

ONLINE MODE

B.Sc.-M.Sc. INTEGRATED PROGRAMME (BIOTECHNOLOGY)
SEMESTER V, ONLINE EXAMINATION 2021
PAPER CODE - BBT-DSE7 TH

PAPER TITLE: ENVIRONMENTAL BIOTECHNOLOGY

Time: Three Hours

Maximum Marks: 75

Attempt all questions. All parts of a question must be attempted in continuation. Start answer of a fresh question on a new page. Cite examples and draw labeled diagrams wherever necessary

Question No. 1:

State whether True or False:

[15 × 1 = 15]

- a) Carbon monoxide (CO) is a product of the incomplete combustion of any fuel.
- b) Particulate matter has no health concern as they improve the respiratory system.
- c) Sulfur oxides are primarily responsible for acid rain.
- d) John Tyndall suggested that changes in water vapor and CO₂ concentrations in the atmosphere could account for "all the mutations of climate".
- e) Energy is a property of matter that can be converted into work, heat or radiation.
- f) Microbial biomass conversion processes take advantage of the ability of microorganisms to synthesize biomass and release oxygen.
- g) Lignin is resistant to degradation and acid- and base-catalyzed hydrolysis.
- h) Biogas is a mixture of gases, primarily consisting of CH₄ and CO₂.
- i) Wastewater screening help in retaining coarse solids that would facilitate mechanical equipment.
- j) During Municipal sludge treatment, chemical stabilization of sludge could be achieved by raising the pH using lime or other alkaline material, such as cement kiln dust.
- k) Biofertilizers are living microbes that enhance plant nutrition by either mobilizing or increasing nutrient availability in soils.
- l) Nitrogenase is an enzyme that converts ammonia into atmospheric nitrogen to help in soil cleaning.
- m) Vesicular-arbuscular mycorrhiza (VAM) are symbiotic endophytic soil fungi, which colonize the roots of approximately 80% of plants.
- n) Bioleaching is the extraction of metals from their ores through the use of dead organisms.
- o) Hyperaccumulator plants can accumulate metal(loid)s above the threshold concentrations of 10,000 mg kg⁻¹ dry weight of shoots for Zn and Mn, 1000 mg kg⁻¹ for Co, Cu, Ni, As, and Se, and 100 mg kg⁻¹ for Cd.

Question No. 2:

Attempt any ONE of the following.

[1 × 15 = 15]

- A. What are the major disadvantages that we face in using firewood and coal as fuels? Suggest some better options with minimized impacts on the environment and human health.
- B. Describe the production of biogas and mention the importance of biogas as a renewable energy source.

Question No. 3:

Attempt any ONE of the following.

[1 × 15 = 15]

- A. How can different organisms help in cleaning contaminated soils? Give detailed insight into the mechanism of phytoremediation.
- B. How are the lignin and cellulose degraded by the microorganisms? Discuss the mechanism of the process mentioning key enzymes.

Question No. 4:

Attempt any ONE of the following.

[1 × 15 = 15]

- A. What is the significance of biological nitrogen fixation? Write a note on the symbiotic nitrogen fixation.
- B. What is the common composition of municipal waste? Discuss important steps and their significance in the treatment of municipal waste.

Question No. 5:

[1 × 15 = 15]

Attempt any ONE of the following.

- A. What is achieved by the bioleaching process? Explain the mechanism of metal recovery by microbes?
- B. Microbes can solubilize metals and ions (such as phosphate) from the soil. Describe the mechanism by citing an example.

***It should be noted that 60 minutes of extra time will be provided to scan your answer sheets, build a PDF and upload it on
Email: biotechnologyexam2020@gmail.com***

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