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Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: IV - THEORY EXAMINATION (2023 - 2024)

Subject: Green Biotechnology and Pollution Abetment

Time: 3 Hours Max. Marks: 100

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A 20

1. Attempt all parts:-

1-a. The rule of 3R's to get rid of waste , does not include (CO1) 1

(a) reduce

(b) reuse

(c) recycle

(d) regeneration

1-b. Biomedical waste of human and animal tissues, organs and infected body parts are to be disposed using (CO1) 1

(a) Autoclaving

(b) Microwave

(c) Composting

(d) Incineration

1-c. Bacterial assemblage can help in the degradation of _____ (CO2) 1

(a) alcohol

(b) carbonic acid

(c) water

(d) organic pollutants

1-d. Foreign substances which are chemical in nature found within an organism and produced naturally are called as _____ (CO2) 1

(a) Xenobiotics

(b) Bio-leaching
(c) Bio-remediation
(d) Bio-fortification

1-e. How does a catalyst increase the rate of a reaction? (CO3) 1

(a) By forming an intermediate complex
(b) By increasing activation energy
(c) By lowering the activation energy
(d) By changing equilibrium constant

1-f. Which of the following is incorrect for enzymes? (CO3) 1

(a) Enzymes are specific
(b) Most of the enzymes are protein
(c) Reactivity of enzymes is least at optimum temperature
(d) High temperature and UV rays can denature enzymes

1-g. Bioaugmentation is a process that involves: (CO4) 1

(a) Using plants for bioremediation
(b) Bioventing
(c) Sludge removal
(d) Ex situ bioremediation

1-h. Mycorrhiza works as (CO4) 1

(a) modified leaf
(b) mechanical support
(c) root hairs in adverse condition
(d) modified stem

1-i. Energy resources derived from natural organic materials are called (CO5) 1

(a) geothermal energy
(b) fossil fuels
(c) biomass
(d) Any of the above

1-j. Modern concept of sustainable development focuses more on (CO5) 1

(a) economic development
(b) social development
(c) environmental protection
(d) all of the above

2. Attempt all parts:-

2.a. What do you understand by waste management?(CO1) 2

2.b. How can you measure the rate of biodegradability? (CO2) 2

2.c. What are isolated enzymes? (CO3) 2

2.d.	How can you improve the conditions that are unfavourable to bioremediation? (CO4)	2
2.e.	If the carbon to nitrogen (C:N) ratio is too high, then what will be its impact on decomposition? (CO5)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Discuss about activated sludge process in detail? (CO1)	6
3-b.	Discuss about the minimal national standards for waste disposal? (CO1)	6
3-c.	What do you understand by microbial degradation of xenobiotics? Discuss? (CO2)	6
3-d.	What are the three methods of biodegradation? Discuss each one of them? (CO2)	6
3.e.	Write some of the advantages and disadvantages of isolated enzymes? (CO3)	6
3.f.	Define bioremediation? Write down the different factors which affect the rate of bioremediation? (CO4)	6
3.g.	Describe the properties of biofertilizers? Compare biofertilizers with chemical fertilizers? (CO5)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Give a brief overview of biogas production with the help of suitable diagram? (CO1)	10
4-b.	How will you apply green biotechnology in biological waste management? (CO1)	10

5. Answer any one of the following:-

5-a.	Xenobiotic compounds are the compounds 'foreign to life'? What does this statement imply? (CO2)	10
5-b.	Define the term biodeterioration? Explain the mechanism of biodegradation process with the help of microorganisms? (CO2)	10

6. Answer any one of the following:-

6-a.	Compare and contrast the lock and key model with the induced fit model of enzyme action? What is the significance of these model? (CO3)	10
6-b.	What are the advantages and limitations of biocatalyst? What are some of the common prejudices against enzymes? (CO3)	10

7. Answer any one of the following:-

7-a.	What is micropropagation? Discuss in detail about the different stages of micropropagation? (CO4)	10
7-b.	Explain in detail about the case study of Bisrampur colliery for the restoration of coal mines? (CO4)	10

8. Answer any one of the following:-

8-a.	Briefly describe the principle, working and applications of biosensor? Also draw the diagram of biosensor. (CO5)	10
8-b.	"Bioethanol must be considered as future petrol". How will you justify this	10

statement? (CO5)