UPES

End Semester Examination, May 2024

Course: Agricultural Microbiology and Plant Pathology
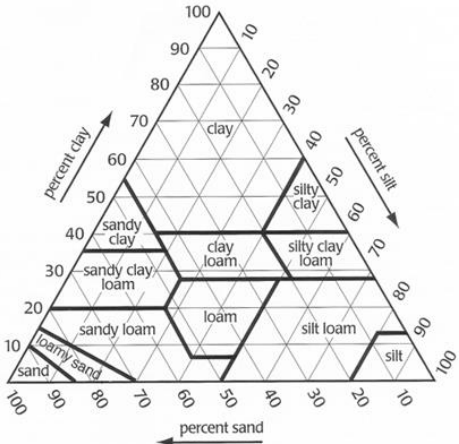
Semester: IV

Program: Integrated BSc-MSc Microbiology

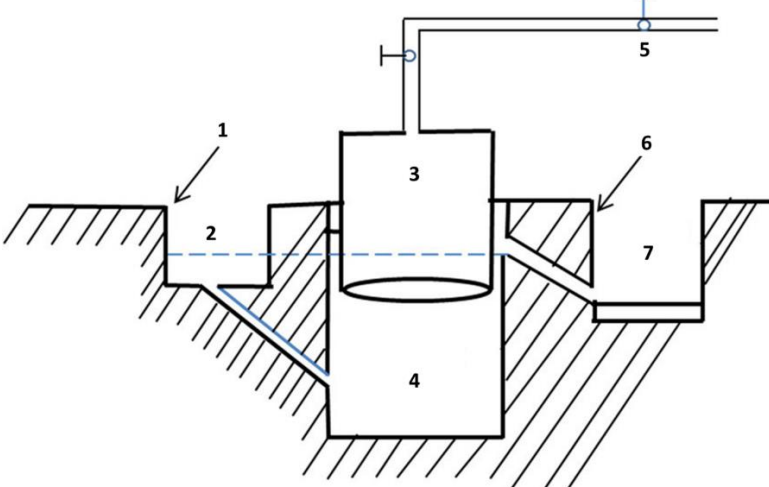**Course Code: HSMB2017**

Duration: 3 Hours
Max. Marks: 100

Instructions: All questions are compulsory.

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	Cos
Q1	Causative agent for bacterial blight of rice is _____.	1.5	CO3
Q2	 Identify the soil type containing 40% Sand and 30% Clay.	1.5	CO1

Q3	Bacteria that can perform "anammox" process belongs to phylum:
	  a) Planctomycetota
	  b) Pseudomonacota
	  c) Myxomycota
	  d) All of the above.
		1.5	CO1

Q4	Name the causative agents for the Tikka disease of Groundnut.	1.5	CO3

Q5	Diazotrophs are bacteria that can perform:
	  A. Nitrogen Fixation
	  B. DNRA
	  C. Annamox
	  D. Nitrification
		1.5	CO1

Q6	Define Biopesticides.	1.5	CO3
Q7	State the different metal-cofactors required for functioning of Nitrogenase.	1.5	CO2
Q8	Define Siderophores. State very briefly their importance as PGPM.	1.5	CO2
Q9	Commonly used tracer for studying soil N cycling is: (a) ^{15}N (b) ^{14}N (c) ^{13}N (d) ^{12}N	1.5	CO1
Q10	State the difference between gross and net-primary productivity.	1.5	CO2
Q11	Commonly used method for estimation of Dissolved Oxygen is: (a) Winkler's Titration (b) Chrome Azurol S assay (c) Oxygen isotopic measurements (d) All of the above	1.5	CO2
Q12	The full form of CTD is _____.	1.5	CO2
Q13	Define DNRA and state the importance of this process for soil productivity.	1.5	CO1
Q14	The limiting step during degradation of organic matter is _____.	1.5	CO4
Q15	Which of the following fungi on infecting crop roots can improve their uptake of phosphorus and other nutrients? A. *Saccharomyces cerevisiae* B. *VA Mycorrhiza* C. *Candida torulopsis* D. *Aspergillus niger*	1.5	CO2
Q16	State the difference between BOD and COD.	1.5	CO3
Q17	Which of the following is a commonly used earthworm species for the vermicomposting process? (A) *Eisenia fetida* (B) *Perionix excavates* (C) Both (a) and (b) (D) None of the above	1.5	CO4
Q18	The moisture level required for vermicomposting should be between: (A) Below 30 per cent (B) 40 and 50 per cent (C) 70 and 80 per cent (D) Above 90 per cent	1.5	CO4

Q19	Following is a prominent example of PGPM and biocontrol agent: (a) *Fusarium* (b) *Trichoderma* (c) *Pythium* (d) *Agrobacterium*	1.5	CO2
Q20	Define Integrated Crop management.	1.5	CO4

Section B
(4Qx5M=20 Marks)

Q1	Describe how *Rhizobium* spp. colonise the root system of legumes with help of a neat diagram.	5	CO2
Q2	Design an assay for screening of P-solubilizing microbes from soil.	5	CO3
Q3	(a) What are GM crops? (a) Briefly state the mode of action of Bt toxin with a labelled diagram?	5 (1+4)	CO3
Q4	Explain the basis of Anabena-Azolla association and discuss their importance as biofertilizers.	5	CO3

Section C
(2Qx15M=30 Marks)

Q1	 a) Identify the process from above image. b) Comment on environmental importance and applications of (a). c) Label different components (1 – 7) in the above image. d) Describe the key microbially mediated reactions involved with examples of representative microbial genera and species. e) Explain the important factors affecting output production.	15 (1+1.5+3.5+6+3)	CO4

Q2	a) Identify the causative pathogen from above image and state host-range of the disease in plants. b) Explain the symptoms of the above disease in details. c) Describe the key control measures required for disease management.	15 (5+5+5)	CO3
Section D **(2Qx10M=20 Marks)**			
Q1	(a) Define Mycorrhiza. (b) Name the different types of Mycorrhizae. (c) Explain the difference between ecto- and endo- mycorrhiza with help of a neat diagram. (d) Discuss the importance of Mycorrhiza as biofertilizers.	10 (1+3+ 3+3)	CO2
Q 2	(a) Describe the typical characteristics of soil profile with help of a neat-labelled diagram. (b) Explain the major factors that influences Soil formation.	10 (5+5)	CO1