

VII SEMESTER B.TECH. MAKE-UP EXAMINATIONS DECEMBER 2019 SUBJECT: BIOREMEDIATION [BIO 4001]

Date of Exam: /12/2019

Time of Exam:

Max. Marks: 50

Instructions to Candidates:

✤ Answer ALL the questions & missing data may be suitable assumed

1A.	How are bioremediation methods advantageous than conventional methods of waste treatment and disposal?	2m
1B.	What are the stages in coal gasification? What is the application of the final product, obtained in the process?	4m
1C.	What do mean by porosity of soil? How is it measured mathematically? What is its usual range for normal soils?	4m
2A.	How is the free energy change used to correlate the energy released in a reaction?	2m
2B.	Explain about the acclimation phase in the life cycle of a bacterium growing in the presence of a polycyclic aromatic hydrocarbon.	3m
2C.	How will moisture and microbial factors influence biodegradation of a toxic compound?	5m
3A.	What methods are used to alter the pH of soil? Explain with examples for all the methods.	3m
3B.	What do you understand by the electron tower concept? How is it used for bioremediation?	3m
3C.	Explain the mechanism by which aromatic compounds are enzymatically degraded. Draw the relevant pathway for a representative compound.	4m
4A.	How are soil samples taken out from a site during treatment using a Land Treatment Unit? Explain using a diagram.	4m
4B.	Name any two design parameters for a Pump, Treat and Reinjection system. Explain how they influence the degradation process.	6m
5A.	Enlist two advantages and disadvantages of phytoremediation.	4m
5B.	Consider the metabolism of glucose by aerobic microbes, for the redox pairs CO_2 /glucose and O_2 /H ₂ O. Write the half reactions and the combined balanced reactions. Find the free energy for this reaction if the RP values for O_2 /H ₂ O is +0.82V and that for CO_2 /C ₆ H ₁₂ O ₆ is -0.43V.	6m