


Name:			
Enrolment No:			
<div>UPES</div> <div>End Semester Examination, May 2025</div>			
Course: Biosafety and aseptic techniques		Semester : IV	
Program: BSc. Microbiology & BSc. FND		Duration : 3 hours	
Course Code: HSMB2028		Max. Marks: 100	
Instructions:			
S. No.	Section A	Marks	COs
	Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)		
Q 1	Which of the following is NOT a physical method of sterilization? a) Heat b) Filtration c) Alcohol d) Radiation	1.5	CO2
Q 2	The effectiveness of disinfectants is measured by: a) Phenol coefficient b) Optical density c) CFU count d) Bacteriophage assay	1.5	CO2
Q 3	Which sterilization method is best for heat-sensitive materials? a) Dry heat b) Moist heat c) Ethylene oxide gas d) Autoclaving	1.5	CO2
Q 4	How many Biosafety Levels (BSL) are defined by the CDC? a. 2 b. 3 c. 4 d. 5	1.5	CO1
Q 5	BSL-4 laboratories require: a. No special safety precautions b. PPE including full-body, air-supplied suits c. Only standard laboratory coats d. Open bench work	1.5	CO1
Q 6	The Department of Biotechnology (DBT) in India regulates: a. Chemical safety b. Environmental safety c. Biosafety for GMOs/LMOs d. Occupational safety	1.5	CO1
Q 7	What is the main purpose of the Institutional Biosafety Committee (IBSC)?	1.5	CO2

	<ul style="list-style-type: none"> <li>a. Managing hospital infections</li> <li>b. Monitoring biosafety in labs handling GMOs</li> <li>c. Regulating antibiotics in healthcare</li> <li>d. All of the given</li> </ul>		
<b>Q 8</b>	Which of the following chemicals is a sterilizing gas? <ul style="list-style-type: none"> <li>a) Ethanol</li> <li>b) Formaldehyde</li> <li>c) Chlorhexidine</li> <li>d) Sodium hypochlorite</li> </ul>	<b>1.5</b>	<b>CO2</b>
<b>Q 9</b>	What is the function of a biosafety cabinet? <ul style="list-style-type: none"> <li>a. Amplifying microbes</li> <li>b. Preventing contamination and exposure</li> <li>c. Increasing airflow in labs</li> <li>d. Enhancing microbial growth</li> </ul>	<b>1.5</b>	<b>CO2</b>
<b>Q 10</b>	Which of the following biosafety levels is required for working with Ebola virus? <ul style="list-style-type: none"> <li>a) BSL-1</li> <li>b) BSL-2</li> <li>c) BSL-3</li> <li>d) BSL-4</li> </ul>	<b>1.5</b>	<b>CO1</b>
<b>Q11</b>	What is the main purpose of a laminar airflow cabinet (LAF)? <ul style="list-style-type: none"> <li>a) Incubation</li> <li>b) Cooling samples</li> <li>c) Providing sterile workspace</li> <li>d) Staining</li> </ul>	<b>1.5</b>	
<b>Q12</b>	Which biosafety level is appropriate for working with <i>Mycobacterium tuberculosis</i> ? <ul style="list-style-type: none"> <li>a. BSL-1</li> <li>b. BSL-2</li> <li>c. BSL-3</li> <li>d. BSL-4</li> </ul>	<b>1.5</b>	<b>CO2</b>
<b>Q13</b>	What does GMO stand for? <ul style="list-style-type: none"> <li>a) General Microbial Organism</li> <li>b) Genetically Modified Organism</li> <li>c) Global Molecular Object</li> <li>d) Growth Monitoring Organelle</li> </ul>	<b>1.5</b>	<b>CO2</b>
<b>Q14</b>	Which of the following disinfectants contains chlorine? <ul style="list-style-type: none"> <li>a) Formaldehyde</li> <li>b) Bleach</li> <li>c) Phenol</li> <li>d) Alcohol</li> </ul>	<b>1.5</b>	<b>CO2</b>
<b>Q15</b>	The role of a biosafety cabinet is to: <ul style="list-style-type: none"> <li>a. Increase airflow</li> <li>b. Kill microbes</li> <li>c. Protect personnel and environment</li> <li>d. Store reagents</li> </ul>	<b>1.5</b>	<b>CO1</b>
<b>Q16</b>	Which of the following can be used to preserve microbial cultures long-term? <ul style="list-style-type: none"> <li>a. Autoclaving</li> </ul>	<b>1.5</b>	<b>CO1</b>

	b. Refrigeration c. Cryopreservation d. Pasteurization		
<b>Q17</b>	Passaging of eukaryotic cells refers to: a) Staining them b) Freezing them c) Diluting and sub-culturing d) Killing them	<b>1.5</b>	<b>CO1</b>
<b>Q18</b>	A major cause of laboratory-acquired infections is: a) Radioactive exposure b) Ingestion of food c) Aerosols d) UV light	<b>1.5</b>	<b>CO1</b>
<b>Q19</b>	Which of the following is NOT a component of standard operating procedures (SOPs)? a. Wearing PPE b. Waste disposal c. Pathogen mutation d. Media preparation	<b>1.5</b>	<b>CO1</b>
<b>Q20</b>	BSL-2 laboratories require which of the following? a. Positive pressure suits b. Open bench work c. Class II biosafety cabinets d. No PPE	<b>1.5</b>	<b>CO2</b>
<b>Section B</b> <b>(4Qx5M=20 Marks)</b>			
<b>Q 1</b>	Distinguish between Biosafety cabinet and laminar air flow.	<b>5</b>	<b>CO2</b>
<b>Q 2</b>	a. Define clean room. b. Classify them into various types and elaborate usage.	<b>5</b>	<b>CO1</b>
<b>Q 3</b>	a. Elaborate use of radiation in ensure microbial control. b. Also discuss why is it called cold sterilization.	<b>5</b>	<b>CO2</b>
<b>Q 4</b>	a. Define sterilization. (1.5) b. Define Disinfection. (1.5) c. Define antiseptic. Cite example. (2)	<b>5</b>	<b>CO1</b>
<b>Section C</b> <b>(2Qx15M=30 Marks)</b>			
<b>Q 1</b>	‘A student attempts to culture <i>Mycobacterium tuberculosis</i> in a BSL-II lab.’ (i) Discuss the safety breach and corrective action. (5) (ii) Define Biosafety (2) (iii) Discuss risk assessment in biological settings and how does it ensure biosafety? (6) (iv) If instead of <i>M. tuberculosis</i> it were an unknown respiratory infectious agent, which lab would be used? (2)	<b>15</b>	<b>CO2</b>
<b>Q 2</b>	‘A scientist wishes to develop a genetically modified crop.’ He starts to work in an institute quietly in lab.’ Based on your knowledge in Biosafety, answer the following: (i) Discuss the breach in biosafety here. (4)	<b>15</b>	<b>CO2</b>

	(ii) Define the constitution and role of institutional biosafety committee in biosafety (IBSC). (6) (iii) What are the steps ensuring that waste disposal follows safety norms at an institution? (5)		
<b>Section D</b> <b>(2Qx10M=20 Marks)</b>			
<b>Q 1</b>	‘A new disinfectant is formulated.’ (i) Which test would be followed to test its efficacy? (2) (ii) Describe the procedure of this test. (5) (iii) This test returns a coefficient. A compound with coefficient of 10 is better or 0.5 at disinfection.	<b>10</b>	<b>CO1</b>
<b>Q 2</b>	a. Enlist some chemicals used for disinfection. (2) b. Write the mode of action of at least 4 in detail. (8)	<b>10</b>	<b>CO1</b>