

Printing Pages : 2

Paper Code: MSC-BT-406

A

(SVSU:2024-25/R)

Enrollment No.

M.Sc. Biotechnology

IV Semester / 2nd Year Examination:

Subject Name-Environmental Biotechnology-Code- M.Sc BT 406

[Time : 03:00 Hours]

[Max. Marks : 70]

Note: 1. Attempt all the questions as per given instructions.

1. Multiple Choice Questions (MCQs) [01×15=15]
- I Which of the following is NOT a type of bioremediation?
 A. In situ bioremediation B. Ex situ bioremediation
 C. Hyperaccumulation D. Photosynthesis
- II Which of the following methods is commonly used to measure the concentration of air pollutants like sulfur dioxide (SO₂) and nitrogen oxides (NO_x)?
 A. Chromatography B. Spectrophotometry C. Centrifugation D. Titration
- III Which of the following industries typically requires wastewater treatment due to high organic content and presence of ethanol?
 A. Dairy industry B. Textile industry
 C. Distillery industry D. Pharmaceutical industry
- IV Which chemical is commonly used in the *chlorination* process during water treatment?
 A. Sodium chloride B. Potassium permanganate
 C. Calcium hypochlorite D. Ammonium nitrate
- V Which gas is primarily responsible for the greenhouse effect and global warming?
 A. Oxygen B. Nitrogen C. Carbon Dioxide D. Hydrogen
- VI What is the primary role of biopesticides in pest management?
 A. Increase the toxicity of chemical pesticides
 B. Promote the rapid growth of pests
 C. Control pests using natural biological methods
 D. Eliminate all soil microorganisms
- VII Which aquatic plant is commonly used for wastewater treatment due to its high nutrient uptake?
 A. Neem (Azadirachta indica) B. Eichhornia crassipes (Water hyacinth)
 C. Spinacia oleracea (Spinach) D. Opuntia (Cactus)
- VIII Vermitechnology primarily involves the use of which organism for waste management?
 A. Bacteria B. Fungi C. Earthworms D. Algae
- IX Which of the following best describes xenobiotics?
 A. Naturally occurring compounds in ecosystems
 B. Biodegradable substances found in food
 C. Synthetic compounds that are foreign to a biological system
 D. Natural hormones produced by animals
- X Which of the following is a key microbial process involved in the activated sludge system?
 A. Methanogenesis B. Nitrification
 C. Sulfate reduction D. Fermentation

- XI In anaerobic digestion, which group of microorganisms is primarily responsible for methane production?**
 A. Acidogenic bacteria B. Nitrifying bacteria
 C. Methanogenic archaea D. Facultative anaerobes
- XII Which aerobic treatment method involves the use of rotating biological contactors to promote microbial growth on disc surfaces?**
 A. Trickling filter B. Oxidation pond
 C. Rotating disc system D. Activated sludge process
- XIII What is the primary advantage of using Upflow Anaerobic Sludge Blanket (UASB) reactors in industrial wastewater treatment?**
 A. High oxygen transfer efficiency B. Minimal sludge production
 C. Enhanced nitrification rate D. Aerobic digestion efficiency
- XIV What is the main purpose of primary treatment in a wastewater treatment plant?**
 A. To add disinfectants B. To remove dissolved salts
 C. To physically separate solids from wastewater D. To neutralize pH levels
- XV Which of the following is *not* a type of pollution?**
 A. Air Pollution B. Water Pollution C. Solar Pollution D. Soil Pollution
- 2. Answer in long (any three) [10×3=30]**
- I Describe the various sources of water pollution and how they affect water quality. What standard techniques are used to measure the extent of water pollution**
- II Discuss the integration of microbiological principles in designing efficient wastewater treatment systems.**
- III Explain the role of microbial communities in aerobic wastewater treatment processes. Discuss in detail the mechanisms and microbiological dynamics involved in activated sludge systems.**
- IV Evaluate the current advancements and limitations in the use of aquatic plants for wastewater treatment.**
- V What is environmental biotechnology? How has its application evolved in addressing current environmental challenges such as waste management, pollution control, and sustainable agriculture?**
- 3. Answer in short (any five) [5×5=25]**
- I Write short Note on application of bioremediation.**
- II Write short Note on anaerobic sludge blanket reactor.**
- III What is the current status and future potential of environmental biotechnology in sustainable development?**
- IV What are the key differences between aerobic and anaerobic wastewater treatment processes?**
- V What physical and chemical processes are used in the treatment of wastewater?**
- VI What treatment schemes are commonly used for wastewater from dairy, distillery, and sugar industries?**
- VII What common methods are used to measure pollutants in air and water?**

19/05/2025

Printing Page: 2

Paper Code: MSC-BT-407

A

(SVSU:2024-25/R)

Enrollment No.

Program Name: M.Sc. (Biotechnology)

IV Semester / 2nd Year Examination

Subject Code: MSC BT 407

Subject Name: Advanced Bioinformatics

[Time: 3 Hours]

[Max. Marks: 70]

Note: 1. Attempt all the questions as per given instructions.

2. Fill the correct answer of MCQs

1. Multiple Choice Questions (MCQs)

[1×15=15]

- I A low-level language that helps to communicate directly with computer hardware.
 - (a) High level language
 - (b) Low level language
 - (c) Assembly language
 - (d) None of these
- II NCBI is a part of.
 - (a) NLM
 - (b) NIH
 - (c) Only NIH
 - (d) Both NIH and NLM
- III Number of computer components?
 - (a) 2
 - (b) 1
 - (c) 3
 - (d) 4
- IV Heuristic algorithm consists of similarity search tools.
 - (a) BLAST
 - (b) FASTA
 - (c) Both a and b
 - (d) None of these
- V Number of biological databases in bioinformatics.
 - (a) 2
 - (b) 3
 - (c) 4
 - (d) 6
- VI Biological database to retrieve protein sequence
 - (a) Nucleotide database
 - (b) Protein database
 - (c) Composite database
 - (d) All
- VII Types of BLAST in bioinformatics.
 - (a) 2
 - (b) 4
 - (c) 6
 - (d) 9
- VIII EMBL is a part of
 - (a) EBI
 - (b) NCBI
 - (c) ENA
 - (d) EBI and ENA
- IX Archival databases also known by the name
 - (a) Primary database
 - (b) Secondary database
 - (c) Both
 - (d) None
- X NCBI complete URL Address is www.
 - (a) ncbi.nlm.nih
 - (b) ncbi.nlm.nih.in
 - (c) ncbi.nlm.nih.gov
 - (d) All
- XI First gene sequenced by?
 - (a) Watson
 - (b) Crick
 - (c) Alexander
 - (d) Fred Sanger

- XII** Phylogeny is the study of
 (a) Evolution history (b) Relationship among organisms
 (c) Behavior of an organism (d) None of these
- XIII** Types of phylogenetic tree in phylogeny?
 (a) Three (b) Four (c) Two (d) One
- XIV** Father of Computer
 (a) Charles Darwin (b) Charles Babbage (c) Alexander (d) All
- XV** Which database is used to store and retrieve DNA sequence data?
 (a) Gene Ontology (GO) (b) Gen Bank
 (c) ENA (European Nucleotide Archive) (d) Both (b) and (c)

2. Answer in long (any three) [10×3=30]

- I** Define bioinformatics and state its applications? Why bioinformatics plays an important role in biotechnology?
- II** State brief about biological databases. How many types of biological databases are there? Explain in brief.
- III** Explain protein -protein interaction in brief?
- IV** Give a brief account on Multiple sequence alignment?

3. Answer in short (any five) [5×5=25]

- I** Define phylogeny. What do you mean by phylogenetic tree?
- II** Elaborate on computer system in detail?
- III** Differentiate between machine and assembly language?
- IV** Explain BLAST and its types in brief?
- V** Give brief account on Microarrays for gene analysis?
- VI** Explain how data about nucleotide can be retrieved from NCBI?
- VII** Explain Secondary database with example?

Printing Pages : 2

Paper Code: MSC-BT/BC-202

B

(SVSU:2024-25/R)

Enrollment No.

Program Name: M.Sc. (Biotechnology)

II Semester / 1st Year Examination

Subject Code: MSC BT/BC 202

Subject Name: Genetic Resources and IPR

Time: 3 Hours

MM:70

Note: 1. Attempt all the questions as per given instructions.

2. Fill the correct answer of MCQs

1. Multiple Choice Questions (MCQs)

[1×15=15]

I Which of the following is not a type of Intellectual Property Right?

A. Patent

B. Trade mark

C. Trade route

D. Geographical Indication

II Which of the following is an example of geographical indication?

A. Basmati rice

B. Bt cotton

C. Roundup Ready Soybeans

D. Tissue culture banana

III Which document lists species that are facing a high risk of extinction?

A. Biodiversity Register

B. Red Data Book

C. Green Index

D. Plant Gene Index

IV Cryopreservation is a method used in:

A. In-situ conservation

B. Ex-situ conservation

C. Hybrid seed production

D. Soil testing

V Which organization plays a key role in global plant genetic resource conservation?

A. WHO

B. IPGRI

C. WTO

D. UNEP

VI TRIPS is associated with:

A. Environmental protection

B. Trade and biodiversity

C. Intellectual property rights

D. Organic farming

VII Which of the following represents the correct order of biodiversity from local to global scale?

A. Gamma, Beta, Alpha

B. Alpha, Beta, Gamma

C. Beta, Gamma, Alpha

D. Alpha, Gamma, Beta

VIII PVP & FR Act is related to:

A. Farmer's loan protection

B. Seed germination regulation

C. Plant Variety Protection and Farmers' Rights

D. Forest conservation

IX Which term describes the unauthorized use of biological resources?

A. Bioethics

B. Biopiracy

C. Biosafety

D. Bioconservation

- X Geographical Indications protect:
 A. Industrial processes B. Traditional knowledge globally
 C. Products specific to a region D. All inventions
- XI The term 'terminator technology' is associated with:
 A. Pest-resistant crops B. Genetically sterile seeds
 C. Organic farming practices D. Monoculture farming
- XII Which of the following does *not* come under ex-situ conservation?
 A. Seed banks B. Cryopreservation
 C. Sacred groves D. Botanical gardens
- XIII Which crop is an example of evolutionary significance in domestication studies?
 A. Potato B. Wheat C. Soybean D. Sugarcane
- XIV The primary aim of plant quarantine is to:
 A. Improve plant nutrition B. Increase crop yield
 C. Prevent spread of pests and diseases D. Promote hybrid seed use
- XV Which crop is most commonly associated with the issue of biopiracy in India?
 A. Maize B. Rice C. Turmeric D. Tomato

2. Answer in long (any three)

[10×3=30]

- I Describe the causes and consequences of biodiversity loss. Highlight the importance of Red Data Books in biodiversity conservation.
- II Elaborate on the methods of germplasm conservation with emphasis on *in-situ* and *ex-situ* strategies. Discuss the role of international organizations in germplasm preservation.
- III Define Intellectual Property Rights. Describe various types of IPRs and explain the importance of TRIPS in protecting biotechnological innovations.
- IV Explain the different levels of biodiversity - Alpha, Beta, and Gamma. Discuss the evolution of crop plants with suitable examples.

3. Answer in short (any five)

[5×5=25]

- I Define genetic resources and different kinds of Plant Genetic Resources.
- II What is the role of NBPGR in plant genetic resource management?
- III Write a short note on biopiracy with one example.
- IV What is the difference between biodiversity and genetic resources?
- V What do you mean by IPR Infringement. Explain Direct Infringement by taking a suitable example
- VI Explain the basic principle of germplasm characterization.
- VII Write down the names of ten endangered species.

Printing Pages :2

Paper Code: MSC BT-401

C (SVSU;2024-25/R)

Enrollment No.

M.Sc. Biotechnology

2nd Year IV Semester

Medical Biotechnology & Bioethics – M.Sc. BT- 401

[Time: 3:00 Hours]

[Max. Marks: 70]

Note : 1. Attempt all the questions as per given instructions.

I. Objectives Question: Answer All Question [1×15=15]

1. Maximum cases of cancer are of
a Blood b. Lungs c. Stomach d. Prostate
2. Phenylketonuria is a disorder of
a. Protein b. Carbohydrates c. Fatty Acids d. None
3. Inactivating a mutated gene that is over-producing its product by targeting RNA is
a. Knockout b. Gene silencing c. Gene inhibition d. All
4. 2016, the Nobel Prize in Medicine was awarded for discoveries of the mechanisms for autophagy
a. Yoshinori Ohsumi b. D. Haldane c. M. Roshbash d. J.C.Hall
5. Change in cell morphology includes
a Hypertrophy b. Hyperplasia c. Atrophy d. All
6. The term vaccine was derived from the word
a Vaccina b. Vaccinia c. Vacca d. Vaccination
7. GM foods has main issues of concern
a Allergenicity b. Gene transfer c. Outcrossing d. All
8. Somatic cells contain multiples of haploid number of chromosomes
a Polyploids b. Diploids c. Tetraploids d. Aneuploidy
9. A short fragment of DNA that is complementary to part of a longer DNA sequence is a Primer
a. Protein b. Probe c. Protein d. Peptide
10. A group of proteins not produced by virus infected cells is called
a Toxoids b. Interferons c. TNF d. Interleukins
11. Immunodeficiencies are due to
a Defective Immune response b. Defective Ab response
c. Defective cellular response d. All

12. Apoptosis is due to
 a. Injury b. Mechanical damage c. Toxic chemicals d. All
13. HIV basic gene structure has
 a. gag (core protein) b. *pol* (polmerse/reverse transcriptase)
 c. *env* (envelope protein) d. All
14. DNA amplification based quantitative diagnosis can be performed by
 a. Limiting dilution analysis b. Competitive PCR
 c. Kinetic PCR d. All
15. HIV is single stranded diploid RNA virus — in diameter
 a. 100-120nm b. 200-300nm c. 350-500nm d. 650-750nm

II Long Question : Answer Any three [10×3=30]

1. Briefly describe the hybridoma technology and application of MABs?
 OR
 What is Human gene therapy; explain its methods, strategies and applications.
2. Explain various aspects of stem cells with its therapeutic applications.
 OR
 Explain the role of Polymerase Chain Reaction in disease diagnosis?
3. Write down the mechanism of HIV in human body?
 OR
 How metabolic disorder leads to cancer, explain briefly?

III. Write Short note on any Five. [5×5=25]

- i. What are Congenital disorders
- ii. Explain Allergeneclty due to transgenic food
- iii. Write about ethical impacts of cloning?
- iv. Differentiate between metabolic and endocrine disorders.
- v. Describe the role of cell death pathway in cancer?
- vi. Describe the structure & functions of pentameric Ab molecule.
- vii. Only diagrammatic representation of 3rd generation of vaccines.
- viii. Vitamin-B complex
- ix. Differentiate between Monoclonal and Polyclonal Abs
- x. How will you differ between embryonic and adult stem cells?

Printing Pages :2

Paper Code: MSC BT-201

C (SVSU:2024-25/R)

Enrollment No.														
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Program Name: M.Sc. (Biotechnology)

II Semester / 1st Year Examination

Subject Code: MSC BT 201

Subject Name: Fundamentals of Biochemistry and Biophysics

[Time: 3 Hours]

[Max. Marks:70]

Note: 1. Attempt all the questions as per given instructions.

1. **Multiple Choice Questions (MCQs)** **[1×15=15]**
 - I **Types of Biological Interactions?**
 (A) 3 (B) 2 (C) 4 (D) 7
 - II **Which type of base pair forms three hydrogen bonds in DNA**
 (A) Adenine and Thymine (B) Guanine and Cytosine
 (C) Adenine and Uracil (D) Guanine and Uracil
 - III **Essential amino acid?**
 (A) Lysine (B) Arginine (C) Glutamine (D) Proline
 - IV **Bond joining two amino acids together to form a protein**
 (A) Hydrogen bond (b) Ionic Bond
 (c) Polypeptide Bond (d) Ester Bond
 - V **High energy molecules that carries electrons to electron transport chain**
 (a) NADH (b) FADH (c) ADP (d) ATP
 - VI **High energy molecules that carries electrons to electron transport chain**
 (a) NADH (b) FADH (c) ATP (d) ADP
 - VII **Quadrant of Ramchandran plot with maximum number of protein structure**
 (a) I Quadrant (b) III Quadrant
 (c) IV Quadrant (d) II Quadrant
 - VIII **Organic natural carrier for enzyme immobilization**
 (a) Dextran (b) Cellulose
 (c) Both a and b (d) Polystyrene
 - IX **In MALDI from which end protein is sequenced from:**
 (a) Amino end (b) Carboxyl end
 (c) Hydrogen group (d) Functional group
 - X **Lipids with ring structure are known as:**
 (a) Phospholipids (b) Aldehydes
 (c) Steroids (d) None of these

XI Nature of catabolic pathways?

- (a) Endergonic (b) Exergonic
(c) Both a and b (d) None

XII Number of complexes present in Electron Transport Chain.

- (a) 4 (b) 6 (c) 5 (d) 2

XIII Number of water molecules expelled out in TCA cycle.

- (a) 2 (b) 4 (c) 6 (d) None of these

XIV Enzyme transfers functional groups from one molecule to another are.

- (a) Lyases (b) Transferases
(c) Oxidoreductases (d) Isomerases

XV How many ATP molecules formed by oxidation of 3NADH molecules by ETC?

- (a) 4 ATP molecules (b) 9 ATP molecules
(c) 2 ATP molecules (d) 1 ATP molecules

2. Answer in long (any three)

[10×3=30]

I Elaborate components of Electron Transport Chain in descriptive form?

II Explain Protein Sequencing Method: Edman Degradation in brief.

III Which organelle carries Electron Transport Chain? Explain ETC with diagram.

IV Describe in detail Induced Fit Model for enzyme action in detail?

3. Answer in short (any five)

[5×5=25]

I Define biological interactions. How many types of biological interaction? Explain any three of them.

II Define Iso enzymes? What is its classification, types, properties and examples?

III Describe catabolism of Amino Acids?

IV Explain structure stabilizing forces in DNA and Proteins?

V With the help of diagram, elaborate Glycolysis process in biological organisms?

VI Elaborate Lock and Key Hypothesis of enzyme action?

VII Explain Carbohydrates in detail?