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Enrolment No:			
<b>UPES</b> <b>End Semester Examination, December 2023</b>			
Course: Biosafety and Aseptic techniques		Semester: III	
Program: Int BMSC Microbiology		Duration: 3 Hours	
Course Code: HSMB 2012			
Max. Marks: 100			
Instructions:			
S. No.	Section A  Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	<b>Which of the following is a common mistake that can compromise the aseptic technique?</b> A) Sterilizing equipment before and after use B) Keeping the Bunsen burner flame yellow C) Working too close to the flame of the Bunsen burner D) Discarding contaminated cultures immediately	1.5	CO3
Q 2	<b>What is the main difference between sterilization and aseptic techniques?</b> A) Sterilization removes visible dirt, while aseptic techniques focus on killing microorganisms. B) Sterilization kills all forms of microorganisms, while aseptic techniques prevent contamination. C) Sterilization is used for cooking, while aseptic techniques are used in medical procedures. D) Sterilization is a subset of aseptic techniques used in research labs.	1.5	CO1
Q 3	<b>Which of the following airflow patterns characterizes a laminar air flow cabinet?</b> A) Random airflow in all directions B) Vertical unidirectional airflow C) Horizontal unidirectional airflow D) Intermittent airflow	1.5	CO2
Q 4	<b>What is the main difference between a laminar air flow cabinet and a fume hood?</b> A) A laminar air flow cabinet has vertical airflow, while a fume hood has horizontal airflow. B) A laminar air flow cabinet is used for biological work, while a fume hood is used for chemical work. C) A laminar air flow cabinet provides a sterile environment, while a fume hood removes chemical fumes.	1.5	CO1

	D) A laminar air flow cabinet has no exhaust system, while a fume hood does.		
<b>Q 5</b>	<b>In a pharmaceutical manufacturing facility, which ISO classification typically applies to an aseptic area where filling and sealing of sterile products occur?</b> A) ISO Class 1 B) ISO Class 5 C) ISO Class 8 D) ISO Class 9	<b>1.5</b>	<b>CO2+4</b>
<b>Q 6</b>	<b>Which of the following actions is NOT a recommended practice for maintaining the cleanliness of an aseptic area?</b> A) Frequent cleaning and disinfection B) Limiting the number of personnel entering the area C) Allowing food and drink inside the area D) Monitoring environmental conditions regularly	<b>1.5</b>	<b>CO1</b>
<b>Q 7</b>	<b>Which of the following diseases might be studied in a BSL3 laboratory?</b> A) Common cold virus B) SARS-CoV-2 (COVID-19) virus C) Anthrax bacteria D) Chickenpox virus	<b>1.5</b>	<b>CO4</b>
<b>Q 8</b>	<b>Which of the following diseases might be studied in a BSL4 laboratory?</b> A) Hepatitis A virus B) Marburg virus C) Salmonella bacteria D) Human papillomavirus (HPV)	<b>1.5</b>	<b>CO3</b>
<b>Q 9</b>	<b>What is the main purpose of BSL3 laboratories?</b> A) To handle agents that pose minimal risk to humans B) To handle agents that can cause serious diseases but have available treatments C) To conduct experiments in a vacuum environment D) To handle agents that can cause serious diseases, and for which treatments are available, but pose a moderate risk	<b>1.5</b>	<b>CO1+2</b>
<b>Q 10</b>	<b>Which microbial assay technique is used specifically for testing the efficacy of antibiotics?</b> A) Kirby-Bauer disk diffusion method B) Polymerase Chain Reaction (PCR) C) Gel electrophoresis D) Enzyme-Linked Immunosorbent Assay (ELISA)	<b>1.5</b>	<b>CO3</b>
<b>Q 11</b>	<b>What is the purpose of a zone of inhibition in a microbial assay?</b> A) It indicates the presence of microbial growth B) It represents the area where microorganisms were killed or inhibited by an antimicrobial substance	<b>1.5</b>	<b>CO1+2</b>

	<p>C) It measures the pH level of the solution</p> <p>D) It is a staining technique used for visualization</p>		
<b>Q 12</b>	<p><b>What does the term "colony-forming unit" (CFU) represent in microbial assays?</b></p> <p>A) A unit of energy</p> <p>B) A unit of concentration</p> <p>C) A unit of length</p> <p>D) A unit of mass</p>	<b>1.5</b>	<b>CO2</b>
<b>Q 13</b>	<p><b>What precaution should laboratory personnel take when handling sharps, such as needles or broken glassware?</b></p> <p>A) Dispose of sharps in regular trash bins</p> <p>B) Handle sharps with bare hands</p> <p>C) Use puncture-resistant gloves and proper disposal containers</p> <p>D) Ignore sharps and continue working</p>	<b>1.5</b>	<b>CO1</b>
<b>Q 14</b>	<p><b>What is the role of biosafety professionals during laboratory inspections?</b></p> <p>A) Ignoring safety violations</p> <p>B) Reporting violations to the laboratory personnel</p> <p>C) Conducting experiments during inspections</p> <p>D) Wearing casual clothing</p>	<b>1.5</b>	<b>CO1</b>
<b>Q 15</b>	<p><b>Which regulatory organization provides guidelines and classifications for Risk Groups?</b></p> <p>A) WHO (World Health Organization)</p> <p>B) NASA (National Aeronautics and Space Administration)</p> <p>C) FDA (Food and Drug Administration)</p> <p>D) UNESCO (United Nations Educational, Scientific and Cultural Organization)</p>	<b>1.5</b>	<b>CO2</b>
<b>Q 16</b>	<p><b>Which of the following best describes the term "risk control measures" in risk assessment?</b></p> <p>A) Measures to increase laboratory noise levels</p> <p>B) Measures to eliminate all hazards</p> <p>C) Measures to reduce the likelihood and impact of identified risks</p> <p>D) Measures to restrict laboratory access</p>	<b>1.5</b>	<b>CO1</b>
<b>Q 17</b>	<p><b>What should be done if new hazards are introduced into the laboratory or if existing risks change significantly?</b></p> <p>A) Ignore the changes</p> <p>B) Document the changes for historical purposes only</p> <p>C) Review and update the risk assessment</p> <p>D) Increase laboratory noise levels</p>	<b>1.5</b>	<b>CO3</b>
<b>Q 18</b>	<p><b>Which of the following is a preventive measure against biological terrorism attacks?</b></p> <p>A) Disregarding laboratory safety protocols</p> <p>B) Ignoring suspicious packages or substances</p>	<b>1.5</b>	<b>CO1</b>

	C) Increasing public awareness and preparedness D) Encouraging close contact with potentially contaminated individuals		
<b>Q 19</b>	<b>When should researchers submit their projects to the IBC for review?</b> A) Only if they have spare time B) After completing the project C) Before starting the project D) Whenever they feel like it	<b>1.5</b>	<b>CO3+4</b>
<b>Q 20</b>	<b>What is the main feature that differentiates a BSC-III from other biosafety cabinets?</b> A) It has a transparent front window B) It operates under negative pressure C) It is completely enclosed and gas-tight D) It has a built-in microscope	<b>1.5</b>	<b>CO1+4</b>
<b>Section B</b> <b>(4Qx5M=20 Marks)</b>			
<b>Q 1</b>	Justify your thoughts on preventing and detecting bioterrorism.	<b>5</b>	<b>CO5</b>
<b>Q 2</b>	Explain the importance of microbiologists wearing lab coats, gloves, and face masks while handling cultures and specimens.	<b>5</b>	<b>CO2</b>
<b>Q 3</b>	With the emergence of new and unknown pathogens, how do biosafety levels need to adapt? Describe the challenges do researchers face in classifying and safely studying these novel agents?	<b>5</b>	<b>CO1+4</b>
<b>Q 4</b>	Draw the requisites and Safety Features in a BSL-1 Lab.	<b>5</b>	<b>CO3</b>
<b>Section C</b> <b>(2Qx15M=30 Marks)</b>			
<b>Q 1</b>	Provide at least three different real-world examples or case studies to illustrate the <u>challenges and best practices</u> associated with biosafety in research laboratories.	<b>15</b> <b>(5+5+5)</b>	<b>CO1+4</b>
<b>Q 2</b>	In the given picture, identify items and write down the following 1. Process type, 2. Methods and 3. Applications. 	<b>15</b> <b>(5+5+5)</b>	<b>CO1+2</b> <b>+3</b>

**Section D**  
**(2Qx10M=20 Marks)**

<b>Q 1</b>	Describe important measurements that should be taken by laboratories to ensure the safety of laboratory workers and prevent them from Laboratory Acquired Infections, especially when working with high-risk pathogens?	<b>10 (5+5)</b>	<b>CO1+2</b>
<b>Q 2</b>	Explain the biosafety procedures in a microbiology lab in bullet points. In your opinion, how should that be handled?	<b>10(5+5)</b>	<b>CO3+4</b>