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Total No. of Questions : 11

ENVIRONMENT BIOTECHNOLOGY

M.Code : 756664

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

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

SECTION-A

1. Describe briefly :
 - a) What is PAH?
 - b) Define Coagulation.
 - c) Explain rotating biological contractors.
 - d) Name Waterborne infectious agents.
 - e) Define Vermiculture.
 - f) Define trickling filters.
 - g) Define microbial leaching.
 - h) Define Aerated lagoons.
 - i) Define Biom Mineralization.
 - j) What do you mean by Phytoremediation?

SECTION-B

2. Explain the metagenomics and culture-based approaches for bioremediation.
3. Highlight and explain parameters of evaluation monitoring.
4. Discuss the Preliminary treatment and microbial leaching.
5. Differentiate between microbial leaching and phytoextraction.
6. Analyze the Wastewater treatment efficiency assessment.
7. Explain PAH and biomedical solid wastes and their treatment.
8. Elaboration on Biodegradation of Hemicelluloses.
9. Explain distillery and pharmaceutical industries?

SECTION-C

10. Discuss the Metagenomics and culture-based approaches and Municipal techniques for prevention and biomedical solid wastes and their treatment and Innovative techniques for prevention and control of pollution.

OR

11. Explain detection and control of pathogenic microbes in water wastewater methods.

OR

- Explore the biomineralization, biofuel, biodegradation of lignocelluloses and bio composting?

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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June-2024

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Total No. of Pages : 00

Master of Science (Bio Technology) (Sem.-1)
COMPUTER APPLICATIONS

Subject Code : MBT/105

M.Code : 75663

Date of Examination : 15-06-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES .

1. 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.
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 system software.
- b. What does binary representation use to encode data?
- c. How do you declare an array of integers in C++?
- d. What is a primary key in a database?
- e. How do you define a string in C++?
- f. Define function overloading.
- g. What does the keyword 'this' represent in a class method?
- h. What operator is used to increment a variable in C++?
- i. Define a cell in the context of a spreadsheet.
- j. What function would you use to sum a range of cells in a spreadsheet?

SECTION B

2. Explain the difference between system software and application software. Provide an example of each.
3. Discuss the importance of an operating system in managing computer hardware and software resources. Give some examples of operating systems. What are its different operations?
4. Discuss the difference between function overloading and operator overloading in C++. Provide examples to illustrate how each is implemented?
5. Discuss the various types of operators in C++ (arithmetic, relational, logical, and bitwise). Provide examples of how each type is used in a program?
6. How can you concatenate two strings, find the length of a string, and compare two strings? Provide code examples to illustrate these operations.
7. Describe how arrays are used in C++ to store and manipulate data. Include an example of how to iterate through an array using a loop?
8. Explain how mail merge works in a word processor? Describe a scenario where mail merge would be particularly useful, and outline the steps involved in setting it up.

SECTION-C

9. Discuss in detail the concepts of inheritance, containership, and polymorphism in C++ with a focus on their differences and relationships. Provide examples demonstrating single and multiple inheritance, the use of base and derived classes, and how containership allows for building complex objects?
10. Write a detailed explanation of control structures in C++, including sequence, selection, and iteration. Describe how each type of control structure affects the flow of a program? Provide code examples for each type, illustrating how they are used to solve common programming problems?
11. Discuss the importance of arrays and strings in C++ programming. Explain how arrays can be used to handle collections of data and how strings are managed as arrays of characters?

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June-2024

Total No. of Pages : 02

Total No. of Questions : 11

Total No. of Pages : 02

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

APPLIED MICROBIOLOGY

Subject Code : MBT/102

M.Code : 75660

Date of Examination : 13-06-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. 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.
3. SECTION-C contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

SECTION-A

1. Describe briefly:
 - a. Bioenergetics
 - b. Basal media and Selective media
 - c. Unicellular eukaryotes
 - d. Nonsense and Missense mutation
 - e. Metabolic genes
 - f. Synchronous growth
 - g. Quorum sensing
 - h. Steam sterilization
 - i. Name two microorganisms used for production of antibiotics
 - j. Name two plant and animal viruses.

SECTION-B

2. Write a brief note on morphological features of eubacteria.
3. Describe batch, fed batch and continuous fermentation kinetics.
4. Describe the salient features of viruses.
5. Describe the effect of pH and temperature on fermentation process.
6. Discuss about the key components required for the preparation of growth media.
7. Describe primary and secondary metabolites with examples.
8. What do you mean by food infections and intoxication? Enlist some microorganisms responsible for causing infections in humans.

SECTION-C

9. What is microbial growth kinetics? Describe the different phases of microbial growth with the help of growth curve diagram.
10. What are pathogenicity islands? Explain their role in bacterial virulence with examples.
11. Describe the following :
 - a. Methods for strain development
 - b. Methods for preservation of food.

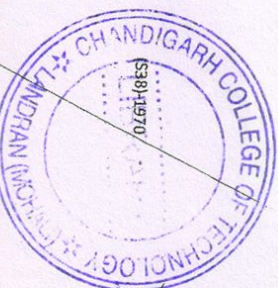
NOTE : Disclosure of Identity by writing Mobile No. or M-A-I :

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June-2024

Roll No.

Total No. of Pages : 02

Total No. of Questions : 11

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

GENETICS AND MOLECULAR BIOLOGY

Subject Code : MBT/103

M.Code : 75661

Date of Examination : 09-06-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. 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.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

- a) Allele and its examples
- b) Complementation tests
- c) Differentiate between germinal and somatic mutations.
- d) Causes of mutations
- e) Define penetrance and expressivity
- f) Importance of genetic diversity
- g) Difference between phenocopy and genetic trait
- h) Concept of genetic imprinting
- i) Importance of telomere replication
- j) Draw a well labelled diagram of tRNA.

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SECTION-B

2. Discuss RNA processing in eukaryotic cells.
3. Explain the concept of polygenic inheritance and how it differs from Mendelian genetics.
4. Discuss fine structure analysis genes and its role in gene mapping.
5. Describe RNA processing, including splicing of mRNA and the role of the spliceosome.
6. Describe different types of mutations. Discuss their causes and mechanisms of occurrence.
7. Discuss the genetic code and the process of translation in prokaryotes.
8. Describe tetrad analysis and its application in mapping genes.

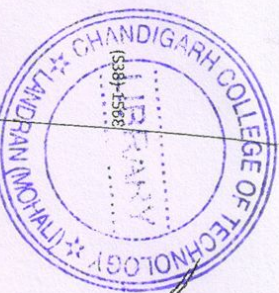
SECTION-C

9. Describe the process of DNA replication in prokaryotes.
10. Discuss the regulation of transcription and the role of transcription factors in controlling gene expression.
11. Write short notes on the following :
 - a) RNA polymerase-structure and function
 - b) Post-translational Modifications.

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June-2024

Total No. of Pages : 02

Total No. of Questions : 11

M.Sc. (BT) (Sem.-1)
NANOBIOTECHNOLOGY

Subject Code : MBT-1112

M.Code : 75665

Date of Examination : 08-06-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. 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.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Explain Briefly :

- (a) How do surface properties influence the behavior of nanoparticles?
- (b) What are the potential applications of nanobiotechnology?
- (c) What are DNA-based nanostructures?
- (d) How surface modifications affect the functionality of nanoparticles?
- (e) How nanoparticles differ from bulk materials?
- (f) What are Nanofertilizers?
- (g) What properties make quantum dots valued in nanotechnology?
- (h) What are the challenges in development of nanobiotechnology?
- (i) How does the size of nanomaterials influence their properties?
- (j) What are magnetosomes?

SECTION-B

2. What role do nanomaterials play in enhancing biomolecular sensing?
3. How does the immune system interact with nanomaterials in biological processes?
4. How do nanobiotechnological approaches help to improve crop yield?
5. How does nanobiotechnology contribute to food safety?
6. How do nanoparticles and quantum dots contribute to advancements in nanobiotechnology?
7. How nanomaterials are integrated into nanobioelectronic devices?
8. What are the potential applications of hybrid conjugates of gold nanoparticles in nanobiotechnology?

SECTION-C

9. What are historical events that paved the way for integration of biology, chemistry, and materials science?
10. What are the advantages of using proteins as building blocks for nanostructures?
11. Explain the key techniques used in nucleic acid engineering and its common applications in nanobiotechnology?

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June-2024

Total No. of Pages : 02

Total No. of Questions : 11

M.Sc. (Biotechnology) (Sem.-2)

CELL AND DEVELOPMENTAL BIOLOGY

Subject Code : MBT/201

M.Code : 76245

Date of Examination : 08-05-2024

Max. Marks : 70

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

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

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

2. **SCORING:** Students have to attempt any FIVE questions. Each question carries TEN marks each and students

SECTION C contains THIRTEEN questions carrying 700 marks. You have to attempt any TWO questions.

SECTION-A

1. Write briefly:

- a) Give organization and role of golgi apparatus.
- b) Explain functions of lysosomes.
- c) What is cytoskeleton? Give examples.
- d) What do you understand by cell lineage?
- e) Define cell senescence.
- f) What is gametogenesis?
- g) What is zygote?
- h) Briefly explain the importance of regeneration in vertebrates.
 - i) Explain the term phylloclaxy.
- j) Write a brief note on organogenesis.

SECTION-B

1. Explain the structure of a typical eukaryotic cell using well labelled diagram. List the functions of important cell organelles also.
2. Describe the organization of eukaryotic chromatin and metaphase chromosomes.
3. What are malignant cells? Explain their properties.
4. Explain various mechanisms and applications of signal transduction cascades.
5. Define the term developmental biology? Explain the process of gastrulation and formation of three germ layers in the case of animals.
6. Explain the process of seed formation in plants. What is the importance of abiotic factors in seed germination?
7. Explain the mechanism of eye lens induction in animals.

SECTION-C

9. Draw a well-illustrated diagram of plasma membrane. Explain various mechanisms of transport through biological membranes.
10. What are morphogenetic gradients? How do they determine cellular differentiation in animals?
11. Explain the process of vulva formation in *Caenorhabditis elegans*.

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Total No. of Pages : 02

Total No. of Questions : 11

M.Sc.(BT) (Sem.-2)

IMMUNOLOGY AND IMMUNOTECHNOLOGY

Subject Code : MBT/202

M.Code : 76246

Date of Examination : 11-05-2024

Max. Marks : 70

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

1. 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.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Describe the following:
 - a. Blast formation
 - b. Lymphoid tissues
 - c. Hybridoma cell
 - d. Tumor antigens
 - e. Graves' disease
 - f. Immunocytochemistry
 - g. Isotype switching
 - h. Structure of IgM
 - i. Role of epitope
 - j. Characteristics of cytokines

SECTION-B

2. Discuss briefly-rearrangement of immunoglobulin genes.
3. What are different types of MHC? Explain with structure.
4. Give significance of CD4 and CD8 Tcells.
5. What is tumor evasion of immune system? Give mechanism also.
6. Write a short note on Immunohistochemistry.
7. Write down about principle and applications of Radioimmunoassay.
8. Explain different types of ELISA in detail.

SECTION-C

9. Discuss in detail different cells and tissues of the immune system.
10. Give an account of immunological basis of graft rejection. Also, add a note on immunosuppressive therapy.
11. What are cytokine related diseases? Explain systemic auto immune diseases.

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June-2024

Total No. of Pages : 02

Total No. of Questions : 11

M.Sc. (BT) (Sem.-2)

ENZYME TECHNOLOGY

Subject Code : MBT

Date of Examination : 15-05-2024

Max. Marks : 70

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES:

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

SECTION-A

1. Describe the following :
 - a. Plasma enzyme
 - b. Oxidoreductase enzyme
 - c. Holoenzyme
 - d. Irreversible inhibition
 - e. Enzyme assay
 - f. Lineweaver-Burk plot
 - g. Lactate dehydrogenase
 - h. Substrate inhibition
 - i. Identification of binding and catalytic sites
 - j. Sub-cellular compartmentalization.

SECTION-B

2. What are enzymes? Discuss briefly about the classification of enzymes with suitable examples.
3. How would you purify an enzyme? Give detail.
4. What are the different factors affecting rate of reaction?
5. Explain kinetics of multisubstrate reactions catalysed by enzyme.
6. Write a note on binding of ligands to protein.
7. What is inborn error of metabolism? Explain.
8. Give an account of allosteric enzyme along with its role.

SECTION-C

9. Give production and applications of immobilization enzymes.
10. Discuss in detail reversible and irreversible inhibition of enzyme.
11. Write short notes on monomeric enzymes and mechanism of enzyme catalysts.

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June-2024

Roll No.

Total No. of Pages : 02

SECTION-B

M.Sc. Biotechnology (Sem.-2)
BIOPROCESS ENGINEERING

Subject Code : MBT/205

M.Code : 76249

Date of Examination : 18-05-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. 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.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Describe briefly :
 - a. Batch, fed batch and continuous fermentation
 - b. Dilution rate and specific growth rate
 - c. Hydrodynamic fermenters and their applications
 - d. Bioconversion *versus* chemical transformation
 - e. D value in Sterilization process
 - f. Liquid-liquid extraction
 - g. Relationship of τ_{pm} and τ_c in centrifugation
 - h. Role of microbes in pickling process.
 - i. Composition of Molasses and its use in Fermentation process
 - j. K_{La} in Fermentation Process.

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SECTION-C

2. Describe the different phases of microbial growth curve.
3. Explain various methods used for long term preservation of microbial cultures.
4. What do you mean by up-streaming and down-streaming in bioprocesses?
5. How agitation and aeration affect any bioprocess in fermenter?
6. What are biocolours and bioflavours? Give two examples of each.
7. Describe various methods used for microbial cell disruption in brief.
8. What are fermented foods? Draw a flow chart for the production process of any one fermented food.

9. What is microbial strain improvement? Describe various strategies used for strain improvement of industrial microorganisms.
10. Define submerged, surface and solid state fermentations. Discuss various factors affecting the solid state fermentations.
11. Explain their principle of anion and cation exchange chromatography. How these techniques are used for purification of fermentation products

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Total No. of Pages : 02

Total No. of Questions : 11

M.Sc. Biotechnology (Sem.-2)

PLANT TISSUE CULTURE

Subject Code : MBT/211

M.Code : 76250

Date of Examination : 22-05-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. 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.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Attempt the following :

- a) Define cryopreservation.
- b) What are totipotent cells?
- c) Which agents are used for surface sterilization of plant parts?
- d) What is an explant?
- e) What is the role of gibberellins in plant growth?
- f) What are biotransformation reactions?
- g) Which was the first transgenic plant to be produced?
- h) What is a callus culture?
- i) Which basal medium is used for establishing plant tissue culture?
- j) What is the role of agar in tissue culture media?

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SECTION-B

2. Write the steps involved in establishing a plant tissue culture.
3. Describe the development of disease-free plants.
4. What are somaclonal variations? Discuss.
5. Describe biotransformation using plant tissue culture.
6. Write a note on the mode of action of auxins.
7. Briefly discuss the importance and major applications of mother culture.
8. Write a note on genetic transformation in plants.

SECTION-C

9. What are the major components of plant tissue culture media? Discuss.
10. Write a note on in vitro production of secondary metabolites.
11. What are plant growth regulators? Describe their physiological effect.

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June-2024

Roll No.

Total No. of Pages : 02

Total No. of Questions : 11

**M.Sc. Biotechnology (Sem.-2)
MOLECULAR CARCINOGENESIS & THERAPY**

Subject Code : MBT/213

M.Code : 76252

Date of Examination : 25-05-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. 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.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- i) Protooncogenes
- ii) Carcinogenesis
- iii) Retrotransposons
- iv) Go in Cell cycle
- v) Hodgkins disease
- vi) Normal and abnormal cells
- vii) Genomic Instability
- viii) Progenitor cells
- ix) Tumour markers
- x) Gene Silencing.

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SECTION-B

2. Write a note on Origin of Cell Lines.
3. What is the role of Growth Factor- Receptor Interaction in the process of Carcinogenesis?
4. Write a note on RNA and DNA tumour Viruses.
5. Discuss about chromosomal abnormalities in Human Tumours.
6. How do Oncogenes carrying Retroviruses influence carcinogenic events?
7. Discuss characteristic feature of cancer cells.
8. List and explain briefly primary screening methods for anticancer agents.

SECTION-C

9. Discuss Carcinogenesis with reference to Cell cycle, Growth Factor requirements and mutations in Dividing cells.
10. Delineate role of cancer gene therapy and vaccines in Cancer treatment.
11. Give a detailed account of characteristic features of Cancer cells at Molecular, Genetic and cellular level.

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June-2024

Total No. of Pages : 02

M.Sc. (BT) (Sem.-3)

FOOD BIOTECHNOLOGY

Subject Code : MBT 312

M.Code : 76734

Date of Examination : 24-06-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. 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.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :
 - a) Give the use of Mallic and fumaric acid in food.
 - b) Cite a few examples of biosensors.
 - c) Who termed "nutraceutical"?
 - d) What is the significance of protein engineering?
 - e) Name a few markers in the development of functional foods.
 - f) Can obesity be controlled by diet regulation? How?
 - g) Write the limitation of using flavors in food.
 - h) What are the prospects of nutrigenomics in India?
 - i) Give a few examples of functional foods.
 - j) How does food technology help in the development of functional foods?

SECTION-B

2. Briefly describe the significance of Nisin in the food industry.
3. Write the applications of biosensors in food processing.
4. Briefly discuss the role of functional foods in preventing diseases in humans.
5. Briefly discuss the food flavors and their application in the food industry.
6. What is nutrigenomics? Give its significance.
7. What are biogums? Discuss its significance.
8. Discuss the oilseed crops and their application in food.

SECTION-C

9. What are Nutraceuticals? How are they classified? How are they different from pharmaceuticals?
10. How does nutrigenomics help in unraveling the physiological effects of complex foods?
11. Briefly discuss any two :
 - a) Nisin
 - b) Glucose isomerases
 - c) Bio colors
 - d) Transporter gene polymorphism.

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June-2024

Total No. of Pages : 02

M.Sc (Biotechnology) (Sem.-3)

Subject Code : MBT302

M.Code : 76729

Date of Examination : 14-06-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. 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.
3. SECTION-C contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

SECTION-A

1. **Write a short note on :**
 - a) Significance of ANOVA. How is it implemented?
 - b) Importance of standard deviation.
 - c) Applications of sampling techniques.
 - d) Difference between diagram and graph.
 - e) Merits and demerits of mode.
 - f) Uses of chi-square test.
 - g) Test for proportion.
 - h) Properties of binomial distribution.
 - i) Importance of measure of precision.
 - j) Types of regression.



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SECTION-B

2. Define normal distribution and various properties of normal distribution and normal probability curve.
3. Define relative measure of dispersion. Explain various requisites of a good measure of dispersion.
4. What is poisson distribution? Explain its characteristics and under which conditions it is used.
5. Define t-test and its types. Discuss the various properties and applications of 't' distribution.
6. Explain the various types of correlation with examples.
7. Write a detailed note on various types of non-parametric tests.
8. Explain design of experiment and its various principles.

SECTION-C

9. a) Write about pie charts and scatter plots.
b) Discuss the various methods of presentation of statistical data in detail.
10. Write a detail note on computer applications in bio-statistics.
11. Enumerate the conditions in which :
 - a) Parametric and non-parametric tests
 - b) Paired and unpaired t test should be selected.

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Total No. of Pages : 02

Total No. of Questions : 11

**M.Sc. (Biotechnology) (Sem.-3)
GENOMICS AND PROTEOMICS**

Subject Code : MBT303

M.Code : 76730

Date of Examination : 18-06-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. 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.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- (a) What are sequences and sequencing?
- (b) Expand EST and SAGE?
- (c) 2D-IEF.
- (d) Genomics and transcriptomics.
- (e) Mass finger-printing.
- (f) Methods of peptide separation.
- (g) Protein expression profiles.
- (h) Genome mapping.
- (i) DNA-Protein interactions.
- (j) Protein modifications.

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SECTION-B

2. How does the organization of genetic material, cytoskeleton and ribosome differ between prokaryotic and eukaryotic cells?
3. How do genetic mutations contribute to genome evolution?
4. What are ESTs? How one can generate them?
5. What are the advantages and limitations of using chemical methods for protein digestion compared to enzymatic digestion?
6. What are protein-protein interactions, and why are they crucial for cellular processes?
7. Explain SAGE and TILLING.
8. How does mass spectrometry enable the identification and quantification of molecules in complex samples?

SECTION-C

9. What are SNPs? Give their importance and methods of their determination in detail?
10. What do you mean by microarray? Give its types along with principle, methods and applications.
11. What is the genome sequencing? Explain its methods along with strategies and applications.



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Total No. of Pages : 02

Total No. of Questions : 11

M.Sc (Biotechnology) (Sem-3)
IPR, GOOD LAB PRACTICES AND BIOETHICS

Subject Code : MBT304

M.Code : 76731

Date of Examination : 20-06-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. 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.
3. SECTION-C contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

SECTION-A

1. Write briefly:

- Define Patent
- IDA
- WIPO
- Industrial Designs
- Copyrights
- Radiation safety
- Biocontainment
- Patent Infringement
- Bioethics
- Ethical dilemma.

SECTION-B

2. What do you mean by IP and IPRs? Enlist various forms of IPRs.
3. Enlist salient features of TRIPs agreement.
4. Explain objectives of TKDL.
5. Explain different biosafety levels for a biotech research laboratory.
6. Discuss about the Farmers Rights in India related to registered plant varieties.
7. Discuss some ethical issues related with patenting in biotechnology.
8. Explain the concept of biopiracy with examples.

SECTION-C

9. Define invention. Discuss the basic requirements of patentability of biological inventions in India.
10. Write a detailed note on the concept of GLPs. Also, discuss its importance.
11. Write a detailed note on Haldi patent case

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