ARKAJAIN University
Jharkhand

6th Semester End Term Examination: MAY- 2023.

Subject : Plant Biotechnology **Roll No: .....**

Course : B.Sc. Biotechnology

Full Marks : 60 **Time : 3 Hours.**

Instructions to the Candidates:

- Read the question paper very carefully.
- Start writing from 2nd page onwards; **Don't Write On The 1st Page Backside**.
- Question Paper is divided into Three Parts -A, B & C.
- Part-A is containing 12 multiple choice questions.
- Part- B containing SIX questions out of which FOUR questions are to be answered.
- Part C containing FOUR questions out of which TWO questions are to be answered.
- Do not write anything except your Roll No. on the question paper.
- Possession of **Mobile Phones** or any kind of **Written Material, Arguments with the Invigilator or Discussing with Co-Student** will comes under **Unfair Means** and will **Result** in the **Cancellation of the Papers**.

PART – A

Multiple Choice Questions [10x1=10]

1. i) Fusion of Two protoplasts with one nucleus each is called
   a) Cybrid b) Hybrid
   c) Somatic hybrid d) Zygote

   ii) Final stage in tissue culture before the new plant are taken out for cultivation is
   a) Caulogenesis b) Embryo
   c) Hardening d) Rhizogenesis

   iii) To obtain a virus free plant we can use .....as an explant in micropropagation
   a) Apical Meristem b) Axillary Meristem
   c) Both a and b d) Internode

   iv) Haploid plants can be obtained from_____.
   a) Anther culture b) Bud culture
   c) Leaf culture d) Root culture

   v) Which of the following is not related to embryo culture?
   a) Growth of embryos on culture medium b) Developing seedlings
   c) Multiplication of rare plants d) Making virus-free plants

vi) Which of the following is not an application of tissue culture?

a) Rapid Clonal Propagation
b) Somaclonal Variations
c) Transgenic Plants
d) Protein Modification

vii) Which of the following is NOT a plant growth regulator?

a) Auxin
b) Cytokinins
c) Abcisic acid
d) Polyphenols

viii) Which of the following plant hormone control fruit ripening?

a) Ethylene
b) Auxin
c) Gibbrellins
d) Abscisis acid

ix) The pair of hormones required for a callus to differentiate are_____.

a) Ethylene and Auxin
b) Auxin and cytokinin
c) Auxin and Abscisic acid
d) Cytokinin and gibberellin

x) What is Dimethyl sulfoxide used for?

a) A gelling agent
b) Cryoprotectant
c) Chelating agent
d) An Alkylating agent

PART - B

Answer any FOUR out of SIX [4x5=20]

2. Discuss methods of sterilization in plant tissue culture?
3. Discuss advantages of Meristem culture technique?
4. Write and draw the steps of plant tissue culture.
5. Write the advantages and disadvantages of anther culture.
6. What is embryo rescue? Write the importance of embryo rescue.
7. What are the advantages and limitations of seed culture?

PART - C

Answer any TWO out of FOUR [2x15=30]

8. What is Plant tissue culture? Draw the steps involved in the process of plant tissue culture using apical bud as an explant.
9. What is Protoplast culture? Explain and draw the process of Protoplast isolation and culture.
10. Describe the structure of Ti plasmid. With suitable illustrations explain Agrobacterium mediated transformation using a binary vector.
11. What is somatic hybridization? Describe the steps of somatic hybridization in the form of flow chart.

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6th Semester End Term Examination: MAY- 2023.

Subject : Bioanalytical Tool
Course : B.Sc. Biotechnology
Full Marks : 60

Roll No: .....
Time : 3 Hours.

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PART – A

Multiple Choice Questions [10x1=10]

1 i) In horizontal gel electrophoresis, DNA is visualize with the help of
a) Coomassie blue b) Safranine
c) Ethidium bromide d) All of these

ii) UV-Vis spectrophotometer is based on
a) Beer Law b) Lambert Law
c) Both a & b d) None of these

iii) Which part of an IR spectrum is called the functional group region?
a) 4000-3000 cm-1 b) 4000-2000 cm-1
c) 4000-1000 cm-1 d) 3000-1000 cm-1

iv) Electrophoresis not used for
a) Separation of proteins b) Separation of nucleic acids
c) Separation of peptides d) Separation of Lipids

v) In paper chromatography, amino acids were detected by using
a) Ninhydrine b) Amphoteric oxide
c) Diazo reagent d) Neutral oxide

vi) What is the principle of the paper chromatography?

a) Partition
b) Adsorption
c) Both a & b
d) None of these

vii) Which among the following helps us in getting a three-dimensional picture of the specimen?

a) Simple Microscope
b) Compound microscope
c) SEM
d) TEM

viii) An acidic solution has

a) Less concentration of hydrogen ions than hydroxide ions.
b) More concentration of hydroxide ions than hydrogen ions.
c) More concentration of hydroxyl ions.
d) Equal concentration of hydroxide and hydrogen ions.

ix) Infrared spectroscopy provides valuable information about

a) Molecular weight
b) Melting point
c) Functional groups
d) Conjugation

x) Resolving power of a microscope depends upon

a) The focal length and aperture of the eye lens
b) The focal length and objective of the eye lens
c) The apertures of the objective and the eye lens
d) The wavelength of light illuminating the object

PART – B

Answer any FOUR out of SIX [4x5=20]

2. What is isoelectric focusing? How it help in the separation of protein.
3. Describe the different components of biosensor.
4. What is ion-exchange chromatography? Give one example of cationic and anionic exchanger.
5. What is PFGE? Write the application of PFGE.
6. What is beer-lambert Law?
7. Draw ray diagram of simple microscopy.

PART – C

Answer any TWO out of FOUR [2x15=30]

8. What is electrophoresis? Describe different types of electrophoresis and their applications.
9. Describe the different parts of electron microscope. Write the differences between SEM and TEM.
10. What is chromatography? Describe the different types of chromatography.
11. Describe the working and application of UV-visible spectrophotometer.

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6th Semester End Term Examination: MAY- 2023.

Subject : Genomics and Proteomics
Course : B.Sc. Biotechnology
Full Marks: 60

Roll No: .....
Time : 3 Hours

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PART – A

Multiple Choice Questions [10x1=10]

1. i)When is electrophoresis not used?
   a) Separation of proteins
   b) Separation of amino acids
   c) Separation of Lipids
   d) Separation of nucleic acids

ii) In SDS-PAGE, protein sample is first treated with detergent sodium dodecyl sulfate (SDS), in order to
   a) Make the protein become negatively charged.
   b) Adjust the pH
   c) Make the protein become positively charged
   d) Denature protein

iii) DNA Sequencing helps in
   a) Identification of conserved region by comparison of sequences
   b) Comparison of DNA Sequences
   c) Find out gene structure
   d) All of above

iv) In a native PAGE, proteins are separated on the basis of
   a) Net negative charge
   b) Net charge and size
   c) Net positive charges and size
   d) Net positive charge

v) Tripeptide consists of
a) 2 peptide bond, 3 aminoacids
b) 3 peptide bond, 2 aminoacids
c) 2 peptide bond, 2 aminoacids
d) 3 peptide bond, 3 aminoacids

vi) This genome browser acts as single point of access to annotated genome for Mainly Vertebrates
a) Ensemble
b) VISTA
c) UCSE
d) None of above

vii) Database specific for drosophilla is
a) SGD
b) EcoCYC
c) Flybase
d) VISTA

viii) Which Database is generally used for comparative genomics?
a) VISTA
b) UCSE
c) Ensemble
d) None of above

ix) Investigating how different proteins interact with each other and the roles they play within the organism is
a) Proteome
b) Proteomics
c)Transcript
d)Transcriptome

x) These are the strongest of all non-covalent interaction
a) Hydrogen bond
b) Ionic bond
c) Hydrophobic interaction
d) Vaander waals interactions

PART – B

Answer any FOUR out of SIX [4x5=20]

2. What is Ensembl ? For what purpose it is used?
3. What are benefits of genome sequencing?
4. Write in details about Peptide bond.
5. Define proteomics and explain different kinds of proteomics.
6. Differentiate between native and SDS PAGE.
7. Discuss Edman degradation Method

PART – C

Answer any TWO out of FOUR [2x15=30]

8. Why Protein and peptides must be purified before analysis, What are different ways of purification, Explain any three of these techniques.
9. Discuss Pyrosequencing in detail.
10. Discuss 2D electrophoresis in detail.
11. Discuss application of Genomics and Proteomics in detail.