

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)**

S. No.	Questions	Marks	CO's
Q1	Describe the role of bar-screens in wastewater treatment.	1.5	CO1
Q2	Mention the types of bacteria that indicates faecal contamination in drinking water.	1.5	CO1
Q3	Comment on how frequency of dividing cells can be estimated using epifluorescent microscope.	1.5	CO4
Q4	Mention an example of polyextremophile.	1.5	CO2
Q5	Define compatible solutes. Mention why Halophiles are dependent on compatible solutes.	1.5	CO1
Q6	State the difference between meromictic lakes and holomictic lakes.	1.5	CO1
Q7	Define pyrogenic aerosols.	1.5	CO1
Q8	State the purpose of FRRF.	1.5	CO4
Q9	Mention the reagents used in Winkler's B during estimation of dissolved Oxygen.	1.5	CO3
Q10	State potential habitats of Magnetotactic bacteria.	1.5	CO2
Q11	State the difference between epibiont and a holobiont.	1.5	CO1
Q12	Tracer used for study of N cycling is _____.	1.5	CO1
Q13	Mention examples of NGS sequencers used for Microbiome studies.	1.5	CO1
Q14	Mention an example of dissimilatory Fe/Mn reducing bacteria.	1.5	CO2
Q15	Define Nitrification.	1.5	CO2
Q16	Comment on importance of thermohaline circulation.	1.5	CO1
Q17	Comment on characteristics of HNLC areas that limit primary productivity.	1.5	CO1
Q18	State the importance of new-productivity for marine systems.	1.5	CO1
Q19	Mention an example of microbial syntrophy and state how it is different from symbiosis.	1.5	CO2
Q20	State the role of carboxysomes.	1.5	CO2

**Section B**

**(4Qx5M=20 Marks)**

Q1	Discuss the implications of Ocean acidification on marine biota.	5	CO1
Q2	100 ml of groundwater was filtered on a 47 mm dia. polycarbonate filter and stained with DAPI. A section of the filter was mounted in an epifluorescent microscope. Average cell-count estimated using an ocular counting grid of 100 um x 100 um square was 200. Calculate the total concentration of cells per ml of ground water.	5	CO4

Q3	Discuss the ecophysiology of chemosynthetic life in hydrothermal vents.	<b>5</b>	<b>CO3</b>
Q4	(a) State the difference between Nitrogen fixation and Annamox. (1 Mark) (b) Discuss their contrasting role in biogeochemistry. (4 Mark)	<b>5</b>	<b>CO3</b>
<b>Section C</b> <b>(2Qx15M=30 Marks)</b>			
Q1	(a) State the different stages of waste-water treatment plants. (3 Marks) (b) Describe how does each stage help to remove contaminants from wastewater.(8 Marks) (c) Discuss the potential health risks for improper wastewater treatment. (4 Marks)	<b>15</b>	<b>CO2</b>
Q2	Describe the aerobic biodegradation of BTEX compounds.	<b>15</b>	<b>CO3</b>
<b>Section D</b> <b>(2Qx10M=20 Marks)</b>			
Q1	(a) Describe the role of Arsenite transforming bacteria during ground water contamination of Arsenic. (7 Marks). (b) Discuss potential bioremediation strategies. (3 Marks).	<b>10</b>	<b>CO3</b>
Q2	Design an experiment to isolate chemoautotrophs from rhizospheric soil.	<b>10</b>	<b>CO4</b>