


Name: Enrolment No:			
<b>UNIVERSITY OF PETROLEUM AND ENERGY STUDIES</b> <b>End Semester Examination, December 2023</b>			
<b>Programme Name: M. Sc. Microbiology</b> <b>Course Name: Biosafety and Aseptic Techniques</b> <b>Course Code: HSMB7010</b>		<b>Semester: I</b> <b>Time: 180min</b> <b>Max. Marks: 100</b>	
<b>SECTION A</b>			
<b>1. Each Question will carry 1.5 Marks</b> <b>2. Instruction: Complete the statement / Select the correct answer(s)</b>			
Q1	“Application of a liquid antimicrobial chemical to living tissue to prevent infection” the above statement is for..... a) Sterilant b) Bactericide c) Disinfectant d) Sanitizer	<b>Marks</b>  <b>1.5</b>	<b>CO1</b>
Q2	Steam sterilization is better over dry heat sterilization a) True . b) False	<b>1.5</b>	<b>CO1</b>
Q3	Why should biological safety professionals require the use of good microbiological techniques when working inside a biological safety cabinet with etiologic agents? a. To ensure that proper waste disposal procedures will be followed by the user b. To require consistency in use of the Class II biological safety cabinet c. To minimize the potential for personnel exposure to etiologic agents d. To make conducting audits and inspection of Class II biological safety cabinet use easier	<b>1.5</b>	<b>CO3</b>
Q4	Which one of the following practices best prevents worker exposure to infectious aerosols? a. Balancing the safety cups prior to placing them in the centrifuge b. Opening the centrifuge safety cups only in the biological safety cabinet c. Using a splash shield to open rubber-stoppered tubes d. Wearing a surgical mask while performing work	<b>1.5</b>	<b>CO4</b>
Q5	A team from a large pharmaceutical firm plans to do an audit of a production facility in which attenuated viral hepatitis A is grown in a bioreactor. Which of the activities listed below must occur for each member of this audit team before the team can enter the work area? a. Training in the use of the appropriate personal protective equipment b. Evaluation for immunocompetency c. Immunization with hepatitis A vaccine, for product and personal protection d. Protection from infection with an injection of human gamma globulin	<b>1.5</b>	<b>CO2</b>
Q6	Which one of the following fungi is most likely to cause a laboratory acquired infection if handled improperly?	<b>1.5</b>	<b>CO3</b>

	<ul style="list-style-type: none"> <li>a. <i>Aspergillus fumigatus</i></li> <li>b. <i>Candida albicans</i></li> <li>c. <i>E. coli</i></li> <li>d. <i>Coccidioides immitis</i></li> </ul>		
Q7	<p>Fewer than <i>Mycobacterium tuberculosis</i> can cause TB disease in a healthy individual.</p> <ul style="list-style-type: none"> <li>a. True</li> <li>b. False</li> </ul>	1.5	CO2
Q8	<p>Exposure to <i>Legionella pneumophila</i> has been associated with which of the following facilities?</p> <ul style="list-style-type: none"> <li>a. Pet shops</li> <li>b. Gold mines</li> <li>c. Cooling towers</li> <li>d. Laundries</li> </ul>	1.5	CO4
Q9	<p>The Occupational Safety and Health Administration requires an exposure control plan for any site under which of the following conditions?</p> <ul style="list-style-type: none"> <li>a. Use of biohazardous materials</li> <li>b. Use of human blood or body fluids</li> <li>c. Has research animals</li> <li>d. Has had a spill of biohazardous materials</li> </ul>	1.5	CO2
Q10	<p>Centers for Disease Control and Prevention/National Institutes of Health (CDC/NIH), BMBL 5 appendix A: Primary Containment for Biohazards: Selection, Installation and Use of Biological Safety Cabinets a. Federal Standard No. 209B</p> <p>The above guidelines is for</p> <ul style="list-style-type: none"> <li>a. Guidelines for assessing the risk group of microbes</li> <li>b. Guideline assessing the biohazard potential of a microbes</li> <li>c. For biohazard specific cabinet guideline</li> <li>d. All of the above</li> </ul>	1.5	CO4
Q11	<p>All work conducted in a Class II biosafety cabinet or other physical containment device, directional airflow from the corridor into the laboratory, and double-door access to the laboratory.</p> <p>Above condition is required for a</p> <ul style="list-style-type: none"> <li>a. Biosafety Level 3 Lab</li> <li>b. Biosafety Level 2 Lab</li> <li>c. Biosafety Level 4 Lab</li> <li>d. Biosafety Level 1 Lab</li> </ul>	1.5	CO3
Q12	<p>Which one of the following agents or toxins requires registration with U.S. Department of Agriculture, Animal and Plant Health Inspection Service under the Agriculture Bioterrorism Protection Act (Title 9 CFR Part 121)?</p> <ul style="list-style-type: none"> <li>a. 5.0 mg <i>Staphylococcal</i> enterotoxin</li> <li>b. The plasmid that expresses the protective antigen of <i>Bacillus anthracis</i></li> <li>c. Complete genetic code for Venezuelan equine encephalitis virus</li> <li>d. 5 liters of <i>Escherichia coli</i> O157:H7, which produces Shiga-like toxin</li> </ul>	1.5	CO5
Q13	<p>According to the National Institutes of Health Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules, an Institutional Biosafety</p>	1.5	CO4

	Committee must include which of the following? a. A minimum of 25 members of the institute b. At least two members with no affiliation to the institution c. Members with expertise in plasmid methodology d. At least one physician on the committee		
Q14	A vaccine to which of the organisms listed below must be offered to personnel working with human blood cells? a. <i>Hepatitis A virus</i> b. <i>Hepatitis B virus</i> c. <i>Clostridium tetani</i> d. <i>Plasmodium falciparum</i>	1.5	CO4
Q15	The best reason for preparing an outline of a biological safety training program is to ensure that assure consistency in the content of the program each time it is delivered a. True b. False	1.5	CO3
Q16	Steam autoclaving is appropriate for which of the following waste items? a. Fixed tissue samples in formalin b. Instrument pans containing equipment soaking in bleach c. Petri dishes d. Reusable bronchoscopes	1.5	CO2
Q17	The face velocity (inward air flow) of Class I and Class II biological safety cabinets should be in which of the ranges of linear feet per minute listed below? a. 25-50 linear feet per minute b. 75-100 linear feet per minute c. 100-150 linear feet per minute d. 150-200 linear feet per minute	1.5	CO2
Q18	The dispensing of uninoculated primary rhesus monkey kidney tissue culture into sterile culture tubes is most appropriately conducted in which of the engineering devices listed below? a. Class I biological safety cabinet b. Class II biological safety cabinet c. Vertical laminar flow clean bench d. Horizontal laminar flow clean bench	1.5	CO4
Q19	Which one of the following is a primary containment device? a. Centrifuge rotor b. Standard animal cage c. Clean air bench d. Gasketed centrifuge cups		CO2
Q20	A Biosafety Level 3 facility should have which type of air pressurization? a. Neutral b. Positive c. Negative d. Atmospheric	1.5	CO2

**SECTION B**

1. Each question will carry 5 marks
2. Instruction: Write short / brief notes

Q21	a. What are biological hazards? b. Why research on biological hazards is necessary?	2+3=5	CO1
Q22	a. What is Laboratory biosafety? b. Discuss different level of biosafety.	2+3=5	CO2
Q23	a. Write the name of organisms for all the biorisk groups. b. What is biocontainment?	4+1=5	CO3
Q24	a. Discuss air circulation plan for BSL 3 and BSL 4 laboratories. b. Discuss on the waste management plan for BSL4 lab.	3+2=5	CO3

### SECTION C

**1. Each Question carries 15 Marks.**

**2. Instruction: Write long answer.**

Q25	Suppose you are a laboratory microbiologist working with a potentially harmful microbe in the risk group of 4. Precautions must be taken in the laboratory to make sure you and others are not infected. a. What types of BSL lab facilities do you needed? b. Where in the lab would you complete your work? c. What protective equipment and practices would you use? d. How would you contain the microbe to limit contamination or accidental infection?	3+3+4= 5=15	CO4
Q26	a) How laboratory acquired infection happen? b) What is the role of IBSC? c) Why biosafety training is mandatory?. d) How small, medium and large spill should be managed in biological lab? e) Write name of four blood borne pathogens.	4+3+3+ 3+2=15	CO5

### SECTION D

**1. Each Question carries 10 Marks.**

**2. Instruction: Write long answer.**

Q27	a. What are the purposes/goals of biorisk assessment? b. Discuss the steps of biorisk assessment for research with air transmissible microbes.	4+6=10	CO2
Q28	a) What are the sources of contamination of clean room? b) Describe methods of contamination controlling in room. c) What is the significance of clean room?.	4+4+2= 10	CO3