

Anekant Education Society's
Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati
Post Graduate Department of Zoology
M.Sc. I Zoology SEM-II: (Autonomous) 2019-20

Question Bank

Paper -IV: ZOO: 4204 – Biological Techniques (4C)

TWO mark questions:

1. What are the fixatives?
2. Describe picrate fixatives.
3. Describe the crosslinking and mercurial fixatives.
4. What is RCF?
5. What is the relation between absorbance and transmittance?
6. What is Beer's law?
7. What is Lambert's law?
8. What is the extinction coefficient?
9. What is the difference between SDS-PAGE and Native PAGE?
10. What is the difference between 1D-gel electrophoresis and 2D-gel electrophoresis?
11. Which technique is suitable for the isolation of ssDNA from dsDNA?
12. What is FRET?
13. How NCBI is useful in bioinformatics study?
14. Describe any two application of phase contrast microscopy.
15. Which are different types of rotors?
16. Define isoelectrofocussing.
17. What is PCR? Give its types.
18. What is monochromator? Give its role in spectrophotometer.
19. Why is SDS used to resolve denatured proteins by SDS-PAGE?
20. Define isotope.

THREE/FOUR marks questions:

1. Describe the sectioning of tissue for histology.
2. Describe various Histochemical stains.
3. Describe the principle of confocal microscopy.
4. Describe density gradient centrifugation.
5. Describe the atomic absorption spectroscopy.

6. What is X-ray crystallography?
7. Describe FACS analysis.
8. Describe the applications of databases.
9. Describe immunohistochemistry in brief.
10. Describe IR-spectroscopy in brief.
11. How we can determine MW of biomolecule using centrifuge?
12. What would be the RCF if $r = 10$ cm and R.P.M. = 1000?
13. Describe the application of RT-PCR.
14. Describe the scanning electron microscopy.
15. Describe application of electron microscope.
16. Explain construction and applications of UV-Spectrophotometer.
17. Explain the construction of Warburg's apparatus.
18. Why is SDS used to resolve denatured proteins by SDS-PAGE?
19. Explain Sanger's dideoxy reaction for DNA sequencing.
20. Explain the applications of isotopes in biology.

SIX mark questions:

1. Describe UV-visible spectroscopy and its applications.
2. Describe RT-PCR and its advantages over conventional PCR.
3. Explain new generation sequencing of DNA.
4. Describe differential and density gradient centrifugation.
5. Describe atomic force microscopy and its applications.
6. Describe circular Dichroism and its applications.
7. Describe various fixatives used in histological techniques.
8. Describe DNA microarray and its applications.
9. How we can sequence a protein?
10. What is molecular spectroscopy? Describe its applications.
11. Explain the SDS- polyacrylamide Gel electrophoresis.
12. Explain the separation of molecules by using ion exchange chromatography
13. Define N and C terminals of as polypeptide. Mention the methods to determine them.
14. What is monochromator? Give its role in spectrophotometer.
15. Explain the agarose gel electrophoresis to resolve DNA fragments.
16. Explain the principle of centrifugation.
17. Define vector. Briefly describe the various kinds of vectors for cloning in *E.coli*.

18. Explain the various methods to identify the clones having recombinant DNAs.
19. Describe the construction of C-DNA Library.
20. Discuss in detail the role of different enzymes used in genetic engineering.

TWLVE mark questions:

1. Describe various techniques to study gene expression in a particular type of cell.
2. Which techniques can be used to study signaling cascade within a cell?
3. How we can use bioinformatics in designing new drugs?
4. Describe various techniques for determination of molecular size/weight of DNA or protein molecules.
5. Describe the importance of antibodies in various biological techniques.
6. What are transgenic animals? Explain the various approaches in transfection.
7. What is invitro mutagenesis? Explain the single primer extension method.
8. Discuss various types of microarray and its application.
9. Discuss the mechanism of RNA interference.
10. Explain the Maxam - Gilbert method of DNA sequencing.
11. What is PCR? Give its types.
12. What is chromatography? Explain the principle and application of Thin layer chromatography.
13. Explain FDNB reaction and give its application.
14. Explain the principle and working of GM counter.
15. What is ion exchange chromatography? Comment on the ion exchangers used to separate biomolecules.
16. What is agarose? What percentage of agarose gel is recommended to resolve genomic DNA
17. Explain the importance of enzymes in protein sequencing.
18. What is centrifugal force? Differentiate between Fixed angle and Swing out rotor.
19. What is flask constant? Explain its importance in manometry.
20. Explain the Chain termination method of DNA sequencing.
21. Explain the construction and application of HPLC.

Multiple Choice Questions:

- Q. 1. In SDS-PAGE the separation of protein molecules occurs on the basis of**
A) Charge on protein molecule

Q. 11. The use of insulin hormone to purify its receptor is an example of

- A) Ion exchange chromatography
- B) Affinity chromatography
- C) Gel filtration chromatography
- D) Ligand mediated chromatography

Q. 12. In anion exchange chromatography,

- A) the column contains negatively charged beads where positively charged proteins bind
- B) the column contains positively charged beads where negatively charged proteins bind
- C) the column contains both positive and negatively charged beads where proteins bind depending on their net charge
- D) all of these

Q. 13. The separation technique of charged molecules under the influence of electric current is

- A) Hybridization
- B) Electrophoresis
- C) Western blotting
- D) Northern blotting

Q. 14. Hydroxyl apatite chromatography is used to separate ...

- A) Single stranded DNA from double stranded
- B) Protein from mixtures
- C) Plant pigments
- D) None of the above

Q. 15. In 2D-PAGE first step is

- A) SDS-PAGE
- B) Isoelectric focusing
- C) Blotting
- D) A and B

Q. 16. Methylene blue is a

- A) Nuclear stain
- B) Cytoplasmic stain
- C) Mitochondrial stain
- D) Lysosomal stain

Q. 17. What is the role of β -mercaptoethanol in SDS-PAGE?

- A) Neutralize the charges
- B) Breaking of di-sulfide bridges
- C) Separation of proteins
- D) None of the above

Q. 18. From following computer software which is generally used for sequence alignment?

- A) Mega
- B) Auto dock
- C) Microsoft office
- D) Corel draw

Q. 19. In affinity chromatography for glycoprotein is used as ligand

- A) Biotin
- B) Proteins A and G
- C) Avidin
- D) Phenylboronate

Q. 20. Amino acid tyrosine can be measured directly at on spectrophotometer.

- A) 700 nm
- B) 405 nm
- C) 660 nm
- D) 280 nm