Enrollment No._____

NAVRACHANA UNIVERSITY
A UGC recognized University

School: School of Science
Program/s: M.Sc. Microbiology/Biotechnology
Year: 2nd **Semester:** 3rd
Examination: End Semester Examination
Examination year: December - 2022

Course Code: APP301 **Course Name:** **Technical applications in microbiology and biotechnology**
Total Marks: 40
Date: 12/12/2022
Total Pages: 2
Time: 08:30 pm to 10:30 pm

Instructions:

- *Write each answer on a new page.*
- *Use of a calculator is permitted/not permitted.*
- ** COs=Course Outcome mapping. # BTL=Bloom's Taxonomy Level mapping*

Q. No.	Details	Marks	COs*	BTL#
Q.1	**Choose the correct answer.** 1. Which of the following is true about interferometry? a. Is a technique which uses the interference of superimposed waves to extract information b. Typically uses electromagnetic waves and is an important investigative technique in various fields c. Is used in Fourier trans form infrared d. All of the above 2. Which of the following is NOT true about phage display: a. Easy to screen large number of clones. b. Difficult to amplify selected phages in *E. coli.* c. Can create Phage library variation by inducing mutations, using error prone PCR d. None of the above 3. Ion-exchange chromatography depends on: a. the electrostatic attraction between species of opposite charge b. the electrostatic attraction between species of same charge c. the chemical reaction between molecules d. difference in size between different species 4. The essential of crystal formation is allowing the sample solution to reach the: a. Supersaturated state b. Saturated stage c. Hydrated stage d. Semi-saturated stage	4	CO1 CO2 CO3 CO4 CO5	BT1, BT2, BT3, BT4
Q.2	**Fill in the blanks.**	6	CO1 CO2 CO3	BT1,

	1. Difference in the specific rotation of plane-polarized light, due to the change in the equilibrium between two anomers in the solution is called _____. 2. _____ technique involves multiple steps of mass spectrometry selection 3. A paramagnetic material is _____ (attracted/rejected) by an external magnetic field. 4. In the CRISPR-Cas9 system _____ and_____ are the two key molecules that introduce a change into the DNA. 5. In _____ method, a short strand of synthetic oligonucleotides contains the predefined mutation and acts as a mutagen that alters a specific nucleobase on the specified DNA position. 6. _____is an antibody-based technology used to selectively enrich specific DNA-binding proteins along with their DNA targets		CO4 CO5 CO6	BT2, BT3, BT4
Q.3	**Do as directed.** 1. In BLAST, NCBI what is the difference between %Query coverage and % Maximum identity? 2. What is the role of Sodium dodecyl sulfate in SDS-PAGE? 3. A researcher used different methods to isolate recombinant proteins but was unable to get good results. He then used affinity chromatography on immobilized glutathione and obtained good results. What is the modification he might have done to the recombinant proteins and how do you think it was helpful? 4. State the principles of (a) RNAi technology (b) Isoelectric focusing 5. State the main principle behind Sangers sequencing method with one application.	**10**	CO1 CO2 CO3 CO4 CO5 CO6	BT1, BT2, BT3, BT4
Q.4	**Answer *any five* from the following in detail.** 1. Explain in detail the Maxam-Gilbert method of sequencing. 2. Write in brief the principle and working of (a) RFLP (b) Western Blot 3. Discuss the principle, working and applications of microarray analysis. 4. What is homology modelling? Write down the steps involved in homology modelling and discuss in detail the advantages and disadvantages of the method. 5. Write in brief the principle of PCR. Discuss in detail any one type of PCR. 6. What is Raman scattering? Explain in brief the principle and applications of Raman spectroscopy. 7. Write a brief note on Mass Spectrometry.	**20**	CO1 CO2 CO3 CO4 CO5 CO6	BT1, BT2, BT3, BT4

**********End of Question Paper**********