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# UNIVERSITY OF RUHUNA

# First Examination in B. Sc. Green Technology

**COURSE : ENVIRONMENTAL BIOTECHNOLOGY**

**COURSE CODE :BL 1203**

**TYPE :THEORY**

**DATE :MODEL PAPER**

**INSTRUCTION TO CANDIDATES**

1. This question paper consists of three (3) parts:

PART I (MCQ)

PART II (Structured essay)

PART III (Essay)

1. Use the given sheet for answering MCQ questions
2. Answer ALL questions

**PART I (MCQ): (20 marks)**

Select the best answer among the choices given and write the answer in the corresponding square on the answer sheet.

Answer Sheet

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Question No | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|  |  |  |  |  |  |  |  |  |  |  |

**PART I MCQ (20 marks)**

**PART II STRUCTURED ESSAY (40 marks)**

1. Fill the blanks using correct terms (12 marks)

I. A   .............................  occurs when a DNA is damaged to alter the genetic message encrypted in the gene.

 II. A  ...........................is an agent of substance that causes a permanent alteration to gene and the genetic message is changed

III. Once the .................................. has been changed the mRNA transcribed from that gene will change the message for transcription.

IV. The .................................produced by translating mRNA will contain a different sequence of amino acids in case of mutations.

V. ......................... have been produced for providing the biologically active environment for remediation of the polluted air.

VI. ....................................... are analytical instruments used for identification of environmental pollution.

2. Write the function of each enzyme(5 marks)

DNA polymerase

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RNA polymerase

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Helicase

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DNA ligase

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Spliceosome

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3. Write the correct term for the following descriptions (5 marks)

I. Partial or complete mineralization by microorganisms is ..........................................................

II. Degradation by the prevailing organisms in the polluted environment or introducing new organisms those could not be seen within the polluted environment .......................................

III. Changing the bio-physical conditions of waste and poisonous compounds in eco-friendly manner using bacteria, fungi and protozoa is described as a .........................................................

IV. The process by which certain living cells (phagocytes) ingest or engulf other cells or particles is described as ....................................................

V. The type of bacteria that converts the N in NH3 into NO2-  is.............................................

3. Biofiltration, bioscrubber, trickling biofiltration, biosparging, and bioventing are some techniques broadly discussed in environmental biotechnology. Briefly describe each technique using the suitable labeled diagram/s (10 marks)

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4.The following statements are incorrect; rewrite it to be corrected in the given space (5 marks).

I. Translation is the one of the steps in gene expression. It involves copying a gene's DNA sequence to make an RNA molecule

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III. Replication has three stages: initiation, elongation, and termination.

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IV. In prokaryotes, RNA molecules must be processed after transcription: they are spliced and have a 5' cap and poly-A tail put on their ends.

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V. Specifically, DNA polymerase builds an RNA strand in the 3' to 5' direction, adding each new nucleotide to the 5' end of the strand

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5. Starting from a hypothetical DNA sequence (12 bases), show the template sequence, coding sequence and transcript (Marks 3)

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**ESSAY (40 marks)**

1. Write short notes on the followings (6 marks)

I. Phytovolatilization

II. Phytostabilization

III. Phytodegradation

IV. Phytoextraction

V. Rhizofiltration

VI. Rhyzodegradation

2. Distinguish the followings in compost production (4 marks)

I. Hydrolysis

II. Acidogenesis

III. Acetogenesis

IV Methonogenesis

3. Explain the problems in compost production and suitable solutions for the identified problems (10 marks)

4. Explain eukaryotic RNA modifications using clearly labeled diagrams (10 marks)

5. Illustrate replication, transcription, and translation by using a hypothetical 16-base pair DNA sequence (10 marks)