B.TECH/BT/7TH SEM/BIOT 4142/2020

ENVIRONMENTAL BIOTECHNOLOGY
(BIOT 4142)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) Xenobiotics" are _____.
(a) any chemicals that contain carbon
(b) products used for the biological control of pests
(c) special soil amendments favoured in organic farming
(d) synthetic organic compounds not found in nature

(ii) Full form of EPA is
(a) Environmental protocol academy
(b) Environmental protection agency
(c) Ecology protection agency
(d) Ecology protection authority

(iii) Which of the following would be considered one of the benefits or advantages of ex situ soil washing as a remediation technique for polluted soils?
(a) the quickness with which clean-up standards can be met
(b) the relatively low cost of washing the soil with an appropriate solvent compared to other methods
(c) the relatively little disturbance of the site and the soil involved
(d) all of the above.

(iv) Sludge Volume Index for a good sludge is
(a) Less than 40 (b) 40-100
(c) 100-200 (d) More than 200.

(v) This clean-up approach includes removal of groundwater or soil from its natural setting to permit for bioremediation
(a) Bioaugmentation (b) In situ bioremediation
(c) Ex situ bioremediation (d) Phytoremediation.

(vi) Mist is a
(a) Liquid with droplet size less than 10 μm
(b) Liquid with droplet size more than 10 μm
(c) Gas with molecular size less than 10 μm
(d) Gas with molecular size more than 10 μm.

(vii) A process using microbes to convert toxic industrial wastes to less toxic or non-toxic compounds is
(a) Precipitation (b) Complement fixation
(c) Bioconversion (d) Bioremediation.

(viii) Spray Tower is used for removal of
(a) Waste water (b) Gaseous air pollutant
(c) Particulate matter (d) None of these.

(ix) Which of the following bacterium is called superbug that could clean up oil spills
(a) Bacillus subtilis (b) Pseudomonas putida
(c) Pseudomonas denitrificans (d) Bacillus denitrificans.

(x) The conditions for formation of Photochemical Smog are
(a) Air stagnation
(b) Abundant sunlight
(c) High concentration of hydrocarbons and nitrogen oxides
(d) All of these.

Group – B

2. (a) A conventional cyclone with diameter 1 m handles 3 m^3/s of standard air. Using N_e = 6, determine the cut size of particles of density 1500 Kg/m^3. $\mu_g = 1.8 \times 10^{-5}$ Kg/m-s.

(b) What is a particulate matter? Classify them.

(c) What do you mean by secondary air pollutants?

4 + (5 + 1) + 2 = 12

3. (a) Describe briefly the working principle of Cyclone Separator.

(b) Discuss the removal of different air pollutants by adsorption by solids.

6 + 6 = 12

Group – C

4. (a) How can you analyse colour and odour in waste water?

(b) How can you remove the dissolved solids from water sample by solvent extraction method?

6 + 6 = 12

5. (a) Briefly discuss the primary waste water treatment.

   (b) What is the significance of food-to-microorganisms (F/M) ratio?

8 + 4 = 12

Group – D

6. (a) What is anaerobic digestion? Mention the reaction schemes involved in the process.

   (b) What should be the ideal values of C: N ratio in composting and why?

6 + 6 = 12

7. (a) Write short note on landfarming with a neat sketch.

   (b) State the advantages and disadvantages of biopile process

6 + 6 = 12

Group – E

8. (a) Differentiate between the terms Biodegradation and Mineralisation.

   (b) Outline the biodegradation pathway of phenol by aerobic microorganism.

   (c) Define phytovolatilization

3 + 7 + 2 = 12

9. (a) Explain co-metabolism and gratuitous metabolism of xenobiotic compounds with at least one example from each type .

   (b) What are PAHs? State their general properties.

4 + 4 + 4 = 12

Department & Section	Submission Link
BT	https://classroom.google.com/c/MjQyMDUwNDEwNTY3/a/Mjc1NTE3MDQ5Njk3/details