Reg. No ..... Name **22P1056**

M. Sc. DEGREE END SEMESTER EXAMINATION : OCTOBER 2022

SEMESTER 1 : ENVIRONMENTAL SCIENCE

COURSE : **21P1EVST04 : TECHNIQUES IN RESEARCH**

(For Regular - 2022 Admission and Supplementary - 2021 Admission)

Duration : Three Hours Max. Weights: 30

PART A

Answer any 8 questions **Weight: 1**

1.	What is ionization chamber? Explain the principle of ionization chamber.	(U, CO 3)
2.	What is indirect ELISA?	(U, CO 4)
3.	Comment on circular dichroism spectroscopy.	(U)
4.	Comment on the calibration of pH meter.	(An, CO 5)
5.	Comment on centrifugal force.	(U, CO 3)
6.	Mention the types of ion exchange chromatography.	(U, CO 2, CO 3)
7.	What is gel electrophoresis?	(U, CO 3)
8.	Comment on Quantum Tunneling	(U, CO 1)
9.	Define vibrational spectroscopy.	(R, CO 3)
10.	What is negative staining?	(R, CO 5)

(1 x 8 = 8)

PART B

Answer any 6 questions **Weights: 2**

11.	Explain the principle and applications of ion exchange chromatography	(U, CO 2, CO 3)
12.	Discuss circular dichroism.	(An, CO 3)
13.	Explain the steps involved in the preparation of permanent slides.	(An, CO 5, CO 6)
14.	Comment on the lens system in light microscope.	(R, CO 1)
15.	Explain the principle and application of Scanning Tunneling Microscopy	(R)
16.	Explain the principle and procedure of disc electrophoresis.	(R, CO 3)
17.	Highlight the applications of nanobiology	(A, CO 2, CO 3)
18.	Explain the working principle of PAGE.	(U, CO 3)

(2 x 6 = 12)

PART C

Answer any 2 questions **Weights: 5**

19.	Give an account on the principles, types and applications of different chromatographical techniques.	(U, CO 2, CO 3)
20.	Explain the working and principle of ionization chamber with a neat diagram.	(U, CO 3)

21.	Elaborate the procedure of specimen preparation for electron microscopy	(An, CO 5, CO 6)
22.	Write an essay on confocal microscope.	(R, CO 1)
		(5 x 2 = 10)

OBE: Questions to Course Outcome Mapping

CO	Course Outcome Description	CL	Questions	Total Wt.
CO 1	Understand the basic concepts of various research techniques and its applications	U	8, 14, 22	8
CO 2	Interpret the working and use of the laboratory equipment.	An	6, 11, 17, 19	10
CO 3	Demonstrate the theory and principle of laboratory equipment.	A	1, 5, 6, 7, 9, 11, 12, 16, 17, 18, 19, 20	25
CO 4	Apply and use the laboratory equipment for research.	An	2	1
CO 5	Compare the equipment and select the appropriate one for research.	An	4, 10, 13, 21	9
CO 6	Maximize acquaintance with state of art laboratory methods in research.	Cr	13, 21	7

Cognitive Level (CL): Cr - CREATE; E - EVALUATE; An - ANALYZE; A - APPLY; U - UNDERSTAND; R - REMEMBER;