


Name:			
Enrolment No:			
<b>UPES</b> <b>End Semester Examination, May 2024</b>			
<b>Course: Instrumentation in Microbiology</b> <b>Program: INT_BMSC_N_D</b> <b>Course Code: HSMB30110</b>		<b>Semester : VI</b> <b>Duration : 3 Hours</b> <b>Max. Marks: 100</b>	
<b>Instructions: Attempt all questions as directed in each section.</b>			
S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	Identify the component of a disc bowl centrifuge that is responsible for generating centrifugal force? a) Rotor b) Bowl c) Motor d) Control panel	1.5	CO2
Q2	Identify the industry that uses centrifugation commonly? a) Pharmaceutical b) Automotive c) Textile d) Construction	1.5	CO2
Q3	Find out the major advantage of using a disc bowl centrifuge over other separation methods? a) Higher throughput b) Lower energy consumption c) Greater versatility d) Faster separation times	1.5	CO2+1
Q4	Identify component of a mixture settles at the bottom of the centrifuge tube during centrifugation? a) Lightest component b) Heaviest component c) Component with the highest solubility d) Component with the lowest density	1.5	CO2
Q5	State the purpose of using a centrifuge? a) To mix components of a solution b) To separate components of a mixture based on density differences c) To accelerate chemical reactions d) To measure the viscosity of a liquid	1.5	CO2+1
Q6	In paper chromatography, what is the mobile phase typically made of? a) Liquid	1.5	CO3

	<ul style="list-style-type: none"> <li>b) Gas</li> <li>c) Solid</li> <li>d) Gel</li> </ul>		
<b>Q7</b>	<p>Recall the most suitable component for the construction of disc bowl centrifuge components due to its resistance to corrosion and high strength?</p> <ul style="list-style-type: none"> <li>a) Stainless steel</li> <li>b) Aluminum</li> <li>c) Copper</li> <li>d) Plastic</li> </ul>	<b>1.5</b>	<b>CO3</b>
<b>Q8</b>	<p>Identify the primary advantage of a compound microscope over a simple microscope?</p> <ul style="list-style-type: none"> <li>a) Higher magnification</li> <li>b) Smaller size</li> <li>c) Easier portability</li> <li>d) Lower cost</li> </ul>	<b>1.5</b>	<b>CO4</b>
<b>Q9</b>	<p>Identify the property that primarily determines their movement through the paper in paper chromatography?</p> <ul style="list-style-type: none"> <li>a) Size</li> <li>b) Density</li> <li>c) Solubility</li> <li>d) Color</li> </ul>	<b>1.5</b>	<b>CO4</b>
<b>Q10</b>	<p>In paper chromatography, what is the stationary phase?</p> <ul style="list-style-type: none"> <li>a) Paper</li> <li>b) Solvent</li> <li>c) Sample</li> <li>d) Mobile phase</li> </ul>	<b>1.5</b>	<b>CO3</b>
<b>Q11</b>	<p>The main purpose of agarose gel electrophoresis is?</p> <ul style="list-style-type: none"> <li>a) Separating proteins based on size</li> <li>b) Separating DNA molecules based on size</li> <li>c) Separating proteins based on charge</li> <li>d) Separating RNA molecules based on charge</li> </ul>	<b>1.5</b>	<b>CO3+4</b>
<b>Q12</b>	<p>Find out the gel that has used in SDS-PAGE?</p> <ul style="list-style-type: none"> <li>a) It is made of agarose</li> <li>b) It is made of cellulose</li> <li>c) It is made of polyacrylamide</li> <li>d) It is made of starch</li> </ul>	<b>1.5</b>	<b>CO4</b>
<b>Q13</b>	<p>Identify the best that describes a simple microscope?</p> <ul style="list-style-type: none"> <li>a) It has a single lens system.</li> <li>b) It has multiple lens systems.</li> <li>c) It uses advanced digital imaging technology.</li> <li>d) It is only used for observing living organisms.</li> </ul>	<b>1.5</b>	<b>CO3</b>
<b>Q14</b>	<p>Recall the component that is present in a compound microscope but not in a simple microscope?</p> <ul style="list-style-type: none"> <li>a) Eyepiece</li> <li>b) Objective lens</li> <li>c) Stage</li> </ul>	<b>1.5</b>	<b>CO3</b>

	d) Condenser		
<b>Q15</b>	An agarose is? a) A type of protein b) A type of carbohydrate c) A type of lipid d) A type of buffer	<b>1.5</b>	<b>CO1+4</b>
<b>Q16</b>	In agarose gel electrophoresis, DNA molecules move through the gel in response to: a) Gravitational force b) Magnetic force c) Centrifugal force d) Electric field	<b>1.5</b>	<b>CO4</b>
<b>Q17</b>	Identify the property of agarose that makes it suitable for gel electrophoresis? a) Its ability to bind to DNA molecules b) Its ability to form a solid gel when cooled c) Its ability to conduct electricity d) Its ability to fluoresce under UV light	<b>1.5</b>	<b>CO3+4</b>
<b>Q18</b>	In the context of Indian cuisine, which cooking method aligns best with the principles of the DASH diet? a) Deep-frying b) Stir-frying c) Grilling d) Butter roasting	<b>1.5</b>	<b>CO1</b>
<b>Q19</b>	Identify the scientist who is known for his improvement of the compound microscope and his detailed observations of microorganisms? a) Louis Pasteur b) Robert Koch c) Joseph Lister d) Antonie van Leeuwenhoek	<b>1.5</b>	<b>CO1</b>
<b>Q20</b>	Find out the end of the gel serves as the starting point for DNA migration during agarose gel electrophoresis? a) Cathode b) Anode c) Both ends d) It depends on the charge of the DNA	<b>1.5</b>	<b>CO2+1</b>
<b>Section B</b> <b>(4Qx5M=20 Marks)</b>			
<b>Q 1</b>	Define gel electrophoresis principle and application.	<b>5</b>	<b>CO2+3</b>
<b>Q2</b>	Describe the importance of SDS in SDS-PAGE.	<b>5</b>	<b>CO4</b>
<b>Q3</b>	Draw a paper chromatography and label both mobile and stationary phase.	<b>5</b>	<b>CO3</b>
<b>Q4</b>	Outline a simple schematic picture of basket and tubular centrifuge.	<b>5</b>	<b>CO1+2</b>
<b>Section C</b>			

<b>(2Qx15M=30 Marks)</b>			
<b>Q 1</b>	Describe the principle of spectrophotometer. Create basic diagram and give one example that you have observed previously.	<b>15</b>	<b>CO3</b>
<b>Q2</b>	Define the practical usage of centrifugation in the food industry? Differentiate between disc bowl and decanter centrifuges?	<b>15</b>	<b>CO3+2</b>
<b>Section D</b>			
<b>(2Qx10M=20 Marks)</b>			
<b>Q 1</b>	Draw schematic representations for both agarose gel electrophoresis and SDS-PAGE.	<b>10</b>	<b>CO4+2</b>
<b>Q2</b>	Recall the features that differentiates between a simple microscope versus a compound microscope. Furthermore, how does the utilization of microscopes benefit the food industry?	<b>10</b>	<b>CO1+3</b>