
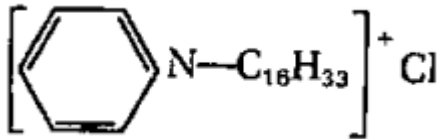


Name:			
Enrolment No:			
<b>UPES</b> <b>End Semester Examination, December 2023</b>			
Course: Principles of Microbiology		Semester : I	
Program: MSc. Microbiology		Duration : 3 Hours	
Course Code: HSMB 7001		Max. Marks: 100	
<b>Instructions:</b>			
S. No.	<b>Section A</b> <b>Short answer questions/ MCQ/T&amp;F</b> <b>(20Qx1.5M= 30 Marks)</b>	Marks	COs
Q 1	Formalin, has a phenol coefficient of 0.3. Given this it can be said that formalin is ..... than phenol.  a. less effective b. more effective c. equally effective d. can not be compared	1.5	CO5
Q 2	Identify the chemical disinfectant below and write one line on its mode of action.  <div style="text-align: center;">  </div>	1.5	CO5
Q3	The total magnification of a microscope is calculated by:  a. Addition of the objective lens and ocular lens magnification powers b. Multiplication of the objective lens and ocular lens magnification powers c. Multiplication of the objective lens and condenser lens magnification powers d. The objective lens power squared e. None of the above	1.5	CO5

<b>Q4</b>	Which of the following microscopic techniques provide three-dimensional images of a bacterial cell?  a. Transmission Electron Microscopy b. Scanning Electron Microscopy c. Negative staining microscopy d. Dark-field microscopy e. Fluorescent microscopy	<b>1.5</b>	<b>CO1</b>
<b>Q5</b>	The transmission electron microscope has the greatest resolving power because it uses an electron beam to view the sample instead of a light beam. The electron beam is used because  a. Electrons have longer wavelengths than light waves b. Electrons do not penetrate the sample c. Light waves are less visible d. Electrons have shorter wavelengths than light waves e. Electrons are less invasive.	<b>1.5</b>	<b>CO1</b>
<b>Q6</b>	Which stains are frequently used to identify mycobacterium and other bacteria whose cell walls contain high amounts of lipids?  a. Gram stain b. Schaeffer-Fulton stain c. Acid-fast stain d. Giemsa Stain e. Spore stain	<b>1.5</b>	<b>CO4</b>
<b>Q7</b>	The respiratory chain of bacteria is associated with the _____  a) cytoplasmic membrane b) cell wall c) cytoplasm d) mitochondrial membrane	<b>1.5</b>	<b>CO2</b>
<b>Q8</b>	Define gut microbiome.	<b>1.5</b>	<b>CO2</b>
<b>Q9</b>	Draw a well labeled bacterial cell.	<b>1.5</b>	<b>CO2</b>
<b>Q10</b>	Draw a well labelled unicellular alga.	<b>1.5</b>	<b>CO5</b>
<b>Q11</b>	'D-Value of sample A is higher compared to B.' What does it mean?	<b>1.5</b>	<b>CO3</b>
<b>Q12</b>	Spores are resistant structures which can be destroyed by:  a) Soap a. Autoclave b. Overnight hot-air oven c. Alcohol	<b>1.5</b>	<b>CO3</b>
<b>Q13</b>	Which of the following microbial control methods does not actually kill microbes or inhibit their growth but instead removes them physically from samples?	<b>1.5</b>	<b>CO4</b>

	<p>A. filtration</p> <p>B. desiccation</p> <p>C. lyophilization</p> <p>D. nonionizing radiation</p>		
<b>Q14</b>	<p>What do both fungi and algae have in common</p> <p>a) Thallus organization</p> <p>b) Chlorophyll</p> <p>c) Grow at same pH</p> <p>Cell wall constituents are same</p>	<b>1.5</b>	<b>CO4</b>
<b>Q15</b>	<p>Bacteria are</p> <p>a. visible under microscope</p> <p>b. Prokaryotes</p> <p>c. Surrounded by a cell wall</p> <p>All of the above</p>	<b>1.5</b>	<b>CO4</b>
<b>Q16</b>	<p>..... is the algae from which agar is obtained.</p>	<b>1.5</b>	<b>CO4</b>
<b>Q17</b>	<p>Name an edible brown alga.</p>	<b>1.5</b>	<b>CO5</b>
<b>Q18</b>	<p>Which of the statements regarding gram staining is wrong?</p> <p>a. <i>Mycobacterium tuberculosis</i> stains blue because of the thick lipid layer</p> <p>b. <i>Streptococcus pyogenes</i> stains blue because of a thick peptidoglycan layer</p> <p>c. <i>Escherichia coli</i> stains pink because of a thin peptidoglycan layer</p> <p>d. <i>Mycoplasma pneumoniae</i> is not visible in the Gram's stain because it has no cell wall</p>	<b>1.5</b>	<b>CO5</b>
<b>Q19</b>	<p>Prokaryotic cells are more resistant to osmotic shock than eukaryotic cells because</p> <p>a. They have impervious cell wall composed of peptidoglycan</p> <p>b. They are selectively permeable</p> <p>c. They contain osmoregulating porins</p> <p>d. The statement is false, eukaryotic cells are more resistant</p>	<b>1.5</b>	<b>CO5</b>
<b>Q20</b>	<p>Name a fluorochrome used in staining DNA.</p>	<b>1.5</b>	<b>CO3</b>
<b>Section B</b>			

<b>(4Qx5M=20 Marks)</b>			
<b>Q 1</b>	Give principle and ray diagrams of phase contrast microscopy.	<b>5</b>	<b>CO4</b>
<b>Q2</b>	Differentiate between: (i) Light field and dark-field microscopy (1) (ii) Phase contrast and Difference interference contrast microscopy (2) (iii) Define Numerical aperture and limit of resolution of a microscope (2)	<b>5</b>	<b>CO4</b>
<b>Q3</b>	What is freeze-fracture technique? Where is it commonly used?	<b>5</b>	<b>CO4</b>
<b>Q4</b>	Differentiate between Epifluorescence and confocal microscope.	<b>5</b>	<b>CO1</b>
<b>Section C</b> <b>(2Qx15M=30 Marks)</b>			
<b>Q 1</b>	A sample of soil has been collected from different parts of the world to test for the presence of various microorganisms. (i) How would you go about finding out diversity of microorganism in this sample? (1) (i) What is the principle behind the technique that answers question (i)? (3) (ii) Having known the diversity; how would you culture different microorganisms in this sample such as bacteria, virus, fungus, protist, and algae? (5) (iii) Give examples of gram negative, gram positive bacteria, a red alga, a ciliated protist, a flagellated protist and an edible fungus.(3) (iv) Enlist various methods of horizontal transfer in bacteria and write a line describing each. (3)	<b>15</b>	<b>CO3</b>
<b>Q2</b>	‘On the bottles of disinfectant its usually written that it is 99.99% effective.’ Based on this answer the following: 1. Write the reasons behind action 99.9% efficacy of disinfectant is how is it tested? (6) 2. Arrange in order of efficacy of disinfection--- Ethanol, Butanol, Pentanol, Propanol (2) 3. How is efficacy of a disinfectant tested? (4) 4. How is phenol coefficient calculated? (3)	<b>15</b>	<b>CO4</b>
<b>Section D</b> <b>(2Qx10M=20 Marks)</b>			
<b>Q 1</b>	1. Name various chemical agents used as antimicrobial agents with their mode of action. (7) 2. ‘Dry heat is more effective than moist.’ Comment on the statement. (1.5)	<b>10</b>	<b>CO5</b>

	3. 'Detergents are sterilizing agents.' Comment on the statement. (1.5)		
<b>Q2</b>	Write the principle and working of a confocal microscope. Where is it ideally used?	<b>10</b>	<b>CO3</b>