

Name:  
Enrolment No:



**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, May 2021**

**Course: Agriculture and Ecological Microbiology**  
**Semester: II**  
**Program: MSc. Microbiology**  
**Course Code: HSMB7013**

**Time : 03 hrs.**  
**Max. Marks: 100**

**Instructions:**

1. Kindly take the examination from Laptop + Mobile or Mobile only with recommended OS & Browser (mentioned in Exam manual)
2. **Section A- Type the Answers**
3. **Section B, Section C and Section D** - Scan and Upload question type.
4. Use Plain paper (A4 sheet) & Black Gel Pen.
5. Kindly note that to avoid connectivity glitches while uploading your answer sheet, please try to finish earlier than the end time to ensure uploading. **To Scan and Upload answers please make sure that when picture is being taken:**
  - ✓ ensure that shadows do not fall on the paper
  - ✓ ensure that the camera is held stably above the answer sheet in parallel to it
  - ✓ ensure the frame of the picture includes the answer sheet and no surroundings
  - ✓ ensure sufficient lighting in the room
  - ✓ If your answer is more than 1 page for particular question, please scan all the pages of answer and then press the upload button
  - ✓ Same questions should be opened on laptop for which you are uploading scanned answer sheet from mobile

**Example: If you are scanning answer sheet for Que No. 1 of Section B, C and D from Mobile, then Que No. 1 should be visible on your laptop screen.**

**SECTION A**

S. No.	MCQs or Fill in the blanks (1 marks each)	30 Marks	CO
1	Insecticidal viruses are found singly or clustered in ..... a) Inclusion bodies b) Occlusion bodies	1.5	CO1

	c) Polyhedrons d) None of the above		
2	Viruses parasitic on insects fall in family .....	1.5	CO1
3	.....is/are soil borne pathogenic fungi a. <i>Botrytis cinerea</i> b. <i>Sclerotium rolfsii</i> c. <i>Rhizoctonia solani</i> d. All of the above	1.5	CO2
4	Cyanobacteria have specialized cells to carry our nitrogen fixation called .....	1.5	CO2
5	Phosphate solubilizing bacteria and fungi secrete .....	1.5	CO2
6	A type of soils where plant pathogens either do not cause disease or cause mild disease are called .....	1.5	CO2
7	Biomanure is produced as a result of .....  a) Aerobic digestion b) Anaerobic digestion c) Both a and b d) None of the above	1.5	CO6
8	Herbicide tolerance soyabean's commercial name is ..... a. Ready up b. Wound up c. Round up ready d. None of the above	1.5	CO3
9	Biobutanol is produced by .....	1.5	CO3
10	When one microbial population produces a substance that is inhibitory to other populations, the interpopulation relationship is called .....	1.5	CO4
11	The pH of rhizosphere is low. True/False	1.5	CO2
12	.....is a mycorrhizal fungi. a) <i>Trichophyton spp.</i> b) <i>Rhizoctonia solani</i> c) <i>Trichoderma reesei</i> d) All of the above	1.5	CO4
13	Plants synthesize oxygen carrying molecule in response to roots being colonized by nitrogen fixers called as .....  a. phytoglobin b. hemoglobin c. leghemoglobin d. none of the above	1.5	CO4
14	Name one stem nodulating bacteria.	1.5	CO2
15	Identify the phenomenon.	1.5	CO5



16	Name one man made xenobiotic degrading bacteria, also called as ‘superbug.’	1.5	CO6
17	Conversion of ammonium to dinitrogen directly is characteristic of genera ..... a. <i>Dienococcus</i> b. <i>Tardigrade</i> c. <i>Plantomycetes</i> d. <i>Pseudomonas denitrificans</i>	1.5	CO5
18	Incineration is one of the ways of remediation. True/False	1.5	CO6
19	Plants like Poplar tree are used in Phytoremediation.	1.5	CO6
20	PGPR also produce phytohormones to promote plant growth. True/False	1.5	CO2
<b>SECTION B the word limit 20 marks 4 questions 5 marks each</b>			
Q	Short Answer Type Question (5 marks each) Scan and Upload 4 questions 5 marks each	20 Marks	CO
1	Define biogeochemical cycle. With suitable illustrations show Sulphur biogeochemical cycle with role of microbes explained suitably.	5	CO5
2	What are pesticides? How do microbes help in bio-remediation of pesticide contaminated soils? (1 + 4 Marks)	5	CO6
3	Define symbiosis. Give examples and explain at least one. (1 + 4)	5	CO4
4	What are the steps in anaerobic digestion? Name few microorganisms involved (4 +1 Marks)	5	CO3
<b>SECTION C 30 marks</b>			
Q	<b>Two case studies 15 marks each subsections</b>	30 Marks	CO
1	Case Study 1 Look at the plot below and answer the following:  <div style="text-align: center;"> </div>	15	CO4
	i. Identify the type of interaction and define the nature of this interaction. 2 Marks		

	<p>ii. Give examples of few microorganism which exhibit this interaction. 5 Marks</p> <p>iii. What are its types? 3 Marks</p> <p>iv. Give an example where this interaction is useful to the microorganism. 2 Marks</p> <p>v. Define syntrophism and give an example. 3 Marks</p>		
2	<p>Case Study 2</p> <p>An oil spill occurred in gulf of Mexico a decade ago. Some suggestions were given by experts for its clean up like batch-wise treatment of water, taking it new location and doing remediation in small batches. Some suggested adding surfactants etc etc.</p> <p>i What is non-polluting way of remediation of oil spill? 3 Marks</p> <p>ii Microbes secrete some substances which can help in oil clean up. What are they called? Give an example 2 Marks</p> <p>iii Why is oil spill of concern and considered a pollutant? 2 Marks</p> <p>iv Supposedly soil and/or ground water get polluted instead of oil spill. Then, what strategy/ies would you follow, list them? 5 Marks</p> <p>v In line with above question, name the microbes that are important in process and give details of one process. 3 Marks</p>	15	CO6
	<b>SECTION- D 20 marks</b>		
Q	Long Answer type Questions Scan and Upload (10 marks each) <b>word limit</b>	<b>20 Marks</b>	<b>CO</b>
1	How is biogas produced? What are the types of reactors used in the process? (1 + 9 Marks)	<b>10</b>	<b>CO3</b>
2	Why is treatment of sewage water important? What are the steps in treatment of sewage water? (2 + 8 Marks)	<b>10</b>	<b>CO6</b>