


Name:	
Enrolment No:	

UPES
End Semester Examination, May 2023

Course: Instrumentation in Microbiology
Semester: II
Program: MSc Nutrition and Dietetics
Duration: 3 Hours
Course Code: HSMB70210 **Max. Marks: 100**

Instructions:

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	In a microtiter well plate, you have added 200 uL of a liquid sample. The path length is dependent on: A. Diameter of the well. B. Height of the well C. Volume of liquid in the well. D. All of the above	1.5	CO1
Q2	The neutral atoms of all isotopes of the same element contain the same number of _____. A. Neutrons B. Electrons C. Mass numbers D. Masses	1.5	CO2
Q3	The atomic number is not changed by which type of radioactive decay. A. Beta B. Gamma C. Alpha D. The atomic number is affected by all forms of radioactive decay	1.5	CO2

Q4	If proteins are separated according to their electrophoretic mobility then the type of electrophoresis is: A. SDS PAGE B. Affinity Electrophoresis C. Electro focusing D. Free flow electrophoresis	1.5	CO3
Q5	In SDS-PAGE, protein sample is first treated with detergent sodium dodecyl sulfate (SDS), in order to A. Make the protein become negatively charged. B. Make the protein become positively charged. C. Renature the protein. D. Adjust the pH of protein.	1.5	CO3
Q6	The pH of SDS-PAGE stacking gel is: A. 6.8 B. 8.8 C. 10 D. 6	1.5	CO3
Q7	The source of Taq polymerase is from the bacterium: A. <i>Thermus aquaticus</i> B. <i>Bacillus cereus</i> C. <i>Bacillus stearothermophilus</i> D. <i>Clostridium botulinum</i>	1.5	CO2
Q8	A protein gives 100 kDa molecular mass in native-PAGE but two bands in SDS-PAGE corresponding to 25 kDa and 50 kDa. The oligomeric Protein thus have _____ subunits. A. 1 B. 2 C. 3 D. 4	1.5	CO2
Q9	The unit of Molar extinction coefficient is: A. $L\ mol^{-1}\ cm^{-1}$ B. $M^{-1}\ cm^{-1}$ C. A & B D. $cm\ M^{-1}\ L^{-1}$	1.5	CO1
Q10	Amino acids detected by spraying the plate with ninhydrin solution is an example of _____ A. Column chromatography B. Thin layer chromatography C. Paper chromatography D. Liquid chromatography	1.5	CO3

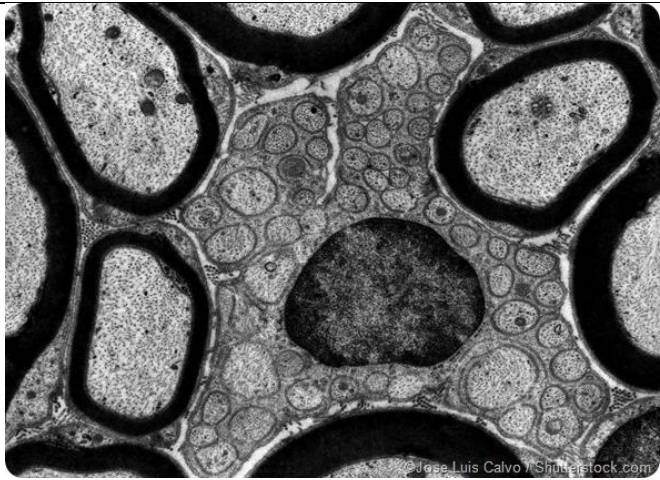

Q11	<p>Which of the following is not a limitation of Beer Lambert's law, which gives the relation between absorption, thickness, and concentration?</p> <p>A. Concentration must be lower B. Radiation must have higher bandwidth C. Radiation source must be monochromatic D. Does not consider factors other than thickness and concentration that affect absorbance</p>	1.5	CO1
Q12	<p>Transmittance is given as $T = P/P_o$. If P_o is the power incident on the sample, what does P represent?</p> <p>A. Radiant power transmitted by the sample B. Radiant power absorbed by the sample C. Sum of powers absorbed and scattered D. Sum of powers transmitted and reflected</p>	1.5	CO1
Q13	<p>Differential centrifugation is based on the differences in _____ of biological particles of different _____:</p> <p>A. Size, density. B. Sedimentation rate, sizes and density. C. Size, structure. D. Mass, size.</p>	1.5	CO1
Q14	<p>Which of the following has the highest energy?</p> <p>A. light with a long wavelength B. light with an intermediate wavelength C. light with a short wavelength D. It is impossible to tell from the information given.</p>	1.5	CO1
Q15	<p>Which type of microscope would be the best choice for viewing very small surface structures of a cell?</p> <p>A. transmission electron microscope B. scanning electron microscope C. brightfield microscope D. darkfield microscope E. phase-contrast microscope</p>	1.5	CO1
Q16	<p>Which is the principle difference (in the properties) that influences centrifugation:</p> <p>A. Densities B. Interfacial tension C. Particle size D. Viscosities</p>	1.5	CO1

Q17	The centrifugal effect counteracts one of the following forces A. Brownian forces B. Cohesive forces C. Electrostatic forces D. Gravitational forces	1.5	CO1
Q18	Which of the following centrifugation is used to separate certain organelles from whole cell? A. Rate-zonal centrifugation B. Normal centrifugation C. Differential centrifugation D. Isopycnic centrifugation	1.5	CO1
Q19	Which of the following is not correct for reversed phase HPLC: A. Relatively non-polar stationary phase B. Relatively polar mobile phase C. Methanol for acidic compounds in mobile phase D. Acetonitrile for acidic compounds in mobile phase	1.5	CO3
Q20	The relative adsorption of each component of the mixture is expressed in terms of its _____ A. Acceleration factor B. Retardation factor C. Both acceleration and retardation factor D. None of the mentioned	1.5	CO3

Section B
(4Qx5M=20 Marks)

Q 1	A. Define Beer-Lamberts law. B. What is the difference between a single beam and double spectrophotometer.	5 (2+3)	CO1
Q2	A. What is radioactivity? B. What is the half-life of a radioisotope. C. What is the difference between CPM and DPM? D. State the SI unit of radioactivity.	5 (1+1+2+1)	CO2
Q3	A. What is microbial metagenomics? B. How is metagenomics applicable for food technology?	5 (2+3)	CO3
Q4	A. What is the principle of Centrifugation? B. State the difference between RCF and RPM.	5 (3+2)	CO1

Section C
(2Qx15M=30 Marks)

<p>Q1</p>	 <p>A. Identify the type of microscopy from above image. B. What is the source of illumination in above microscope? C. Describe the working principle of above microscope with a schematic diagram. D. Write down the procedure of sample preparation for above microscopy.</p>	<p align="center">15 (2+2+8+3)</p>	<p align="center">CO1</p>
<p>Q2</p>	 <p>A. Identify the type of chromatography from above figure. B. What are the essential components of the above instrument? C. Write down the working principle of above chromatography. D. What is the difference between an isocratic and gradient system? E. What are the applications of this technique in Food Technology.</p>	<p align="center">15 (2+4+4+3 +2)</p>	<p align="center">CO3</p>

Section D
(2Qx10M=20 Marks)

Q 1	A. Define Fluorescence. B. Write down the working principle of an Epifluorescent microscopy with a schematic diagram? C. Name some fluorescent stains used for direct enumeration of bacteria in a food sample using Epifluorescent microscopy.	10 (2+6+2)	CO1
Q2	A. What is PCR? B. Explain the basic principle of PCR technique with a schematic diagram? C. What are the applications of PCR in food technology.	10 (2+6+2)	CO3