Name: Enrolment No:	

UPES

End Semester Examination, Dec 2024

Course: Environmental Microbiology and Microbial Ecology
Semester: V
Program: Integrated B.MSc Microbiology **Time : 03 hrs.**
Course Code: HSMB3016 **Max. Marks: 100**

Instructions: Answer all questions. Students are allowed to use a scientific calculator.

Short answer questions/ MCQ/T&F
(20Qx1.5M= 30 Marks)

Sl	Questions	Marks	CO's
Q1	State the difference between symbiosis and syntrophy with an example.	1.5	CO2
Q2	Periodic changes in Earth's orbital parameters that cause major changes in the planet's climate are called the _____ cycles.	1.5	CO1
Q3	Mention names of BTEX compounds.	1.5	CO1
Q4	Define Mixed layer Depth.	1.5	CO1
Q5	State how dechlorination is done from water samples before BOD analysis.	1.5	CO3
Q6	State the difference between gray water and black water.	1.5	CO1
Q7	Comment on the difference between zone of illuviation and eluviation.	1.5	CO1
Q8	Define Thermakarst lakes.	1.5	CO1
Q9	Mention the reagents used in Winkler's A during estimation of dissolved Oxygen.	1.5	CO3
Q10	Define Primary Productivity.	1.5	CO1
Q11	Define valorization and give an example.	1.5	CO3
Q12	State the utility of SHARON process.	1.5	CO3
Q13	Define Nitrogen fixation.	1.5	CO1
Q14	State the difference between net and gross primary-productivity.	1.5	CO1
Q15	Mention examples of autoinducers involved in Quorum Sensing.	1.5	CO2
Q16	Mention the red-field ratio.	1.5	CO1
Q17	State the purpose of CTD profiler.	1.5	CO1
Q18	Mention typical habitat of Magnetotactic bacteria.	1.5	CO2
Q19	State the importance of bioaugmentation with an example.	1.5	CO2
Q20	Mention an example of negative symbiotic relationship.	1.5	CO2
	Section B **(4Qx5M=20 Marks)**		
Q1	(a) Discuss the differences between BOD and COD and their applications to estimate water quality. (3 Marks). (b) State why COD value is greater than BOD value. (2 Marks)	5	CO4
Q2	Explain the concept and implications of Microbial loop with help of a labelled diagram.	5	CO2
Q3	(a) Define Nitrification. (1 Mark) (b) Explain the ecophsyiology of nitrifiers and their role in N cycling.	5	CO1
Q4	Discuss how microbes may be used for bioremediation of Uranium.	5	CO1

Section C **(2Qx15M=30 Marks)**			
Q1	(a) Describe the key components of waste-water treatment plant which ensures effective treatment before discharge. (05 Marks) (b) Describe the role of aeration in wastewater treatment plant. (05 Marks) (c) Discuss the role of microbes in biological treatment process of wastewater. (05 Marks).	**15**	**CO3**
Q2	(a) Total prokaryotic cells can be estimated using epifluorescent microscopy from any water sample. Explain the principle and procedure of using fluorescent stains to estimate total bacterial counts from a water sample. (05 Marks). (b) From the following information calculate the total number of prokaryotic cells in a given river water sample: (05 Marks) Volume Filtered: 5 ml Diameter of filter: 25 mm Dimensions of Ocular micrometer: 100 uM x 100 uM Counts per field of view (FOV): FOV 1 : 156 FOV 4: 189 FOV 2 : 162 FOV 5: 200 FOV 3 : 165 FOV 6: 175	**15**	**CO4**
Section D **(2Qx10M=20 Marks)**			
Q1	Describe the formation of hydrothermal vents and microbial interactions that supports chemosynthetic food chains in vent environments.	**10**	**CO3**
Q2	Discuss various factors that influence formation of Harmful Algal Blooms in coastal and open oceans.	**10**	**CO2**