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Roll No.	

Total No. of Pages: 02

Total No. of Questions: 11

M.Sc. (BT) (Sem.-1) COMPUTER APPLICATIONS

Subject Code: MBT-105 M.Code: 75663

Date of Examination: 25-05-2023

Time: 3 Hrs.

Max. Marks: 70

### INSTRUCTIONS TO CANDIDATES:

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

### SECTION-A

- 1. Explain the following:
  - a) RAM
  - b) Application Software
  - c)  $345_{10} = ?_2$
  - d) Variable
  - e) Operator ++
  - f) String
  - g) While Loop
  - h) Record
  - i) Class and Object
  - i) Superscript.

### SECTION-B

- Describe the block structure of a computer in detail.
- Write a program to check weather a number is prime or not.
- Write a note on arrays with example.
- Differentiate between class and object. How much memory is used by them?
- Differentiate between call by value and call by reference.
- Write a note how to insert a table and graphs in word processing?
- Explain any 5 arithmetic formulas with help of example.

### SECTION-C

- 9. Define constructors. Explain its types with help of example.
- Write a program to overload 'operator'.
- 11. Define database. Discuss the advantages of database over file system.



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.

July -2023

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- Total No. of Pages: 02 No.
- Subject Code: MBT-103 M.Code: 75661

GENETICS AND MOLECULAR BIOLOGY

(Sem.-1)

M.Sc. (BT)

al No. of Questions: 11

- Date of Examination: 16-05-23

- Max. Marks: 70

me : 3 Hrs.

- - STRUCTIONS TO CANDIDATES:
- SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks

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

SECTION-A

SECTION-B contains SEVEN questions carrying SIX marks each and students

have to attempt any FIVE questions.

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- Discuss regulation of Trp operon in E.coli.

Describe the process of replication of Telomeres in eukaryotes.

Explain how Lod Score helps in establishing Linkage.

Describe initiation of translation in E.coli.

SECTION-B

- Describe the regulation of protein gradients during embryonic development of Describe the processing of secretary proteins in eukaryotes.
  - Describe gene mapping by linkage analysis.
- SECTION-C
- Discuss post translational chemical modifications of proteins.
- - Describe various types of RNA Polymerases in eukaryotes and their transcription Explain regulation of process of translation in cukaryotes.

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9

f) Leucine Zipper Motif of transcription Factor.

e) Structure of Nucleosomes.

d) Klinefelter Syndrome.

b) Dihybrid tests.

Write briefly: a) Epistasis. c) Transposons

i) Operator Sequence in prokaryotic genes.

Protein Hydroxylation.

h) RNA Polymerase of E.coli.

g) Rep protein.

- NOTE: Disclosure of Identity by writing Mobile No. or Making of passing request on any

Total No. of Questions: 11

ENVIRONMENT BIOTECHNOLOGY M.Sc (BT) (Sem.-1)

Subject Code: MBT-111

M.Code: 75664

Date of Examination: 18-05-2023

Time: 3 Hrs.

Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

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

- SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions. 5
- SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

# SECTION-A

Describe briefly:

a) What are aerated lagoons?

- b) How pathogenic microorganisms are detected in water?
- c) Distinguish between clarification and coagulation.
- d) Define trickling filters.
- e) What is meant by microbial leaching?
- f) Define the role of organic farming in environment.
- g) What is the nature of waste of dairy industry?
- h) Name different sources of pollution of agricultural practices.
- i) What is the role of oxidation ponds in waste water treatment?
- j) How COD of waste water can be reduced?

11 M-75664

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# SECTION-B

- Describe methods of bio-hydrogen production.
- Write a brief note on phycoremediation.
- Discuss briefly biodegradation of lignocelluloses.
- Write a note on vermicomposting.
- Discuss how distillery waste is treated before its discharge into the environment? ٠.
- Write a note on wastewater treatment efficiency assessment.
- What changes do occur during secondary and tertiary treatment of wastewater?

# SECTION-C

- Describe culture based approach for bioremediation. Discuss it vis-a-vis metagenomic approach.
  - Discuss municipal techniques for the prevention and treatment of biomedical wastes. 10
- Discuss in detail about the feedstock(s) and mechanism of biodiesel production. What are the recent targets set by Government of India for biodiesel production and what are the limitations to achieve these targets? Ξ

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Roll No.

Total No. of Pages: 02

Total No. of Questions: 11

BIOMOLECULES AND METABOLISM M.Sc. (BT) (Sem.-1)

Subject Code: MBT-101 M.Code: 75659

Date of Examination: 20-05-2023

Time: 3 Hrs.

INSTRUCTIONS TO CANDIDATES:

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

SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions. <del>ب</del> 7

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

SECTION-A

Attempt all parts: i

a) How t-RNA is different from m-RNA?

b) Distinguish anomers and epimers.

c) What is the fate of pyruvate formed through glycolysis?

d) Name the intermediates of citric acid cycle which are converted into amino acids.

e) What is enzyme code?

f) What is meant by enzyme turn over?

g) Write the structure of N-acetylglucosamine.

h) Name any two unsaturated fatty acids.

Write the structure of sucrose.

What are sterols?

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2 M-7565

# SECTION-B

- Write a note on pyruvate dehydrogenase complex. 5
- Write a brief note on pentose phosphate pathway.
- Describe the structure of eukaryotic ribosomes.

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Write a brief note on sphingolipids.

5 9

Max. Marks: 70

- Write a brief note on storage polysaccharides.
- Discuss briefly glycoproteins.
- Write a note on mitochondrial electron transport chain.

# SECTION-C

- Discuss in detail how enzyme activity is regulated? 6
- Describe oxidation of unsaturated fatty acids.
- 11. Describe how metabolism is coordinated and regulated.

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Total No. of Pages: 02 APPLIED MICROBIOLOGY M.Sc. (BT) (Sem.-1) Total No. of Questions: 11 Roll No.

Subject Code: MBT-102 M.Code: 75660

Date of Examination : 22-05-23

Max. Marks: 70

Time: 3 Hrs.

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks INSTRUCTIONS TO CANDIDATES:

SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions. 7

## SECTION-A

### Describe briefly: <u>.</u>:

- a) Write characteristic features of Archeabacteria.
- b) How tumor viruses are different from other viruses?
- c) Write down the advantages of continuous cultures.
- d) Distinguish between batch and fed batch microbial cultures.
- e) What are the modes of virus entry into the host cells?
- f) Define pathogenicity islands. Write down their molecular features.
- g) When does a microrganism switch to secondary metabolite production?
- b) Write three important diseases of veterinary animals and their causal organisms.
- i) Write names of two microorganisms important for the commercial production of (i) ethanol (ii) organic acids and (iii) antibiotics.
- What is meant by mathematical modelling of microbial growth?

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# SECTION-B

- Discuss in brief how was it established that diseases are caused by  $\min$  croorganisms?
  - Describe how microorganisms are screened for the production of new metabolites?
- Discuss physical factors affecting growth of microorganisms
- Describe molecular mechanism of fungal disease development in plants. Š
- Describe the role of pathogenicity islands in bacterial virulence 9
- Discuss briefly metabolite genes and their functions
- Write a brief note on food additives and their advantages.

# SECTION-C

- Write a detailed note on bacterial quorum sensing and its role in virulence
- Write down the steps involved in microbial strain improvement through mutations.
- Discuss in detail steps involved in microbial secondary metabolite production at commercial level. Ξ

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July-2023

Total No. of Questions: 11

COMPUTER APPLICATIONS Subject Code: MBT-105 M.Sc. (BT) (Sem.-1)

M.Code: 75663

Date of Examination: 17-01-2023

Time: 3 Hrs.

Max. Marks: 70

- INSTRUCTIONS TO CANDIDATES:
  1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks
- SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions. 6
- SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

### SECTION-A

### Answer briefly: -:

- a. What is Data?
- b. What do you mean by Binary representation of numbers?
- What is Byte?
- d. What is ASCII code?
- e. What is Object Oriented Programming?
- f. What are Spreadsheets?
- g. What is function overloading?
- h. How do you represent fraction of data?
- What do you mean by Arrays?
- What are string data types? Explain by citing examples.

1 M-75663

- Discuss the various business applications of computers in present competitive world.
- What is the importance of programming language 'C++' in today's scenario? Explain by citing suitable examples.
- What is the advantage of binary representation of data? Discuss by citing examples
- Discuss various applications of spreadsheets in business organizations 5
- Discuss in detail about various concepts used in database. Explain by citing examples. 9
- Explain the following terms with reference to Object Oriented Programming
- a. Classes
- Functions.
- Write a program to read two numbers from keyboard and display the larger value on screen.

### SECTION-C

- How computers are used in solving complex problems in present scenario. Explain in detail by citing suitable examples. 6
- Explain in detail the benefits of using Object Oriented Programming 10.
- 11. Answer the following in detail:
- a. Word processing.
- b. Explain the use of spreadsheets.

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Total No. of Questions: 11

M.Sc. (Bio Technology) (Sem. - 1)

APPLIED MICROBIOLOGY Subject Code: MBT-102

M Code: 75660

Date of Examination: 12-01-2023

Time: 3 Hrs.

INSTRUCTIONS TO CANDIDATES:

Max. Marks: 70

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

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

SECTION-A

1. Explain the following in brief:

a) Properties of Eubacteria.

b) Organization of yeast.

c) Properties of animal viruses.

d) Techniques for screening of new metabolites.

c) Sterilization techniques- physical methods.

f) Industrial relevance of mutant organisms.

g) Microbes causing human diseases.

h) Bacterial virulence factors.

i) Quorum sensing.

Diauxic growth curve.

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# SECTION-B

- What do bacterial, animal and tumor viruses have in common?
- Write down an illustrated note on history of microbiology
- 4. Give a detailed account of procedures for strain development for industrial applications
- 5. Explain composition of typical growth media, what are the nutritional requirements for growing E. coli culture?
- Describe important mechanism of host-pathogen interaction using suitable examples.
- 7. Write a detailed note on animal and plant diseases caused by microorganisms. What is the role of pathogenicity islands in etiology of the disease?
- 8. Explain various physico-chemical methods of food preservation.

- 9. Give a detailed account of morphological and structural organization of typical yeast. Also draw a well labeled diagram showing sub-cellular organization of budding yeast.
- 10. How does growth kinetics vary during batch and fed batch fermentation? Explain in detail.
- 11. Compare primary and secondary metabolites Explain biochemistry and microbiology of organic acid synthesis for industrial application.



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M-75660

Roll No. of Pages: 02	
Total No. of Questions: 11	2
Master of Science (Bio Technology)(Sem. – 1)	i ki
Subject Code: MBT-101	
M Code: 75659	4
Date of Examination: 10-01-2023	•
Time: 3 Hrs.	v.
INSTRUCTIONS TO CANDIDATES:	.9
1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each. 2. SECTION-B contains SEVEN questions carrying FIVE marks each and students have to	7.
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SECTION-A	
1. Explain the following in brief:	6
a) Functions of ribosomes.	
b) Role of physiological proteins.	
c) Michaelis- Menten equation.	
d) Enzyme inhibition.	
e) Structures of RNA.	
f) Functions of lipids.	
g) Basic concepts of metabolism.	
h) Role of haemoglobin.	
i) Structure of collagen.	

- Explain physiological and structural features of myoglobin.
- Describe mechanism of enzyme action using suitable diagrams. Explain the importance of biocatalysts in industrial procedures.
- Discuss various techniques used for protein characterization.
- Draw a labeled diagram showing components of a typical biological membrane.
- Give outline of various DNA sequencing techniques. Explain any one in detail.
- What do you understand by nucleotide metabolism? Explain metabolism of purines.
- Discuss the importance of TCA cycle. Draw well labeled diagram also.

# SECTION-C

- Explain properties of biomolecules. What are the criteria used for protein classification? Discuss different levels of protein structures.
- 0. What is glycolysis? Give diagrammatic sketch of all the intermediates and enzymes involved in
- 11. Describe using suitable examples the classification, structure and functions of carbohydrates.

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j) Secondary metabolites.

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	Total No. of Pages: 02
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Master of Science (Bio Technology)( ENVIRONMENT BIOTECHNO Subject Code: MBT-111 M Code: 75664 Date of Examination: 19-01	LOGY
Time: 3 Hrs.	Max. Marks: 70
INSTRUCTIONS TO CANDIDATES:  1. SECTION-A is COMPULSORY consisting of TEN question 2. SECTION-B contains SEVEN questions carrying FIVE n attempt any SIX questions. 3. SECTION-C contains THREE questions carrying TEN n attempt any TWO questions.	narks each and students have to
SECTON-A	
1. Explain the following in brief:	
a) Definition of the term environment.	
b) Important water borne pathogens and diseases caused	by them.
c) Definition of metagenomics and its applications.	
d) Composition of the dairy waste.	
e) Organic farming.	
f) Microbial leaching.	
g) Degradation of lignocelluloses.	
h) Role of biosurfactants.	
i) Treatment of solid waste.	
j) Innovation in pollution treatment methods.	
M-75664	S-259

- 2. Explain different parameters used to monitor environmental pollution.
- 3. Discuss working and organization of rotating biological contactors for treating waste water.
- What is bioremediation? Illustrate the importance of culture based techniques in bioremediation procedures.
- 5. Differentiate between biocompost and vermicompost.
- 6. Explain biochemistry, microbiology and applications of Biomineralization.
- 7. Write a detailed note on treatment of biomedical waste.
- 8. Suggest various approaches used to control environmental pollution in the urban sector.

### SECTION-C

- 9. Compare design and working of oxidation ponds and trickling filters for waste water treatment.
- 10. Give detailed procedure for the treatment of dairy industry waste.
- Explain methodology and application of organic farming. Also briefly discuss the importance of vermiculture in agricultural upliftment.

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

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Total No. of Questions: 11 Master of Science (Bio Technology)(	Sem. – 1)
GENETICS AND MOLECULAR B	IOLOGY
Subject Code: MBT-103	
M Code: 75661	
Date of Examination : 14-01-2	
Time: 3 Hrs.	Max. Marks: 70
INSTRUCTIONS TO CANDIDATES:  1. SECTION-A is COMPULSORY consisting of TEN question 2. SECTION-B contains SEVEN questions carrying FIVE mattempt any SIX questions. 3. SECTION-C contains THREE questions carrying TEN matter	und com and creating
attempt any TWO questions.	
SECTON-A	
1. Explain the following in brief:	
a) Define linkage.	
b) Outcome of crossing over.	
c) Establishment of linkage maps.	
d) Ploidy and its genetic implications.	
e) Applications of pedigree analysis.	
f) Telomere structure and its importance.	
g) Principle of QTL-mapping.	
h) Complexity of a genome.	
<ol> <li>Role of rRNA in translation.</li> </ol>	
j) Post translational modifications.	

- 2. Explain extra chromosomal inheritance using examples.
- 3. Give a detailed account of Mendelian Principles. Provide supporting examples also.
- 4. Explain methods and applications of Karyotyping.
- 5. What are homeotic genes? Give examples. Explain their role in animal development.
- 6. Write a detailed note on organization of Eukaryotic chromosomes.
- 7. Explain various factors that determine the complexity of eukaryotic genomes.
- 8. Discuss features of the genetic code. Also explain regulation of gene expression.

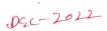
### SECTION-C

- What is mutation? Explain types, causes and detection of mutations. Also compare germinal and somatic mutants.
- Explain the term Developmental Genetics. Discuss role of various genes involved in early development, maternal effect and pattern formation.
- 11. Compare features of prokaryotic and eukaryotic transcription process in detail. Provide a detailed account of accessory proteins involved in the process of transcription.

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M-75661

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Roll No.

M.Sc. (BT) (Sem.-1) Total No. of Questions: 11

NANOBIOTECHNOLOGY

Subject Code: MBT-112 M.Code: 75665

Date of Examination : 21-01-2023

Max. Marks: 70

Time: 3 Hrs.

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks INSTRUCTIONS TO CANDIDATES:

SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions. 6

# SECTION-A

- Write short note on the following: -
- Concept of nano biotechnology
- b. Nano-biosensors
- c. Quantum dots and its applications
- d. DNA oligomers
- e. Nano-pesticides
- f. Nanotechnology in food safety
- Applications of Gold nano-particles
- Role of nano-technology in smart packaging
- i. Polymer nano-containers
- Carbon nano-tubes.

1 M-75665

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# SECTION-B

- Describe some important structural and functional properties of nano material ri
  - technology. Discuss DAIDO and Differentiate between nano science
    - developments in nano-technology.
- Explain the top down and bottom up approach for synthesis of nanoparticles.
- Explain the terms: ś
- a) nano-particle,
- b) nano-camposite
- c) nano-powders.
- are better than their con-What are nano based fertilizers? How these counterparts? 9
  - Describe the structure and properties of fullerene. 7
- Describe the principle of nano-bioelectronic devices and enlist some applications œί

# SECTION-C

- What do you mean by nucleic acid engineering? Describe the major strategies as modification of DNA for nano-technological applications. 6
- Differentiate between inorganic and organic nano-particles? Write a detailed no microbial production of inorganic nano-particles and their applications. 10.
- Write a detailed note on the following: Ξ
- a) Impact of nano-materials in biological processes.
- b) Opportunities and challenges for nano-biotechnology.

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Roll No.

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Total No. of Questions: 09 INTRODUCTION AND FUNDAMENTALS OF BIOTECHNOLOGY B.Sc.(BT) (2014 to 2017) (Sem.-1) Subject Code: BSBT-105

M.Code: 47023

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTION TO CANDIDATES :

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

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

## SECTION-A

# Q1. Answer briefly:

- a) How do biomolecules separates in gradient centrifugation?
- b) Give the name of model organism use to study prokaryotic system.
- c) What is biotechnology?
- By which microscope you can visualize

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- Bacterial cell
- ii) Flagella
- e) Define magnification of microscope.
- Give the name(s) of medium used for culturing fungi.

Þ

- g) Why do we preserve microbial culture? Name any one method.
- Þ Give the name of microbial culture collection bank in India.
- What is the stationary and mobile phase in paper chromatography?
- Which type of incident rays are used in Electron microscope?

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Q2  $Q_3$ 

Discuss different types of isotopes used in radioisotopy technique.

SECTION-B

- What is the basis of separation of nucleic acid in electrophoresis?
- 24 What is the principle of ion exchange chromatography?
- Briefly explain the eukaryotic system used in biotechnology.
- Q6. What are the different parameters to characterize a microbe?

### SECTION-C

- Q7. What is spectroscopy? Discuss the principle and application of any one spectroscope?
- Discuss about different branches of modern Biotechnology and their future scope.
- Q Give different methods for preserving microbial culture.



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Total No. of Questions: 09

Roll No.

(Sem.-1) **BASICS OF BIOSCIENCES** B.Sc.(Biotechnology)

Subject Code: BSBT-107-18 M.Code: 75330

Time: 3 Hrs.

Max. Marks: 30

# INSTRUCTIONS TO CANDIDATES:

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying ONE mark
- SECTION-B contains FIVE questions carrying 21/2 (Two and Half) marks each and students has to attempt any FOUR questions.

  SECTION-C contains THREE questions carrying FIVE marks each and students has to attempt any TWO questions. 7
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# SECTION-A

# Describe briefly:

- a) Flora and Fauna
- b) Cellular organization
- c) Kingdom protista
- d) Xylem tissue
- e) Annual rings in plants
- f) Connective tissue
- g) Endocrine vs. Exocrine glands
- h) Biomolecules
- i) Mitosis vs. Meiosis
- j) Kingdom monera

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# SECTION-B

- Differentiate between cork cambium and vascular cambium.
- Differentiate between prophase and telophase of mitosis.
- Give general account of plant kingdom.
- Describe the cell structure with a well labelled diagram.
- What do you understand from structural organisation in animals? Explain

### SECTION-C

- 7. Describe the various stages of meiosis with well labelled diagrams.
- Give a brief account of classification of animals. ∞:
- Describe various types of animal tissues with diagrams.

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Total No. of Questions: 09

B.Sc.(BT) (2014 to 2017) (Sem.-1) Subject Code: BSBTM-09 BIOSTATISTICS M.Code: 47031

Time: 3 Hrs.

Max. Marks: 60

# INSTRUCTIONS TO CANDIDATES:

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

7

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

# SECTION-A

# Write briefly:

- a) What do you mean by Raw Data?
- b) Explain the notations  $\overline{x}$ ,  $\sigma$ .
- c) Describe Relative dispersion.
- d) What are Ogives?
- e) Differentiate between Simple and Combined arithmetic mean.
- f) Define two-tailed test.
- g) What are Leptokurtic curves?
- b) Explain Cumulative Frequency.
- i) What do you mean by Geometric Mean?
- j) What are the pre-requisites of  $\chi^2$  test?



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# SECTION-B

Differentiate between Random sampling and Non - Random sampling.

5

The number of Basophils (a kind of WBC) of 30 patients of T.B. was recorded in frequencies. Calculate the Gemoetric Mean.

No. of Basophils	Ξ	14	17	19	22	
Frequencies	5	9	œ	7	4	

- What do you mean by dispersion? Describe different types of dispersions.
- What is analysis of variance? Explain the technique of analysis of variance for data with one-way classification.
- What is  $\chi^2$  test? Enumerate the hypothesis on which it is based.

6

## SECTION-C

- What do you mean by Test of Significance of a Mean? Define Standard error of mean and Standard error of Standard Deviation. 7
- What are the various ways to present the statistical data? Explain different types of Graphic Representation of Grouped data. s,
- Determine the value of Chi-square from the following data 6

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Total No. of Pages: 02 Roll No.

Total No. of Questions: 09

B.Sc.(BT) (2014 to 2017) (Sem.-1) COMPUTER APPLICATION IN BIOTECHNOLOGY Subject Code: BSBT-107 M.Code: 47024

Time: 3 Hrs.

INSTRUCTION TO CANDIDATES:

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

SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions. 5

ь,

SECTION-A

Answer briefly: 1 a) Analogue Computers

b) Online software

c) Magnetic Tape-data representation

d) Optical disks

e) Joystick

f) Soft Copy

g) Citations

h) NCBI

i) Plotters

j) Phylogram

DEC-2019

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# SECTION-B

- Explain the process of Multiple Sequence Alignment. 7
- What are input devices? ۳,
- Describe source data automation.

4

What are Bibliographic databases? ς.

Max. Marks: 60

Explain the Genbank format. 9

# SECTION-C

- Explain the different types of hardware and softwares.
- Describe the different types of phylogenetic analysis. ∞;
- Write a note on NCBI data model. 6

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Total No. of Questions: 09 Roll No.

B.Sc.(BT) (2018 & Onwards) (Sem.-1) BIOCHEMISTRY AND METABOLISM Subject Code: BSBT-103-18

M.Code: 75326

Max. Marks: 60

Time: 3 Hrs.

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks INSTRUCTIONS TO CANDIDATES:

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

Aswer briefly:

a. Define the term Biochemistry.

b. What are polysaccharides?

c. Give two examples of disaccharides.

d. Write functions of phospholipids?

e. Define Nucleotide.

f. What is meant by apoenzymes?

g. Define Active site of enzymes.

h. Define Glycolysis.

i. Explain in brief glycogenolysis.

j. Write functions of cerebrocides.

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SECTION-B

Give a brief account on protein structure and classification.

Write a detailed note on structure, classification and functions of lipids

Explain in detail activation energy

Give detailed account on structure and function of DNA

Write a note on sphingolipids and gangliosides.

SECTION-C

Give a detailed account on TCA cycle.

Describe structure, functions and properties of monosaccharides.

Discuss **\(\beta\--\)**-exidation of fatty acids in detail.

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Roll No. Total No. of Questions: 11 M.Sc. (BT) (2018 Onwards Batch) (Sem.-1)
GENETICS AND MOLECULAR BIOLOGY

Subject Code: MBT-103 M.Code: 75661 Max. Marks: 70

INSTRUCTIONS TO CANDIDATES: SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks

Time: 3 Hrs.

SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.

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

# Write briefly:

- a. Dihybrid tests.

- Tetrad analysis
- c. Down's syndrome
- d. Leucine Zipper Motif of transcription Factor.
- e. Epistasis
- f. Telomerase

g. Karyotype

- Signal Recognition Particle
- Promoter sequence

Thymine dimer

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- Discuss various types of chromosomal abnormalities and their characteristic phenotypic features. Describe the process of replication of E.cali genome.
- Discuss export of mRNA and initiation of translation in eukaryotes.
- Explain how Cot curve analysis reveals complexity of a genome.
- What is meant by quantitative traits? Discuss Mapping of QTL Describe splicing of pre-mRNA in cukaryotes.
- How does LOD Score analysis help in establishing Linkage?

# SECTION-C

- Discuss post translational modifications of proteins in eukaryotes.
- 10. Explain the process of transcription by RNA Polymerase II in eukaryotes.
- Explain various methods of repair of damaged DNA in a cell.

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Discuss various types of chromosomal abnormalities and their characteristic phenotypic SECTION-B

Total No. of Pages: 02

Total No. of Questions: 11 Roll No.

M.Sc. (BT) (2018 Onwards Batch) (Sem.-1) GENETICS AND MOLECULAR BIOLOGY Subject Code: MBT-103 M.Code: 75661

Max. Marks: 70

Time: 3 Hrs.

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks INSTRUCTIONS TO CANDIDATES:

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

SECTION-A

1. Write briefly:

a. Dihybrid tests.

b. Tetrad analysis

c. Down's syndrome

d. Leucine Zipper Motif of transcription Factor.

e. Epistasis

f. Telomerase

g. Karyotype

h. Signal Recognition Particle

Promoter sequence

j. Thymine dimer

How does LOD Score analysis help in establishing Linkage? Describe splicing of pre-mRNA in cukaryotes.

Discuss export of mRNA and mittation of translation in eukaryotes

Describe the process of replication of  $E\ coh$  genome

5. Explain how Cot curve analysis reveals complexity of a genome. What is meant by quantitative traits? Discuss Mapping of QTL.

SECTION-C

9. Discuss post translational modifications of proteins in eukaryotes

Explain the process of transcription by RNA Polymerase II in cukaryotes

11. Explain various methods of repair of damaged DNA in a cell.

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7

Roll No.	

Total No. of Questions: 11

M.Sc. (BT) (Sem.-1) NANOBIOTECHNOLOGY Subject Code: MBT-112 M.Code: 75665

Time: 3 Hrs.

Max. Marks: 70

### INSTRUCTIONS TO CANDIDATES:

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

### SECTION-A

- Write short note on following:
  - (a) Biomaterials
  - (b) DNA-oligomers
  - (c) Gold nanoparticles
  - (d) Transducer
  - (e) Amplifiers
  - (f) Carbon nanotubes
  - (g) Quantum dots
  - (h) Buckyballs
  - (i) Nanoinsecticides
  - (i) Smart packaging



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### SECTION-B

- Describe the structure and functional properties of biomaterials for nanotechnology.
- Describe protein based nanostructures building blocks and templates with examples.
- What are gold nanoparticles? Discuss hybrid conjugates of gold nanoparticles.
- Discuss the impact of nanomaterials in biological processes with examples.
- Discuss carbon nanotubes and quantum dots interface with biological macromolecules.
- Discuss the applications of nanotechnology in toxin and contaminant detections.
- Discuss the historical prospectives of integration of biology with chemistry and material science.

### SECTION-C

- What is molecular sensing? Discuss molecular recognition and flexibility of biomaterials.
- 10. What are DNA based nanostructures? Describe the topographic and electrostatic properties of DNA and proteins.
- 11. Write an essay on applications of nanotechnology in agriculture and food technology.

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Roll No.

Total No. of Pages: 02

Total No. of Questions: 11

ENVIRONMENT BIOTECHNOLOGY M.Sc (BT) EL-I (2018 Onwards Batch) Subject Code: MBT-111

M.Code: 75664

Max. Marks: 70

Time: 3 Hrs.

- INSTRUCTIONS TO CANDIDATES:
  1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks
  - SECTION-B contains SEVEN questions carrying SIX marks each and students
    - have to attempt any FIVE questions.
      SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

# SECTION-A

- Describe briefly:
- (a) Oxidation ponds
- (b) Trickling fillers
- (c) Rotating biological contractors
- (d) Phytoremediation
- (e) Xenobiotics
- (f) Microbial leaching
- (g) Biomineralization
- (h) Solid waste management
- (j) Organic farming

(i) Pollution

# SECTION-B

- Explain briefly primary treatment, clarification and coagulation.
- Describe the procedure for assessment of waste water treatment efficiency
- Describe technologies for treatment of dairy waste. 4
- Describe briefly biomass as a source of energy. S.
- What is biocomposting? Describe the procedure for vermiculture. 9
- Describe the innovative techniques for prevention and control of pollution.
- What are lignocellulosics? Give a brief account of biodegradation of lignocellulosics.

# SECTION-C

- What are water borne infection agents? Describe the techniques for detection and control of pathogenic microbes in water. 6
- What are metagenomics? Describe metagenomics and culture based approaches used for bioremediation. 10
- Give a brief account of municipal techniques used for prevention and control of biomedical solid waste. Ξ.



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Roll No.  Total No. of Questions: 11  M.Sc. (BT) (2018 Onwards Batch) COMPUTER APPLICATIO Subject Code: MBT-105 M.Code: 75663  Time: 3 Hrs.	Total No. of Pages : 02 (Sem1) NS Max. Marks : 70
INSTRUCTIONS TO CANDIDATES:  1. SECTION-A is COMPULSORY consisting of TEN questions carrying Seach.  2. SECTION-B contains SEVEN questions carrying Seach to attempt any FIVE questions.  3. SECTION-C contains THREE questions carrying Teach have to attempt any TWO questions.	IX marks each and students
SECTION-A	
1. Answer briefly:	
a) Define Computer.	
b) Write two characteristics of computer.	
c) Give the Binary equivalent of 31.	
d) List the relational operators of C language.	
e) Define Array and syntax of array.	
f) Define Overloading.	
g) List different type of inheritance.	
h) What is word processer?	
i) What are the applications of database?	

- What are the different input devices of computer? Explain.
- 3. What is binary number system? How data is represented in computer?
- Distinguish While and Do-While control structure with example.
- 5. What is string in C++ explain?
- 6. Where spreadsheets are used and what is cell address?
- 7. What is the use of system software in computer? Explain?
- What do you understand by encapsulation in OOP?

### SECTION-C

- 9. What is basic computer explain its different parts and function of each?
- Write a programme in C++ using functions to calculate factorial of N number.
- 11. Explain any five in built functions of spreadsheets with example.



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j) Define Class Key word of C++.

Roll No.	

Total No. of Questions: 11

M.Sc. (BT) (Sem.-1)
BIOMOLECULES AND METABOLISM

Subject Code: MBT-101 M.Code: 75659

Time: 3 Hrs.

Max. Marks: 70

### INSTRUCTIONS TO CANDIDATES:

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

### SECTION-A

### 1. Answer briefly:

- a) Quaternary proteins
- b) Enzyme activity vs. Specific activity
- c) Myoglobin
- d) Km and Vmax
- e) Catalysis
- f) Biomembrane
- g) Glycoproteins
- h) Enzyme regulation
- i) Citric acid cycle
- i) Nucleotide

### SECTION-B

- Explain the formation of hydrogen bonding and disulphide bridges in the secondary structure of proteins with suitable examples.
- What is collagen? Describe its structure, characteristics and role.
- 4. Explain enzyme inhibition. How would you know whether an inhibitor is competitive or non-competitive?
- 5. Deduce the Michaelis-Menton equation for the determination of Km and Vmax.
- Describe the different types of RNA found in the cell. Discuss the forces that contribute to the stability and folding of RNA molecules.
- Give a brief account of classification of carbohydrates. Also highlight functions.
- Describe the stepwise β-oxidation of fatty acids.

### SECTION-C

- Give a general account of purification techniques of proteins with merits and demerits in each case.
- 10. Describe briefly DNA sequencing and its chemical synthesis with suitable examples.
- 11. Write short notes on:
  - a) Glycolysis
  - b) Oxidative phosphorylation.



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Roll No.

Total No. of Pages: 02

Total No. of Questions: 11

BIOMOLECULES AND METABOLISM M.Sc. (BT) (Sem.-1)

Subject Code: MBT-101

M.Code: 75659

Time: 3 Hrs.

Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks
- SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions. 5
- SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions. e,

# SECTION-A

# 1. Answer briefly:

- a) Quaternary proteins
- b) Euzyme activity vs. Specific activity
- c) Myoglobin
- d) Km and Vmax
- e) Catalysis
- f) Biomembrane
- g) Glycoproteins
- h) Enzyme regulation
- i) Citric acid cycle
- j) Nucleotide

# SECTION-B

- Explain the formation of hydrogen bonding and disulphide bridges in the secondary structure of proteins with suitable examples. ć
- What is collagen? Describe its structure, characteristics and role
- Explain enzyme inhibition. How would you know whether an inhibitor is competitive or non-competitive? 4
- Deduce the Michaelis-Menton equation for the determination of Km and V max
- Describe the different types of RNA found in the cell. Discuss the forces that contribute to the stability and folding of RNA molecules. 9
- Give a brief account of classification of carbohydrates. Also highlight functions.
- Describe the stepwise \( \beta \- \colon xidation of fatty acids. \) 8

# SECTION-C

- Give a general account of purification techniques of proteins with merits and demerits in each case. 6
- Describe briefly DNA sequencing and its chemical synthesis with suitable examples. 10.
- 11. Write short notes on:
- a) Glycolysis
- b) Oxidative phosphorylation.



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Roll No.	

Total No. of Questions: 11

M.Sc. (BT) (2018 Onwards Batch) APPLIED MICROBIOLOGY Subject Code: MBT-102

M.Code: 75660

Time: 3 Hrs.

Max. Marks: 70

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks INSTRUCTIONS TO CANDIDATES : SECTION-B contains SEVEN questions carrying SIX marks each and students
  - SECTION-C contains THREE questions carrying TEN marks each and students
  - have to attempt any TWO questions.

### SECTION-A

- 1. Describe briefly:
  - (a) Bacteriophage
  - (b) Tumour
  - (c) Archaebacteria
  - (d) Generation time
  - (c) Feb batch system (f) Quorum sensing
  - (g) Pathogenicity islands
  - (h) Secondary metabolite
  - (i) Food additives
  - (j) Growth curve



### SECTION-B

- 2. Give a brief account of historical perspectives in discovery of microorganisms.
- Describe briefly morphological and structural organization of microbes.
- Describe mutagenesis for the improvement of microbial strains.
- Describe the criteria for the formulation of medium for industrial fermentations.
- Describe host-pathogen interactions with suitable examples.
- Give a brief account of microbes causing human infections.
- Give a brief account of anacrobic bioenergetics with suitable examples.

### SECTION-C

- Describe briefly production of secondary metabolites at industrial scale.
- Discuss growth kinetics of batch and fed batch system.
- 11. Discuss the role of pathogenicity islands in bacterial virulence with suitable examples.

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Roll No.

Total No. of Pages: 02

Total No. of Questions: 20

M.Sc. (BT) (2018 Onwards Batch) (Sem.-1)
NANOBIOTECHNOLOGY

Subject Code: MBT-112 M.Code: 75665

Time: 3 Hrs.

Max. Marks: 70

### INSTRUCTIONS TO CANDIDATES:

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

### SECTION-A

### Write short note on following:

- 1. How nano-biotechnology is different from nano-science?
- 2. What is the diameter of a bucky ball? How many pentagons and hexagons are there in a bucky ball?
- 3. Decipher the terms:
  - (i) MIMIC
  - (ii) PDMS in protein nanocircuity.
- 4. What are the effects of nanoparticles on the environment?
- 5. Give some examples of DNA Nanostructures.
- Explain basic biological concepts and principles for the development of nanoengineering systems.
- Discuss the nanotoxicology in marine system.
- 8. Which amino acids provide sharp bends/turns in protein chain?
- 9. Give few examples of bionanomachines.
- 10. Enlist the pro and cons for ZnO nanomaterials used as fertilizers in agriculture field.

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SECTION-B

- 11. Explain the Principle for DNA based Nanostructure.
- 12. Discuss in detail structural and functional principles of Nanobiotechnology.
- 13. Write down the protein based nanocircuity in silicon wafer and antigen antibody binding with the specific site with neat diagram.
- 14. Explain the role of DNA as Functional Template for Nanocircuitry.
- Write a short note on current status and future perspectives of nanotechnology in agriculture field.
- 16. Discuss the role of liposome based nanobiosensor for pesticide detection.
- Write a short note on Physico-chemical properties of nanoparticles that determine their potential toxicity.

### SECTION-C

- Discuss in detail the Nanoparticle based Biomaterial Hybrid Systems for bioelectronic Devices with examples and near sketch.
- 19. Write a short on the following:
  - a) Nanomaterials used in food preservation.
  - b) Gold nanoparticles used in biosecurity.
- 20. a) Describe the generation of different ROS in a cell under the effect of toxic nanomaterials.
  - b) Give the name of various principles (any four) essential for framing the ethical guidelines for carrying out research activities in the domain of nanotechnology.

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