Name:

Enrolment No:

UPES

End Semester Examination, May 2023

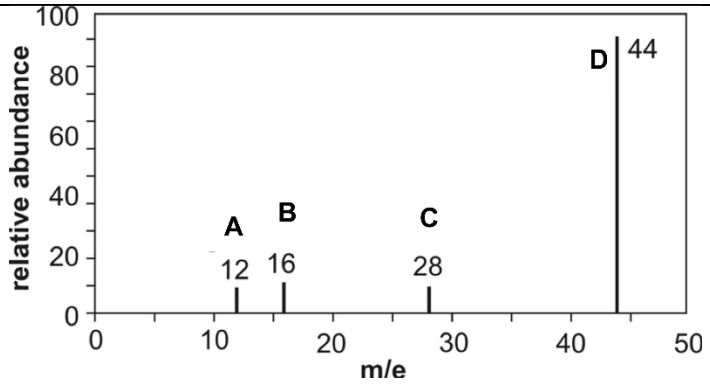
Course: Bioinstrumentation **Semester: IV**

Program: BSc Microbiology **Duration: 3 Hours**

Course Code: HSCC2026 **Max. Marks: 100**

Instructions:

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	In 1906 Tswett used chromatography to separate plant pigments. True/ False	1.5	CO1
Q 2	Write the difference between centripetal and centrifugal force.	1.5	CO1
Q 3	Separation of oils and fatty acids can be done with _____ chromatography	1.5	CO1
Q 4	Eluent is the stationary phase. True/ False	1.5	CO1
Q 5	Define density gradient centrifugation.	1.5	CO1
Q 6	Aluminium oxide, cellulose, or silica gel are used in _____ chromatography.	1.5	CO1
Q 7	State any two the usage of gel filtration technology	1.5	CO1
Q 8	List out the common detectors for HPLC	1.5	CO1
Q 9	Chromatography is used for analysis, isolation, and purification. True/False	1.5	CO1
Q 10	What is full form of NMR	1.5	CO2
Q 11	Give the name of arc lamp used in fluorescence technique	1.5	CO2
Q 12	State three usage of radioactive elements.	1.5	CO2
Q 13	Frequency of X-ray is higher than radio waves. True/false	1.5	CO2
Q 14	List out three names of spectrometer.	1.5	CO2
Q 15	Define isotopes. Give on example	1.5	CO2
Q 16	Give the name of three basic buffers used in electrophoresis	1.5	CO3
Q 17	Define western blotting	1.5	CO3
Q 18	Electric current is applied to drive the molecules to be separated via a gel. What is the name of the technique?	1.5	CO3
Q 19	Which electrophoresis is used for the determination of the molecular weight of proteins?	1.5	CO3
Q 20	Ethidium bromide is used in _____	1.5	CO3

Section B (4Qx5M=20 Marks)			
Q		**5**	**CO**
Q1	**Briefly explain sedimentation coefficient and its formula.**		**CO1**
Q2	**Define Retardation factor (RF) with diagram in chromatography.**	**5**	**CO1**
Q3	 **Identify the four (A-D) components in the mass spectrum**	**5**	**CO2**
Q4	**Explain briefly about paper electrophoresis.**	**5**	**CO3**
Section C (2Qx15M=30 Marks)			
Q		**15**	
Q1	**Interpret gel electrophoresis technology and briefly explain methodology of electrophoresis (with diagram).**	**5+ 10**	**CO3**
Q2	**Describe the principle of scintillation counter (with diagram). Also explain scintillator and photodetector components.**	**7+3+5**	**CO4**
Section D (2Qx10M=20 Marks)			
Q		**10**	
Q1	**What is the principle of FTIR (Fourier-transform infrared spectroscopy)? Explain FTIR with block diagram**	**5+5**	**CO2**
Q2	**Describe the comparison chart of properties of alpha, beta and gamma radiation. Provide three equations of how they are formed.**	**7+3**	**CO4**