KUMARAGURU college of technology
character is life

Register Number:……

M.TECH DEGREE EXAMINATIONS: JUNE 2018

(Regulation 2015)

Second Semester

BIOTECHNOLOGY

P15BTE201 : Environmental Biotechnology

COURSE OUTCOMES

CO1: Develop a comprehensive understanding of wastewater treatment methodologies and waste management strategies in specific industries.

CO2: Understand the biodegradation pathways for xenobiotic compounds.

CO3: Acquire an ability to apply the concepts in real-world scenarios, for environmental clean-up.

CO4: Ability to handle industrial waste treatment.

CO5: Application of environmental concepts.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Assertion (A): The rapid growing population and economic development is leading to a number of environmental issues in India CO1 [K_4]

   Reason (R): Uncontrolled growth of urbanization and industrialization, expansion and massive intensification of agriculture, and the destruction of forests cause more pollution

   a) Both A and R are Individually true and R is the correct explanation of A
   b) Both A and R are Individually true but R is not the correct explanation of A
   c) A is true but R is false
   d) A is false but R is true

2. About Half of the greenhouse effect is caused by CO1 [K_1]

   a) CO_2
   b) CH_4
   c) N_2O
   d) CFC

3. Mechanisms of bioremediation include CO2 [K_2]

   a) Bioaugmentation
   b) Bioleaching
   c) Biosorption
   d) Biotransformation

4. Match List I with List II CO2 [K_5]

List I	List II
A. Microbial Remediation	i. Algae
B. Phytoremediation	ii. Fungi
C. Mycoremediation	iii. Microorganisms
D. Phycoremediation	iv. Plants

	A	B	C	D
a)	ii	i	iii	iv
b)	iii	iv	ii	i
c)	ii	iv	iii	i
d)	iii	i	ii	Iv

5. Assertion (A): At a temperature of 155˚ F, organic matter will decompose about twice as fast as at 130˚ F CO3 [K_4]

Reason (R): Generally, composting begins at mesophilic temperatures and progresses into the thermophilic range

a) Both A and R are Individually true and R is the correct explanation of A
b) Both A and R are Individually true but R is not the correct explanation of A
c) A is true but R is false
d) A is false but R is true

6. In water treatment procedures, the purpose of coagulation and flocculation is to CO3 [K_2]

a) Disinfect the water supply
b) Remove microorganisms, organic matter, and suspended fine particles
c) Soften the water by removing calcium and magnesium
d) Remove taste and odor problems

7. Disinfection of water in our country is mainly done by CO4 [K_3]

1) Oxygenation
2) Ultraviolet radiation
3) Chlorination
4) Filtration

a) 1,3
b) 1,4
c) 1,2
d) 2,3

8. Assertion (A): The determination of pH value of sewage is important CO4 [K_4]
Reason (R): The efficiency of certain treatment methods depends upon the availability of pH value.

a) Both A and R are Individually true and R is the correct explanation of A
b) Both A and R are Individually true but R is not the correct explanation of A
c) A is true but R is false
d) A is false but R is true

9. _____ is a process in which organic material is heated in vacuum to lower its boiling point and to avoid adverse chemical reactions CO5 [K_1]

a) Energy recovery
b) Vacuum pyrolysis
c) Incineration
d) Gasification

10. In the degradation pathway of alkanes to acyl coA, the sequence of enzymes that degrades corresponding product is CO5 [K_5]

1. Acyl-coA synthetase
2. Aldehyde dehydrogenase
3. Alkane hydroxylase
4. Alcohol dehydrogenase

a) 2-3-4-1
b) 1-3-2-4
c) 3-4-2-1
d) 4-1-3-2

PART B (10 x 2 = 20 Marks)

11. What is eutrophication? CO1 [K_1]
12. Outline the use of algae in waste water treatment. CO1 [K_4]
13. Define Xenobiotics. CO2 [K_1]
14. What is phytoremediation? CO2 [K_2]
15. Compare primary and secondary treatment of water. CO3 [K_2]
16. List any two methods involved in tertiary treatment. CO3 [K_1]
17. Differentiate BOD and COD. CO4 [K_4]
18. Compare land filling and incineration method of solid waste management. CO4 [K_4]
19. List any two microorganisms used for bioleaching. CO5 [K_1]
20. Interpret the role of desulphurization in microbial enhanced oil recovery. CO5 [K_2]

PART C (6 x 5 = 30 Marks)

21. Illustrate the four layers of atmosphere with detailed characteristics of them. CO1 [K_2]
22. Explain metal phytoremediation with two case studies. CO2 [K_4]

23.	Explain any four physicochemical characteristics that should be analyzed for polluted water.	CO3	[K_2]
24.	Interpret the usage of activated sludge and fluidized bed process for treatment of water.	CO4	[K_2]
25.	Exemplify the difference in four different generations of biofuel production.	CO5	[K_2]
26.	Explain in detail about Bioplastic technology.	CO5	[K_2]

Answer any FOUR Questions
PART D (4 x 10 = 40 Marks)

27.	Summarize the causes and activities that lead to formation of acid rain with reaction behind it.	CO1	[K_2]
28.	Organize the biodegradation of any one macromolecule with pathways that is followed.	CO2	[K_4]
29.	Integrate the usage of aerobic lagoons and trickling filters for secondary treatment of water.	CO3	[K_4]
30.	Discuss the mechanism of bioremediation of spilled oil and grease deposits	CO4	[K_4]
31.	Explain the steps involved for energy recovery from organic waste by any two methods.	CO5	[K_3]

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