UPES

End Semester Examination, May 2023

Course: Instrumentation in Microbiology

Semester: IV

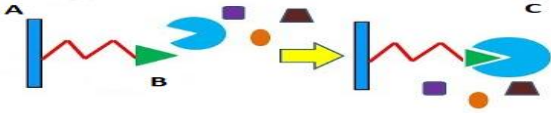Program: Integrated BSc MSc Microbiology   Duration   : 3 Hours

Course Code: HSMB 2015   Max. Marks: 100

Instructions: read the questions carefully and draw a diagram wherever required.

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	Define Retention factor (Rf).	1.5	CO1
Q 2	List the types of centrifuges on the basis of speed.	1.5	CO1
Q 3	State the function of SDS in gel electrophoresis.	1.5	CO1
Q 4	Recall the function of TEMED.	1.5	CO1
Q 5	The shift of an absorption maximum to a longer wavelength is called hypsochromic or red shift (True/False)	1.5	CO1
Q 6	State the role of Ammonium per sulfate (APS).	1.5	CO1
Q 7	Energy (E) is directly proportional to the wavelength (λ) (True/False). Explain	1.5	CO1
Q 8	Recall the function of beam splitter in dual beam spectrophotometer.	1.5	CO1
Q 9	Recall the full form of GFP.	1.5	CO1
Q 10	Define quantum yield.	1.5	CO2
Q 11	Define the term molecular ion.	1.5	CO2
Q 12	List the names of different types of rotors.	1.5	CO2
Q 13	Beer's law states that absorbance is directly proportional to the thickness of the absorbing material (True/False). Explain	1.5	CO2
Q 14	Write the name of staining dye used for proteins in SDS PAGE.	1.5	CO2
Q 15	Define isotopes with an example.	1.5	CO2
Q 16	IR absorption is attributable to transitions between rotational energy levels only of whole molecule (True/False).	1.5	CO3
Q 17	Define Quencher with an example	1.5	CO3
Q 18	Write the role of separating gel in electrophoresis.	1.5	CO3
Q 19	Write the name of electrophoresis is used for the separation of proteins based on the pI and size.	1.5	CO3

Q 20	Identify the type of chromatography and label A, B, and C:	1.5	CO3

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Section B
(4Qx5M=20 Marks)

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Q		5	CO
Q1	Discuss the principle of size exclusion chromatography.	5	CO1
Q2	Draw a schematic of instrumentation of single beam UV Visible spectrophotometer.	5	CO1
Q3	Differentiate between differential and density gradient centrifugation.	5	CO2
Q4	Discuss the detection and measurement of radioactivity using Geiger Muller counter.	5	CO3

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Section C
(2Qx15M=30 Marks)

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Q			
Q1	Define Electrophoresis. Describe the principle of SDS PAGE gel electrophoresis. You have two proteins, A and B. Protein A (monomer) has a molecular weight of 120 kD. Protein B has also similar molecular weight 120 kD but it is a dimeric protein of which one subunit has molecular weight of 80 kD and other subunit has molecular weight of 40 kD. Draw the pattern of protein separation on SDS PAGE and Native Page.	3+6+6	CO3
Q2	Define spectroscopy. Describe the principle of fluorescence spectroscopy. Discuss the molecular beacon approach for detection of virus in a sample.	3+5+7	CO4

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Section D
(2Qx10M=20 Marks)

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Q			
Q1	Discuss the principle of ion exchange chromatography. A protein with a pI of 7 and if it is placed in a buffer solution of pH-5 which type of ion exchanger you will use to purify the protein. Explain	5+5	CO2
Q2	Draw the schematic of Jablonski diagram and explain the phenomena of internal conversion, intersystem crossing, fluorescence, and phosphorescence.	4+6	CO4