negative Bacteria.
5. Write a brief note on Microscopy Bright Field Microscope, Dark Field Microscope and Phase Contrast Microscope.
6. Explain in detail how cell wall is affected by antibiotics and enzymes activity.

SECTION-C

7. Describe composition and detailed structure of Gram and acid fast staining mechanisms, lipopolysaccharide (LPS), sphaeroplasts, protoplasts and L-forms of bacteria.
8. Discuss Morphology, metabolism, ecological significance and economic importance of Gram Negative and Gram Positive Bacteria.
9. Write a note on :
 - a) Nutritional requirements in bacteria and nutritional categories.
 - b) Culture media: components of media, natural and synthetic media, complex media, selective, indicator.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Sc. Honours (Microbiology) (Sem-2)

MICROBIAL PHYSIOLOGY AND METABOLISM

Subject Code : BSMB207-19

M.Code : 79878

Date of Examination : 21-11-2023

Time : 3 Hrs.

Max. Marks : 60

SECTION-B

2. Describe how microbial growth is affected by energy and nutrition?
3. Write a brief note on LPS synthesis.
4. Describe how mitochondrial electron transport chain is different from bacterial electron transport chain?
5. Describe the metabolism of glycogen by bacteria.
6. Differentiate between anoxygenic and oxygenic photosynthesis.

SECTION-C

7. Explain the complete process of glycolysis in microbes including its location, significance and energetics.
8. Describe the complete mechanism of photosynthesis in detail.
9. Describe the structure of microbial cell with the help of a neat and clean well-labelled diagram.

SECTION-A

1. Attempt the following :
- What do you mean by sulphur bacteria?
 - Define denitrification.
 - Define passive diffusion.
 - Give a brief idea about diauxic growth curve.
 - Enlist various organs and their functions involved in microbial mobility.
 - What is the significance of TCA cycle in microbes?
 - Define antiport.
 - Write the significance of pentose phosphate pathway.
 - What is Pasteur effect?
 - Define continuous cultures.



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Total No. of Pages : 02

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B.Sc. Honours (Microbiology) (Sem-2)
FUNDAMENTALS OF BIOCHEMISTRY

Subject Code : BSMB-203-19

M.Code : 79874

Date of Examination : 17-11-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
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SECTION-A

1. Answer Briefly :

- Anomers
- Lipid micelles
- Identification test for proteins
- Biotins as coenzyme
- Oligopeptides
- Monomer units of fructose.
- Steroids
- Haworth projection formula
- Peptide bond
- Homo and hetero polysaccharides.

SECTION-B

2. What are lipids, explain the types and functions of lipids?
3. Write a short note on UV absorption by nucleic acids.
4. Enlist the difference between nucleotides and nucleosides.
5. Write a short note on prostaglandins.
6. Give the structural features and classification of amino acids.

SECTION-C

7. Define chemical bond. Classify chemical bond with suitable chemical reactions.
8. Write a detailed note on carbohydrates, its types and functions of carbohydrates in human body.
9. Explain in detail about the DNA and RNA.



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B.Sc. Honours (Microbiology) (Sem-2)
FUNDAMENTALS OF BIOCHEMISTRY

Subject Code : BSMB-203-19

M.Code : 79874

Date of Examination : 17-11-2023

Time : 3 Hrs.

Max. Marks : 60

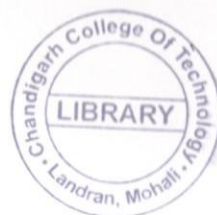
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SECTION-A

1. Answer Briefly :

- Anomers
- Lipid micelles
- Identification test for proteins
- Biotins as coenzyme
- Oligopeptides
- Monomer units of fructose.
- Steroids
- Haworth projection formula
- Peptide bond
- Homo and hetero polysaccharides.



SECTION-B

2. What are lipids, explain the types and functions of lipids?
3. Write a short note on UV absorption by nucleic acids.
4. Enlist the difference between nucleotides and nucleosides.
5. Write a short note on prostaglandins.
6. Give the structural features and classification of amino acids.

SECTION-C

7. Define chemical bond. Classify chemical bond with suitable chemical reactions.
8. Write a detailed note on carbohydrates, its types and functions of carbohydrates in human body.
9. Explain in detail about the DNA and RNA.

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Roll No.

Total No. of Pages : 02

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B.Sc. - Honours (Microbiology) (Sem.-3)

BIOSTATISTICS

Subject Code : BSMB308-19

M.Code : 90374

Date of Examination : 18-12-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
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SECTION-A

1. Write briefly :
- a) Define degrees of freedom
 - b) Define confidence limits
 - c) What is the probability that a leap year selected at random will contain 53 Sundays?
 - d) Define hypothesis
 - e) Calculate mean for the data 5,10,15,24,36,78
 - f) Define standard deviation
 - g) Give two examples for non parametric tests
 - h) Define covariance
 - i) What is intercept?
 - j) Give the formula for chi square test and explain terms.



SECTION-B

2. Give a brief account on probability basic laws.
3. In an anti malarial campaign particular city, quinine was given to some people. Discuss the usefulness of quinine checking malaria by using chi square test

Observed:	20	220	792	2216
Expected:	60	180	752	2256

(For chi square 1 the table value is 3.84).

4. The number of defects per unit in sample of 330 units of manufactured product was found as follows :

No. of Defects	0	1	2	3	4
No. of Units	214	92	20	3	1

Fit a poisson distribution to the data (Given $e^{-0.439} = 0.6447$)

5. Write a short note on regression.
6. Find spearman's rank coefficient of correlation for the following data :

X	50	66	34	21	15	79	42
Y	31	64	53	41	17	73	29

SECTION-C

7. Two types of drugs were used on 5 and 7 patients for reducing their weight. Drug A was imported and Drug B is indigenous. The decrease in weight after using 6 months as follows :

Drug A	10	12	13	11	14		
Drug B	8	9	12	14	15	10	9

Is there a significant difference in the efficacy of the two drugs (For $v=10$ $t_{0.05}$ is 2.223; For $v = 9$ $t_{0.05}$ is 2.262; For $v=12$ $t_{0.05}$ is 2.179; For $v=11$ $t_{0.05}$ is 2.201). Take the appropriate t value from the above and interpret your result.

8. Discuss in detail Mann-Whitney U test and its importance.
9. Describe statistical hypothesis testing. Discuss importance of normal distribution.

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Total No. of Pages : 02

VIROLOGY

M.Code : 90367

Date of Examination : 08-12-2023

Time : 3 Hrs.

Max. Marks : 60

SECTION-B

2. What is a lytic and lysogenic cycle in the virus?
3. Write a note on the classification and taxonomy of virus.
4. Discuss about the replication pattern of plant virus.
5. Define interferon with its suitable example.
6. Write a note on the discovery and origin of the virus.

SECTION-C

7. Define virus. Explain the isolation, purification and cultivation of the virus in detail.
8. What is viral vaccination? Write a detail about general principle of viral vaccination.
9. What are antiviral compounds? Explain the mode of action of interferon in detail.

SECTION-A

1. Write briefly :
- What are the properties of a virus?
 - Draw the structure of a virus.
 - What is bacteriophage?
 - How does SARS-CoV-2 bind to ACE2?
 - What is the difference between enveloped and non-enveloped viruses?
 - What is transduction?
 - Write a note on poliovirus.
 - What is capsid?
 - What is the rhabdo virus?
 - Write a note on lambda regulon.



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Total No. of Questions : 09

Total No. of Pages : 02

B.Sc. Hons. (Microbiology) (Sem.-3)

VIROLOGY

Subject Code : BSMB301-19

M.Code : 90367

Date of Examination : 08-12-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- What are the properties of a virus?
- Draw the structure of a virus.
- What is bacteriophage?
- How does SARS-CoV-2 bind to ACE2?
- What is the difference between enveloped and non-enveloped viruses?
- What is transduction?
- Write a note on poliovirus.
- What is capsid?
- What is the rhabdo virus?
- Write a note on lambda regulon.



SECTION-B

2. What is a lytic and lysogenic cycle in the virus?
3. Write a note on the classification and taxonomy of virus.
4. Discuss about the replication pattern of plant virus.
5. Define interferon with its suitable example.
6. Write a note on the discovery and origin of the virus.

SECTION-C

7. Define virus. Explain the isolation, purification and cultivation of the virus in detail.
8. What is viral vaccination? Write a detail about general principle of viral vaccination.
9. What are antiviral compounds? Explain the mode of action of interferon in detail.

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SECTION-B

Roll No.

[illegible]

Total No. of Pages : 02

Total No. of Questions : 09

B.Sc. (MB) (Sem.-3)

MIRCROBES IN ENVIRONMENT

Subject Code : BSMB-305-19

M.Code : 90371

Date of Examination : 13-12-2023

Time : 3 Hrs.

Max. Marks : 60

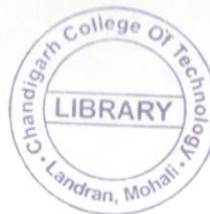
INSTRUCTIONS TO CANDIDATES :

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 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- What are functions of ecosystem?
- Define osmotic pressure.
- What are ruminants?
- What is symbiosis? Give example.
- Define BOD and COD.
- Discuss the effect of pH on microbial growth.
- What is trickling filter?
- What is the composition of liquid waste management?
- Define extremophiles.
- What do you understand by parasitism?



SECTION-C

2. Write a detailed note on microbiomics.
3. Describe microbes thriving at high and low temperature.
4. What is microbe plant interaction? Discuss in detail about symbiotic and non-symbiotic interactions.
5. What is ecosystem? Discuss the structure and functions of ecosystem.
6. Discuss various methods of soil waste disposal.

7. Discuss in detail about negative microbial interactions.
8. Describe terrestrial environment related to soil profile and soil microflora.
9. Discuss in detail about primary and secondary sewage treatments.

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Total No. of Questions : 09

ANALYTICAL TECHNIQUES IN MICROBIOLOGY

M.Code : 92105

Date of Examination : 20-11-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- Define sedimentation velocity.
- What is the basic principle of UV-vis spectroscopy?
- Define the term molecular polarizability.
- What do mean by ion exchange chromatography?
- Discuss about gel chromatography with suitable examples.
- Discuss about isoelectric focussing of proteins and its importance.
- What information do we get from X-Ray crystallography?
- Give the significance of Lambert Beer law.
- Discuss the basic principle of TLC.
- What does the term metastable ion mean?



SECTION-B

2. Explain in detail the chemical shift and shielding and deshielding.
3. Write a detailed note on fragmentation rule in mass spectrometry.
4. Enlist the factors affecting absorption of a chromophore.
5. Write a brief note on autoradiography and identification of materials.
6. Explain Raman spectra of simple linear molecule with example.

SECTION-C

7. Explain the principle and working of HPLC and pumps used in HPLC.
8. Describe the instrumentation of ultracentrifuge in detail.
9. Explain the theory of electrophoresis and factors affecting migration of substances.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Sc - Honours (Microbiology) (Sem.-5)

ENZYME TECHNOLOGY

Subject Code : BSMB509-20

M.Code : 92515

Date of Examination : 30-11-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

- What are the general characteristics of enzymes?
- Define apoenzyme.
- What is the unit of enzymes?
- Give any four examples of reversible inhibition.
- Define K_m .
- What is isoenzymes?
- Write the application of substrate in the microbiology field.
- Give an example of competitive inhibition.
- What are the four properties of enzymes?
- What are cofactors? Explain their role in humans.



SECTION-B

2. Define enzyme. Explain the classification of enzymes in detail.
3. Write about enzyme therapy for disease treatment.
4. Discuss the irreversible inhibition.
5. Explain the line weaver-Burk plot.
6. Write the application of microbial enzymes in the environment process.

SECTION-C

7. Describe the immobilized enzymes and their industrial applications.
8. Explain in detail about the factors affecting enzyme activity.
9. What is feedback inhibition? Describe the operon model in detail.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Sc. Honours (Microbiology) (Sem.-5)

COMPUTER SCIENCE AND BIOINFORMATICS

Subject Code : BSMB507-20

M.Code : 92513

Date of Examination : 28-11-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- What is the full form of BLAST and FASTA?
- What do you mean by virtual memory?
- Write down the various file formats used in bioinformatics.
- What are the advantages of hard disk?
- What are output devices?
- Enlist types of BLAST.
- What is system software?
- What are the 4 steps of FASTA?
- Advantages of mainframe computers.
- What is pixel for image?



SECTION-B

2. Explain biological database with types.
3. Differentiate between memory and storage.
4. Write a short note on Protein sequence database.
5. Explain Phylogenetic trees constitution for microbial diversity.
6. What are the uses of computer applications in healthcare?

SECTION-C

7. What is the architecture of a computer system?
8. Describe the role of Bioinformatics in microbial diagnostic with their applications.
9. Describe the different database used in DNA and Protein sequencing.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Sc- Honours (Microbiology) (Sem-5)

IMMUNOLOGY

Subject Code : BSMB-501-20

M.Code : 92507

Date of Examination : 10-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**1. Write briefly :**

- a) Discuss mononuclear phagocytes.
- b) Define MALT.
- c) Define haptens.
- d) What do you mean by avidity?
- e) What are the symptoms of antigen-antibody interactions?
- f) Discuss the tonsils.
- g) What do you mean by antigens?
- h) What is adaptive immunity?
- i) Define transplantation.
- j) Mention the role of cytokines.

**SECTION-B**

2. Discuss in detail the antigen processing and presentation.
3. Elaborate in detail about major Histocompatibility complexes.
4. Describe in detail about autoimmunity -organ specific and systemic.
5. Define epitopes. Give a detailed comment.
6. Give a overview of graft rejection.

SECTION-C**7. Discuss the following :**

- a) Granulocytic cells
- b) Spleen
- c) Antigen binding sites

8. Discuss in detail about ELISA with their applications.**9. Comment on :**

- a) Cytokines: receptors
- b) Immunodeficiency
- c) Thymus and lymph node.

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Total No. of Questions : 09

B.Sc. Honours (Microbiology) (Sem.-5)
COMPUTER SCIENCE AND BIOINFORMATICS

Subject Code : BSMB507-20

M.Code : 92513

Date of Examination : 28-11-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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SECTION-A**1. Write briefly :**

- a) What is the full form of BLAST and FASTA?
- b) What do you mean by virtual memory?
- c) Write down the various file formats used in bioinformatics.
- d) What are the advantages of hard disk?
- e) What are output devices?
- f) Enlist types of BLAST.
- g) What is system software?
- h) What are the 4 steps of FASTA?
- i) Advantages of mainframe computers.
- j) What is pixel for image?

**SECTION-B**

2. Explain biological database with types.
3. Differentiate between memory and storage.
4. Write a short note on Protein sequence database.
5. Explain Phylogenetic trees constitution for microbial diversity.
6. What are the uses of computer applications in healthcare?

SECTION-C

7. What is the architecture of a computer system?
8. Describe the role of Bioinformatics in microbial diagnostic with their applications.
9. Describe the different database used in DNA and Protein sequencing.

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Total No. of Questions : 09

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B.Sc. Honours (Microbiology) (Sem.-5)

BIOSAFETY AND INTELLECTUAL PROPERTY RIGHT

Subject Code : BSMB-505-20

M.Code : 92511

Date of Examination : 23-11-2023

Time : 3 Hrs.

Max. Marks : 30

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying ONE mark each.
2. SECTION-B contains FIVE questions carrying TWO AND A HALF marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying FIVE marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :
- What do you mean by Biosafety?
 - What do you understand by heat sterilization?
 - Define the term ISO.
 - What is the need of quality management system in pharmaceutical industries?
 - What do you understand by geographical indications in IP?
 - What are animal biosafety levels?
 - Expand the term NABL.
 - What is the difference between copyright and trademark?
 - What is the role of GLP in pharmaceutical industries?
 - Describe the terms toxicology and allergenicity.

SECTION-B

2. Write a note on regulatory aspects of quality control.
3. Discuss in detail about design and layout of sterile product manufacturing.
4. What do you understand by institutional ethics committee and its role?
5. Write a short note on protection of GMOs IP as a factor in R & D.
6. Write a short note on patents and trademarks.

SECTION-C

7. Write a descriptive note on role of NABL and ISO.
8. Give a descriptive account on design and safety of microbiology laboratory.
9. Write a detailed note on need for the introduction of Intellectual Property Rights with its historical perspectives.



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B.Sc- Honours (Microbiology) (Sem.-5)

IMMUNOLOGY

Subject Code : BSMB-501-20

M.Code : 92507

Date of Examination : 17-11-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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3. SECTION-C contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

SECTION-A

1. Answer briefly :
- a) Innate immunity
 - b) GALT
 - c) Antibody affinity
 - d) Heptane
 - e) MHC complex
 - f) Cytosolic pathway
 - g) T-cell maturation
 - h) Cytokines
 - i) Transplantation
 - j) Function of granulocytic cells.



SECTION-B

2. Explain the structure of antibody and its function.
3. Write a note on primary and secondary lymphoid organs.
4. What do you mean by overview of graft rejection?
5. Write various types of hypersensitivity reactions.
6. What is ELISA and its application?

SECTION-C

7. What are antigens? What are the characteristics of T-dependent and T-independent antigens?
8. Explain about the organization and inheritance of MHC locus.
9. Discuss the complement system by taking examples of classical, alternative and lectin pathway.

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Total No. of Questions : 09

MEDICAL MICROBIOLOGY

Subject Code : BSMB-503-20

M.Code : 92509

Date of Examination : 21-11-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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SECTION-A

1. Write in brief about :
 - a) Pathogenicity
 - b) Nosocomial infection
 - c) Septic shock
 - d) *Mycobacterium tuberculosis*
 - e) How sample collection is done?
 - f) Viral disease
 - g) Herpes virus
 - h) Characteristics of antimicrobial agents
 - i) Mode of action of anti-fungal agents
 - j) Antibiotic resistance.



2. Explain about toxigenicity and virulence.
3. Exemplify one bacterial disease with reference to its symptom, pathogenesis and control.
4. What are respiratory diseases and explain about *Streptococcus pyogenes*.
5. Write about protozoan infection with its prophylaxis and control.
6. Write a note on inhibitor of the cell wall synthesis.

SECTION-C

7. What are antibacterial agents with their mode of action?
8. Explain about the viral disease like Covid-19 and Monkey pox.
9. Discuss the sample collection, transport and culturing of clinical sample.

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Total No. of Questions : 09

B.Sc. Hons. (Microbiology) (Sem.-1)
INTRODUCTION TO MICROBIOLOGY

Subject Code : BSMB 101-19

M.Code : 78979

Date of Examination : 24-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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SECTION-A

1. Write briefly :

- a) Contributions of L. Pasteur to microbiology.
- b) Discovery of antibiotic.
- c) Phase microscopy.
- d) Morphology of bacteria.
- e) Microbial spores.
- f) Nutritional biodiversity.
- g) Synchronous growth.
- h) Microbial flora in human.
- i) Anaerobic fermentation.
- j) Symbiosis.

SECTION-B

2. Discuss the principle of electron microscopy.
3. Difference between aerobic and anaerobic fermentation.
4. Write a note on microbial interaction like symbiosis.
5. Elaborate on the different phases of the growth of bacteria.
6. Difference between gram-positive and gram-negative bacteria.

SECTION-C

7. Elaborate on the morphology of bacteria and viruses, emphasizing structure.
8. Discuss sterilization and pasteurization with examples.
9. Explain the types of microbial pathogens and diseases caused by them.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Sc. (Microbiology) (Sem.-1)

ENGLISH

Subject Code : BTHU103/18

M.Code : 80141

Date of Examination : 19-05-23

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :
- Encoding
 - Two-way model of Communication
 - Formal communication
 - Paralanguage
 - Spoken or Oral Communication
 - Semantic barriers
 - Importance of communication
 - Note making
 - Advantages of written communication
 - Advantages of informal communication

SECTION-B

2. Write a short paragraph on Online Education.
3. Write a letter to bank manager asking him to stop payment of a cheque.
4. Characteristics of a good paraphrase.
5. Write a note on formal channels of communication.
6. Write a conversation between two friends who have just come out the Examination hall.

SECTION-C

7. Define Non-verbal communication. Discuss in detail its various forms and also explain their importance.
8. Write a letter to the editor of the local newspaper expressing your anguish over the problems faced by the people due to free sale of liquor everywhere.
9. Suppose you are the Manager of stores in a big business organization and one of your stores catches fire at mid night. Write a report to boss about the steps you have taken to control the fire and the result of your preliminary investigation.

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Total No. of Questions : 09

Total No. of Pages : 02

B.Sc. Hons. (Microbiology) (Sem-2)

MOLECULAR BIOLOGY

Subject Code : BSMB-205-19

M.Code : 79876

Date of Examination : 07-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

- Define replicon.
- How does RNA differ from DNA?
- What is transfer RNA?
- How many initiation factors are involved in protein synthesis?
- What is excision repair?
- What is meant by RNA splicing?
- Write the concept of introns.
- Differentiate between RNA primer and DNA primer.
- DNA replication fork is symmetric or asymmetric type, why?
- Where is bacterial site specific recombinase tool used?

SECTION-B

2. Briefly explain alternative forms of DNA helix.
3. What are the basic differences between DNA and RNA?
4. Explain the DNA replication in prokaryotes.
5. Briefly explain the term RNA polymerases.
6. How does protein synthesis occur in prokaryotes?

SECTION-C

7. Elaborate the transcription process of prokaryotes.
8. Highlight the steps involved in the translation of prokaryotes.
9. Explain the structure of Watson and Crick model of DNA and Z-DNA.

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Total No. of Questions : 09

Total No. of Pages : 02

B.Sc. (Honours) (Microbiology) (Sem-2)

BACTERIOLOGY

Subject Code : BSMB201-19

M.Code : 79872

Date of Examination : 05-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly:

- In what manner bacterial cells organized?
- Write the name of different component of bacterial cell membrane.
- Differentiate between Bright Field and Dark field Microscope.
- What is Serial dilution?
- Give an example of gram positive and gram negative bacteria.
- Enlist the different techniques for microbial control?
- What temperature and pressure should be maintained during bacterial growth?
- Define Scanning Electron Microscope.
- Define the term nanoarchaeum.
- How bacteria perform their metabolism.

SECTION-B

2. Draw a labeled diagram and write the different stages of sporulation in bacteria with an example.
3. How to cultivate the anaerobic bacteria and in what manner they are differ from aerobic bacteria.
4. Suppose you had the choice of destroying one class of organic compounds in bacterial cells to prevent their spread which class would you choose. Why?
5. By what standards are bacteria classified? Name the classifications.
6. What are the various chemical methods of microbial control?

SECTION-C

7. Discuss in detail the composition and structure of gram positive and gram negative cell wall.
8. Write a detailed note on various physical method of microbial control.
9. Explain in brief the different bacteriological techniques for their cultivation.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Sc. Honours (Microbiology) (Sem-2)
FUNDAMENTALS OF BIOCHEMISTRY

Subject Code : BSMB-203-19

M.Code : 79874

Date of Examination: 30-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write Briefly :

- a) Define ionization with suitable examples.
- b) Draw Haworth projection formula for fructose.
- c) What are sphingolipids?
- d) What are galactolipids?
- e) Define proteoglycans with suitable examples.
- f) What are coenzymes?
- g) Enlist any four properties of peptide bond.
- h) Give any two examples of homopolysaccharides.
- i) Differentiate between reducing and non-reducing sugars
- j) What are nucleotides?

SECTION-B

2. Explain in detail stereoisomerism of monosaccharides.
3. Write a detailed note on effect of acid and alkali on DNA.
4. Give detailed classification of lipids.
5. Write a brief note on UV absorption by nucleic acids.
6. Give sources, properties and functions of fat-soluble vitamins.

SECTION-C

7. Classify vitamins. Write a detailed note on coenzymes.
8. Classify carbohydrates and give suitable examples from each class including their chemical structures.
9. Explain the structure of mRNA, tRNA and rRNA.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Sc - Honours (Microbiology) (Sem.-3)

BIostatistics

Subject Code : BSMB-308-19

M.Code : 90374

Date of Examination : 16-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) Define Range.
- b) Define Degrees of Freedom.
- c) If a dice is thrown one time what is the probability to get 4 on the dice.
- d) Plot the graph which shows positive correlation.
- e) Give any two examples for parametric tests.
- f) What do you mean by r in regression analysis? Write its significance.
- g) Define standard deviation.
- h) Write the importance of rank correlation
- i) What do you mean by goodness of fit?
- j) Define confidence limits.

SECTION-B

2. Write a note on Poisson Distribution :
3. In a test given to two groups of students, the marks obtained are as follows :

First group	18	20	36	50	49	36	34	49	41
Second Group	29	28	26	35	30	44	46		

Examine the significance of difference between the arithmetic mean of the marks secured by the students of the above two groups.

(The value of t at 5% level of significance for $v = 14$ is 2.14).

4. Calculate Karl Pearson coefficient of correlation from the given data

S. No	1	2	3	4	5
Marks in Chemistry	48	35	17	23	47
Marks in Maths	45	20	40	25	45

5. Write a note on Hypothesis testing.
6. A bag contains 30 balls numbered from 1 to 30. One ball is drawn at random. Find the probability that the number of ball drawn will be multiple of (a) 5 or 7 (b) 3 or 7.

SECTION-C

7. Write a note on :
 - a) Binomial distribution
 - b) Normal Distribution
8. Calculate the Mann Whitney U test of the two samples :

Sample I	2	4	5	7	3
Sample II	1	2	5	8	3

(Table value is 7, at 0.05).

9. Perform ONE WAY ANOVA for the following data :

For (2, 6) DF $F_{0.05}$ is 5.14 ; For (3, 6) DF $F_{0.05}$ is 4.76

SCHOOLS

A	B	C
2	5	4
3	4	3
4	6	5

Take one appropriate value given above for degrees of freedom and interpret the result what you have obtain

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Total No. of Questions : 09

Total No. of Pages : 02

B.Sc. (Microbiology) (Sem.-4)
PHYCOLOGY AND MYCOLOGY

Subject Code : BSMB-401-20

M.Code : 92099

Date of Examination : 26-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. SECTION-B contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. SECTION-C contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

SECTION-A

1. Write briefly :
 - a) Significance of Phialopore in Volvox
 - b) Mycotoxins
 - c) Nostoc
 - d) Symptoms of Candidiasis infection
 - e) Lichens
 - f) Cryptococcus
 - g) Phaeophyceae
 - h) Economic Importance of fungi
 - i) Role of algae in food
 - j) Mycology.

SECTION-B

2. Depict the life cycle of *Penicillium* with the help of labelled diagrams only. Write its systematic position.
3. Why are Myxomycetes classified as fungi?
4. Discuss economic importance of algae. What are the relationship between cyanophyta and chlorophyta?
5. Write a brief note on classification of algae.
6. Write a brief note on systemic infection.

SECTION-C

7. Describe the variation in thallus organization in various Chlorophyceae algae.
8. Give an account of fungi classification based on various important criteria.
9. Elaborate symptoms, pathogenesis, transmission and control of Subcutaneous infection.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Sc. Hons. (Microbiology) (Sem.-4)
ANALYTICAL TECHNIQUES IN MICROBIOLOGY

Subject Code : BSMB407-20

M.Code : 92105

Date of Examination : 24-05-23

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :
 - a. HPLC
 - b. Principle of centrifugation
 - c. What is PAGE?
 - d. Principle of NMR Spectroscopy
 - e. Write the properties of chromophore.
 - f. Write the equation of sedimentation velocity.
 - g. Enlist the detector used in UV spectroscopy.
 - h. What is hyperfine splitting?
 - i. What is gel chromatography?
 - j. Write the principle of x-ray diffraction.

SECTION-B

2. Write down the principle and methods of affinity chromatography.
3. Write a note on centrifugation.
4. Write principle and procedure of UV spectroscopy.
5. Write briefly on instrumentation of mass spectroscopy.
6. Write a note on raman spectroscopy.

SECTION-C

7. Diagrammatically discuss the instrumentation of NMR spectroscopy.
8. **Write about followings :**
 - a) Molecular polarizability
 - b) GLC
9. Write in detail agarose electrophoresis of nucleic acid.

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Total No. of Questions : 09

Total No. of Pages : 02

B.Sc. - Honours (Microbiology) (Sem.-4)

FOOD AND DAIRY MICROBIOLOGY

Subject Code : BSMB405-20

M.Code : 92103

Date of Examination : 17-05-23

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- What is the role of salt in preservation of pickles?
- What is the role of invert sugar in food products?
- State the advantage of quick freezing over slow freezing.
- List the microorganisms responsible for spoilage of milk.
- Which enzyme is used in fruit juice clarification?
- State two drawbacks of using radiations in food preservation.
- What do you understand by Freeze Burn?
- Enlist the microorganisms responsible for spoilage of fruit juices.
- Which microorganisms can be used in ripening of cheese?
- What do you understand by grading of milk?

SECTION-B

2. Explain the process of preservation of food by high temperature.
3.
 - a. Discuss the role of pectinase in fruit juice production.
 - b. Write short note on soyabean as an important traditional fermented food.
4. Discuss about the nutritional value of milk in our diet.
5. Mention the applications of the following in food industry:
 - a. High fructose syrup
 - b. Catalase.
6. Describe the role of microbes in production of Cheddar cheese.

SECTION-C

7.
 - a. Discuss briefly about the historical development in food microbiology
 - b. Write the importance of microorganisms in fermentation of meat and fish.
8. What do you understand by food additives? Give examples. Discuss the role of food additives used in food industry.
9.
 - a. Describe the role of water activity in microbial growth in food products.
 - b. Write a note on the milk and milk products legislation in India.

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Total No. of Pages : 02

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B.Sc. - Honours (Microbiology) (Sem.-5)
BIO SAFETY AND INTELLECTUAL PROPERTY RIGHT

Subject Code : BSMB505-20

M.Code : 92511

Date of Examination : 08-06-23

Time : 3 Hrs.

Max. Marks : 30

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying ONE mark each.
2. SECTION-B contains FIVE questions carrying TWO AND A HALF marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying FIVE marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a. Trademark
- b. D Value
- c. Institutional ethics committee
- d. What is WIPO and its main role?
- e. Role of Quality control in pharmaceuticals
- f. Mechanism of cold sterilization
- g. Biohazards
- h. Geographical indication in IPR
- i. Gases used in gaseous sterilization
- j. Protection of plant varieties in IPR

SECTION-B

2. What is ISO 9000:2015 and its benefits.
3. Explain the survival curve in sterilization process.
4. Discuss the various biosafety levels.
5. Explain IPR and its types.
6. Discuss sterility testing.

SECTION-C

7. Discuss the history of patent development in India starting from its inception.
8. Explain the term Bio-Safety Levels (BSL). Briefly point out the various BSL and their significance in laboratory setup.
9. Explain the role of GLP in pharmaceutical industry.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Sc - Honours (Microbiology) (Sem.-5)

ENZYME TECHNOLOGY

Subject Code : BSMB509-20

M.Code : 92515

Date of Examination : 09-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- Discuss the applications of enzyme technology.
- Define holoenzyme.
- Define IU.
- What do you mean by coenzyme?
- What is K_m ?
- Define feedback inhibition.
- Discuss the actual meaning of competitive inhibition.
- What are allosteric enzymes?
- Enlist enzyme-based products available in the market.
- Highlight the relation of enzyme technology with microbiology.

SECTION-B

2. Mention enzyme turnover number and specific activity.
3. Elaborate on the mechanism of enzyme action with a justified diagram.
4. Describe about enzyme repression induction operon model.
5. Differentiate between reversible and irreversible inhibition.
6. Discuss applications of microbial enzymes in the environment.

SECTION-C

7. Discuss in detail the factors affecting enzyme activity enzyme concentration.
8. Mention in detail the application of enzyme-based tests in microbiology for the biochemical analysis of microorganisms.
9. What do you know about immobilized enzymes and their industrial applications?

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Total No. of Pages : 02

Total No. of Questions : 09

B.Sc. Hons. (Microbiology) (Sem-5)

MEDICAL MICROBIOLOGY

Subject Code : BSMB-503-20

M.Code : 92509

Date of Examination : 26-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) Discuss the pathogenicity.
- b) Define septicemia.
- c) Define septic shock.
- d) What do you mean by toxigenicity?
- e) What are the symptoms of respiratory diseases caused by streptococcus pyrogens?
- f) Define HIV.
- g) Discuss the actual meaning of COVID-19.
- h) What are antibacterial agents?
- i) Enlist the diseases caused by clostridium tetani.
- j) Mention the symptoms of monkeypox disease.

SECTION-B

2. Mention the carriers and their types.
3. Elaborate the symptoms and transmission of E-coli.
4. Describe the transmission of AIDS.
5. Define resistance comment antibiotic resistance.
6. Discuss the inhibitors of cell membrane functions.

SECTION-C

7. Discuss in detail, the collection, transport and culturing of clinical samples.
8. Mention a detailed note on Salmonella Typhi.
9. What do you know about the Antiviral Agent? Explain with relevant examples and mechanisms.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Sc. Honours (Microbiology) (Sem.-6)

MICROBIAL BIOTECHNOLOGY

Subject Code : BSMB 603-20

M.Code : 92519

Date of Examination : 20-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Attempt all questions :

- Biocatalyst
- Maximum biomass yield
- Enlist the fermentation process
- Bioreactor
- Bubble column
- Airlift fermenter
- Agitation
- SCP
- Silage
- Gasohol.

SECTION-B

2. Discuss the biotechnological innovation in the chemical industry.
3. Write a note on the efficiency of growth and product formation.
4. Explain the components of the microbial fermentation process.
5. Explain fermentation design with special reference to stirred tank and immobilized cell reactors.
6. Write the procedure for the production of Wine and Vinegar.

SECTION-C

7. Explain the method of cultivation of mushrooms and silage.
8. Illustrate the design and types of bioreactors.
9. What is the difference between a hollow fiber bioreactor and an immobilized cell reactor?

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Total No. of Pages : 02

B.Sc - Honours (Microbiology) (Sem.-6)

RECOMBINANT DNA TECHNOLOGY
Subject Code: BSM20102

Subject Code : BSMB601-20

M.Code : 92517

Date of Examination : 25-05-23

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

- I. Write briefly :**
 - a. What do you mean by Recombinant DNA technology?
 - b. What are different types of cloning vectors?
 - c. What are restriction Endonuclease III? Give example.
 - d. Define attenuated bacterial vaccines.
 - e. Define biotechnology.
 - f. What are cloning vectors?
 - g. Classify recombinant vaccines.
 - h. Define antibiotics with examples.
 - i. Write few properties of bioplastics
 - j. What do you mean by Bioleaching?

SECTION-B

2. Explain the process of protecting and coating of DNA.
3. Write a note on plant and mammalian vectors.
4. Explain the production of fermented beverages using strain improvement.
5. Explain the recombinant production of bacterial vaccine.
6. Write a note on bioplastics.

SECTION-C

7. Define agrobacterium and explain its role in agriculture.
8. Explain the role of genetically engineered E.coli in Bioremediation, Phytoremediation and Bioleaching.
9. Write the process of production of organic acid.

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