


<b>Name:</b>			
<b>Enrolment No:</b>			
<b>UPES</b>			
<b>End Semester Examination Dec – 2024</b>			
<b>Program Name: B.Sc. Microbiology</b>		<b>Semester : V</b>	
<b>Course Name: Marine Microbiology</b>		<b>Time : 2 hrs</b>	
<b>Course Code: HSMB 3030</b>		<b>Max. Marks : 100</b>	
<b>Nos. of page(s): 2</b>			
<b>Instructions:</b>			
Read all questions carefully and support your answers with labelled diagrams wherever necessary.			
<b>S. No.</b>	<b>Section A</b>	<b>Marks</b>	<b>COs</b>
	<b>Short answer questions/ MCQ/T&amp;F</b> <b>(20Q x 1.5M = 30 Marks)</b>		
<b>Q 1</b>	The father of Marine Microbiology is _____.	<b>1.5</b>	<b>CO1</b>
<b>Q2</b>	State the difference between pelagic zone and neritic zone.	<b>1.5</b>	<b>CO1</b>
<b>Q3</b>	State the difference between primary production and new production.	<b>1.5</b>	<b>CO1</b>
<b>Q4</b>	Sea water density is a function of _____, _____ and _____.	<b>1.5</b>	<b>CO2</b>
<b>Q5</b>	State the difference between plankton and benthos.	<b>1.5</b>	<b>CO1</b>
<b>Q6</b>	Define PAR.	<b>1.5</b>	<b>CO1</b>
<b>Q7</b>	State the importance of mixed layer depth for nutrient availability.	<b>1.5</b>	<b>CO1</b>
<b>Q8</b>	Mention important groups of marine phytoplankton.	<b>1.5</b>	<b>CO1</b>
<b>Q9</b>	State typical characteristics of Abyssopelagic Zone.	<b>1.5</b>	<b>CO1</b>
<b>Q10</b>	Define OMZ.	<b>1.5</b>	<b>CO1</b>
<b>Q11</b>	Enlist factors that drives thermohaline circulation in oceans.	<b>1.5</b>	<b>CO2</b>
<b>Q12</b>	Comment on the importance of thermohaline circulation.	<b>1.5</b>	<b>CO2</b>
<b>Q13</b>	The average salinity of ocean is _____.	<b>1.5</b>	<b>CO1</b>
<b>Q14</b>	Define red-field ratio.	<b>1.5</b>	<b>CO2</b>
<b>Q15</b>	Enlist nutrient(s) that typically limits productivity of HNLC regions.	<b>1.5</b>	<b>CO3</b>
<b>Q16</b>	Define Ocean acidification.	<b>1.5</b>	<b>CO3</b>
<b>Q17</b>	State the importance of microbial loop for C cycle.	<b>1.5</b>	<b>CO2</b>
<b>Q18</b>	Comment on importance of viral shunt.	<b>1.5</b>	<b>CO2</b>
<b>Q19</b>	A common tracer used for studying marine nitrogen cycling is _____.	<b>1.5</b>	<b>CO2</b>
<b>Q20</b>	Cells of Coccolithophores are made of _____.	<b>1.5</b>	<b>CO1</b>

<b>Section B</b> <b>(4Qx5M=20 Marks)</b>			
<b>Q1</b>	Describe the size-based classifications of planktons with help of a labelled diagram.	<b>5</b>	<b>CO1</b>
<b>Q2</b>	Discuss typical characteristics of a marine oligotrophic bacteria.	<b>5</b>	<b>CO1</b>
<b>Q3</b>	Describe biological carbon pump and their importance for C cycle.	<b>5</b>	<b>CO3</b>
<b>Q4</b>	Describe symbiotic interactions involving Bob-tail squids and marine bacteria.	<b>5</b>	<b>CO2</b>
<b>Section C</b> <b>(2Qx15M=30 Marks)</b>			
<b>Q 1</b>	(a) Explain the structure of a coral polyp with help of a labelled diagram (5 Marks). (b) Discuss symbiotic interactions between zooxanthellae and coral polyps. (5 Marks) (c) Discuss the environmental importance of coral-reef ecosystems and impacts of climate change. (5 Marks)	<b>15</b>	<b>CO3</b>
<b>Q2</b>	Describe microbial interactions of hydrothermal vent ecosystems and their evolutionary importance.	<b>15</b>	<b>CO2</b>
<b>Section D</b> <b>(2Qx10M=20 Marks)</b>			
<b>Q 1</b>	Explain the various causative factors controlling formation of harmful algal blooms and discuss their impacts on human health.	<b>10</b>	<b>CO3</b>
<b>Q2</b>	Enlist and explain various oceanography samplers and profilers used for study of marine microbes.	<b>10</b>	<b>CO2</b>