
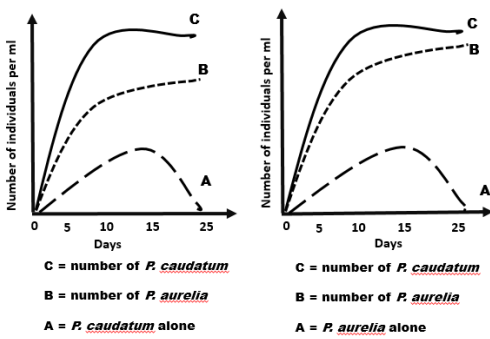


Name:			
Enrolment No:			
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES End Semester Examination, May 2022 Course: Agricultural microbiology and Microbial Ecology Semester: II Program: M.Sc. Microbiology Time : 03 hrs. Course Code: HSMB 7013 Max. Marks: 100			
Instructions:			
Q.No	Section A Short answer questions/ MCQ/True or False	(20Q x1.5M= 30 Marks)	COs
Q	Statement of question		CO
1.	----- are not known to have Ectomycorrhizza a. Gymnosperms b. Dicots c. Monocots d. None of the above	1.5	CO2
2.	What is 'VAM' a. Ectomycorrhizza b. Ectendomycorrhizza c. Endomycorrhizza d. None of the above	1.5	CO1
3.	'The growth rate of any organism in nature is controlled by a limiting nutrient.' What is this law called and where is it applied? a. Lotka-Volterra model b. Gauss law c. Liebig's law of minimum d. Law of endurance	1.5	CO1
4.	'Nitrogenase' is an enzyme which works only in presence of oxygen.' Comment on this statement.	1.5	CO2
5.	----- is a predatory bacteria.	1.5	CO4
6.	----- is a family of insecticidal viruses useful in control of pests.	1.5	CO1
7.	Antibiosis is an example of a. Ammensalism b. Mutualism c. Competition d. Symbiosis	1.5	CO4
8.	'Carbon cycle is intimately linked to one biogeochemical cycle.' Which of the following cycles is it? a. Phosphorous cycle b. Nitrogen cycle c. Sulfur cycle	1.5	CO5

	d. Iron cycle		
9.	Define biogeochemical cycle.	1.5	CO5
10.	Nitrogen supply in paddy fields is due to a cyanobacterium.....(genus and species); which is present in leaves of(host).	1.5	CO3
11.	<i>Agrobacterium tumefaciens</i> containsplasmid and while <i>Agrobacterium rhizogenes</i> containsplasmid. A) T-DNA, T-DNA B) Ti plasmid, Ti plasmid C) ColE1 plasmid, ColE1 plasmid D) Ti plasmid, Ri plasmid	1.5	CO3
12.	Insecticidal viruses are found singly or clustered in a) Inclusion bodies b) Occlusion bodies c) Polyhedrons d) None of the above	1.5	CO3
13.	Name one man made xenobiotic degrading bacteria, also called as 'superbug.'	1.5	CO6
14.	There is a lot of thrust on using biofertilizers. What are the main elements that these biofertilizers supply?	1.5	CO3
15.	Peanut, Soyabean plants are provided specific symbiotic biofertilizers which fix nitrogen. Name any one of them (genus and species).	1.5	CO3
16.	Some plants can remove pollutants from environment by a process called as	1.5	CO6
17.	Define COD.	1.5	CO1
18.	Metabolically similar microbial populations that exploit the same resources in a similar way are called a. Niche b. Microbial community c. Guilds d. All of the above	1.5	CO1
19.	Microbial activity of ecosystem can be monitored using : a. Microprobes b. Stable isotope probing c. Functional genomics d. All of the above	1.5	CO1
20.	"The total number of different species present in an ecosystem gives" a. Species abundance b. Species richness c. Microbial population d. Microbial taxonomy	1.5	CO1
	Section B	(4Qx5M=20 Marks)	CO

Q	Statement of question		
1.	<p>Given the pictures below, explain the ecological phenomenon that causes this.</p>  <p> C = number of <i>P. caudatum</i> B = number of <i>P. aurelia</i> A = <i>P. caudatum</i> alone </p> <p> C = number of <i>P. caudatum</i> B = number of <i>P. aurelia</i> A = <i>P. aurelia</i> alone </p>	5	CO4
2.	Define microbial consortia and explain it with the help of an example.	5	CO4
3.	Describe the sewage treatment process. Draw a flow chart and highlight the steps and the microbiology involved.	5	CO6
4.	What is co-evolution? How can one identify/study co-evolution with the help of symbiotic associations?	5	CO4
Section C		(2Qx15M=30 Marks)	
Q	Statement of question (Case studies)		CO
1.	<p>An ecologist cultured a soil sample and found few microbial colonies on his culture plates corresponding to few taxa; while 16S rRNA sequencing of the same sample indicated presence of 1000 fold more taxa.</p> <ol style="list-style-type: none"> What is technique where 16S rRNA is sequenced? (2) Explain; how the above mentioned technique is revolutionizing the field of microbial ecology? (5) Explain how the technique be applied/utlized to study rhizosphere microflora. (5) What are similar techniques which have traditionally been used to identify diversity of microbes in ecosystem? (3) 	15	CO1
2.	An anaerobic digester was constructed below ground and a part of it is visible above ground which collects biogas. However, due to being made quite long back some corrosion happened. Based on this information; and the figure below	15	CO2



- (i) Identify the type of digester and explain its operation. (5)
- (ii) Compare merits and demerits of different types of digestors (5).
- (iii) Mention/Enlist the optimum conditions for efficient operation of anaerobic digestors. (5)

Section D

(2Qx10M=20 Marks)

Q	Statement of question		CO
1.	<p>With the help of illustrations and text; outline the biogeochemical cycle or Carbon.</p> <p style="text-align: center;">Or</p> <p>With the help of illustrations and text; outline the biogeochemical cycle or Nitrogen.</p>	10	CO5
2.	<p>With the help of flowchart and text; outline the role of PGPRs in promoting plant growth.</p> <p style="text-align: center;">Or</p> <p>Define bioremediation. What are different approaches towards bioremediation?</p>	10	CO6