

<b>Name:</b>	 <b>UPES</b> UNIVERSITY WITH A PURPOSE	
<b>Enrolment No:</b>		

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

**End Semester Examination, December 2021**

**Programme Name: B. Sc. Microbiology**

**Semester : III**

**Course Name : Environmental Microbiology and Microbial Ecology**

**Time : 180min**

**Course Code : HSMB2009**

**Max. Marks : 100**

**SECTION A**

**1. Each Question will carry 1.5 Marks**

**2. Instruction: Complete the statement / Select the correct answer(s)**

		Marks	
Q 1	Define eco-system.	1.5	CO1
Q2	Radiophiles are  a) Microbes that can survive at high temperature b) Microbes that needs high salinity for growth c) Microbes that survive radiation d) None of the above	1.5	CO1
Q3	Ruminant have anaerobic fungi in their rumen a. True b. False	1.5	CO2
Q4	Fill in the blanks and complete the following food-chains with appropriate example  a) Phytoplankton, ..... , ..... , large fishes, .....	1.5	CO1
Q5	Define food chains.	1.5	CO1
Q6	Write three sources of solid waste	1.5	CO3
Q7	Piezophiles are bacteria that can grow  a) At high salinity b) At high hydrostatic pressure c) Both A and B d) None of the above	1.5	CO1
Q8	Which of the following microbes is thermophiles  a) <i>Deinococcus radiodurans</i> b) <i>Thermus aquaticus</i> c) <i>Escherichia coli</i>	1.5	CO1

	d) <i>Pseudomonas putida</i>		
Q9	Synergism is the interaction or cooperation of two or more microbial agents to produce a combined effect greater than the sum of their separate effects a) True b) False	1.5	CO2
Q10	Mutualism is a. an association between two organisms in which one benefits and the other derives neither benefit nor harm b. an association between two organisms in which both are benefitted c. an association between two organisms where one is benefitted but other is harmed d. none of the above	1.5	CO2
Q11	Fill in the blanks and complete the following food-chains with appropriate example  a) Grass, ....., Frog, ....., peacock	1.5	CO1
Q12	BOD stands for..... a) Biological oxygen details b) Biological oxygen demand c) Biogas oxygen demand d) None of the above	1.5	CO3
Q13	Which of the following treatment physically removes 20-30% of the BOD that present in suspended form? a) Primary b) Secondary c) Tertiary d) All of the above	1.5	CO3
Q14	The surface waters are susceptible to contamination with microorganisms from _____ a) the air b) the surface runoff c) precipitation d) atmospheric water and the surface runoff	1.5	CO3
Q15	Primary producers are found growing in which of the following layers of water? a) upper layer b) middle layer c) intermediate layer d) bottom layer	1.5	CO1
Q16	Which of the following test is used for routine analysis of Coliform? a) Confirmed test b) Completed test c) Presumptive test d) All of the above	1.5	CO4

Q17	Which of the following processes is performed by Thiobacillus thiooxidans? a) converting sulphur to sulphates b) converting sulphur to sulphides c) converting sulphur to sulphites d) converting organic sulphur to inorganic sulphur	1.5	CO2
Q18	The degradation of complex molecules in soil by fungi for utilization by bacteria is an example of which type of association? a) Neutralism b) Mutualism c) Commensalism d) Antagonism	1.5	CO2
Q19	Parasitism results from competition among organisms for essential nutrients. a) True b) False	1.5	CO2
Q20	Oxidation ponds are very deep ponds. a) True b) False	1.5	CO3

### SECTION B

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

Q1	a. What is bioaerosol? b. Briefly discuss the parameters that affect the survival of microbes in the bioaerosol	1+4=5	CO1
Q2	Match the following mutual relationship with the corresponding example a) Plant and microbes                      i. Lichen b) Protist and fungi                          ii. Root nodule of chickpea and Rhizobium c) Animal and bacteria                      iii. Crocodile and Plover bird d) Plant and insect                            iv. Ruminant and methanogens e) Animal and animal                        v. Flower and bees	5	CO2
Q3	Write the wastewater treatment process	5	CO3
Q4	Is carbon cycle and nitrogen cycle are related to each other? Explain	5	CO4

### SECTION C

- 1. Each Question carries 15 Marks.**  
**2. Instruction: Write long answer.**

Q1	a. Classify the biological agents as per the biosafety b. What are the impacts of solid waste on our environment? c. Write short note on the nitrogen fixation by bacterial agents	5+5+5=15	CO2
Q2	a. Discuss the sources of microbes in the outdoor environment b. Discuss the solid waste disposal strategies c. Match the following  i. Thermophiles                              1. <i>Deinococcus radiodurans</i> ii. Mesophiles                                    2. <i>Thermus aquaticus</i> iii. Psychrophiles                              3. <i>Escherichia coli</i>	5+5+5=15	CO1

	iv. Piezophiles v. Radiophiles	4. <i>Pseudomonas putida</i> 5. <i>Schewenella Benthica</i>		
<b>SECTION D</b>				
<b>1. Each Question carries 10 Marks.</b>				
<b>2. Instruction: Write long answer.</b>				
Q1	a. Describe the procedure for MPN test b. Discuss the advantages of membrane filter techniques for analysis of water		<b>6+4=10</b>	<b>CO4</b>
Q2	a. Write a short note on biosafety level to be followed in your laboratory b. What is the significance of biogeochemical cycles?		<b>6+4=10</b>	<b>CO2</b>