

DSCC 7 Environmental Microbiology Semester V

Unit wise model questions

Unit 1

Answer the following questions in one to two words (1 mark each)

1. Write the name of first identified Hyperthermophile
2. Write the name of the world toughest bacteria
3. Write the name of oil-eating bacteria
4. Which bacteria grow at 37°C?
5. Which bacteria grow at high osmotic pressure?
6. Define the term barophile

Answer the following short questions (2 marks each)

1. What is Extrimophiles?
2. Define Halophiles with an example
3. Which factors affecting the rate of decomposition?
4. Write the feature of Oligotrophs
5. Define Psychrotolerants. Give an example
6. Define radioresistor with an example
7. Define xerophile with an example
8. Define barotolarent with an example
9. What are the different extreme environmental conditions?
10. State about the occurrence of Oligotrophs.

Answer the following broad questions (more than 2 marks)

1. What are the characteristic adaptations of oligotrophs? Give an example of it. Write the biotechnological application of halophiles. (2+1+2)
2. Explain the adaptive mechanism of psychrophiles. Why psychrophiles are known as bioremediators? . (2+2)
3. Classify the thermophiles with respect to temperature and give an example of each. Explain the adaptive mechanism of thermophiles with diagram (1.5+1.5+2)
4. Write the biotechnological application of acidophiles and alkaliphiles (2+2)
5. Why microorganism decomposes plant organic materials? Explain the different decomposition process. (2+3)

Unit 2

Answer the following questions in one to two words (1 mark each)

1. What is neutralism?
2. What is bio-fertilizer?
3. What is ammensalism?
4. What is meant by the term fixed Nitrogen?
5. What is the biological significance of root nodule formation legumes?
6. What is competitive exclusion?
7. What are rhizobia?

Answer the following short questions (2 marks each)

1. State differences between mutualism and commensalism? Give example.
2. Give example of ammensalism and synergism.
3. Compare bio-fertilizers and chemical fertilizers.
4. Define predation and parasitism. How are these similar and different?
5. Discuss mutualism relationship between two microbial population.
6. How do Rhizobia colonize the legume root?
7. Why is nitrification a good example of commensalistic process?
8. How does bio-fertilizers enhances soil fertility?
9. How do Azotobactor and *Rhizobium* sp. protect their nitrogenase from oxygen?
10. How do molybdenum and vanadium and leg haemoglobin influence nitrogenase activity?
11. Describe the differences between symbiotic and asymbiotic nitrogen fixation.
12. Briefly describe the process of nitrification and de-nitrification.
13. Discuss the differences among symbionts and opportunist and pathogens.
14. What factors determines the attraction of Rhizobium to the root surface of legume plants?
15. With suitable examples define commensalism.
16. Write notes on nod gene?
17. Differentiate between competition and predation with respect to microbial interaction.
18. What are the two kinds of nitrogen fixing bacteria? Elucidate with example.

Answer the following broad questions (3 marks each)

1. Briefly state the mechanism of biological nitrogen fixation.
2. Write short notes on Rhizobium.

Unit 3

Answer the following questions in one to two words (1 mark each)

1. What is meant by cross inoculation group?

2. What is nod cluster?
3. Differentiate between nitrification and ammonification
4. Distinguish between nitrate assimilation and denitrification.
5. What is infection thread?

Answer the following short questions (2 marks each)

1. Name the signal molecules secreted by legumes to interact with Rhizobia.
2. What is leg-hemoglobin? What is its function?
3. Differentiate between symbiotic and non-symbiotic nitrogen fixation?
4. What role played by IAA and lectins in biological nitrogen fixation?
5. What are nif genes and nif clusters?

Answer the following broad questions (more than 2 marks)

1. Write the chemical nature of dinitrogenase complex. 4
2. Give an account on the symbiotic and non-symbiotic nitrogen fixers with their specific hosts. 4
3. Write the role of TCA cycle acids in amino acid biosynthesis. 3
4. Write the reactions catalysed by GS and GOGAT and mention their regulatory roles. 4+2
5. Write the role of different types of cofactors involved in dinitrogen fixation in Rhizobia. 4

Unit 4

Answer the following questions in one to two words (1 mark each)

1. What is waste?
2. Define biomedical waste.
3. Define MSW.
4. What is e-Waste?
5. What do you mean by Waste management?
6. What is hazardous waste?
7. What is composting?
8. What is C/N ratio?
9. Define BOD
10. Define COD
11. Define NOD
12. What are coliform bacteria?
13. What do you mean by eutrophication?

Answer the following short questions (2 marks each)

1. Write the different categories of solid waste.

2. Describe the risks and problems associated with solid wastes.
3. What is the “4R”’s of waste management?
4. What do you mean by sludge and activated sludge?
5. Write the characteristics of an indicator organism
6. What do you mean by secondary waste water treatment?
7. What do you mean by tertiary waste water treatment?
8. Write the importance of secondary sewage treatment.
9. Write the importance of tertiary sewage treatment.
10. Describe how solid sludge is disposed after sewage treatment.

Answer the following broad questions (3 marks each)

1. Briefly describe activated sludge process of waste water treatment
2. Briefly describe trickling filter process of waste water treatment
3. Briefly describe the various processes of tertiary waste water treatment.
4. Write short note on organic composting.
5. Write short note on sanitary landfilling.

Unit 5

Answer the following questions in one or two words (1 mark each)

1. What do you mean by bioremediation?
2. Define the following terms
Biostimulation, Bioaugmentation, Biosparging, Bioventing, Biopiles
3. What do you mean by Xenobiotic compound?
4. What is bioleaching?
5. What do you mean by in-situ and ex-situ remediation?
6. What is Super Bug?
7. What are PAHs?

Answer the following short questions (2 marks each)

1. Describe the role of microbe in degradation of DDT
2. What are the limitations of Bioremediation?
3. Write the advantages of Bioremediation

Answer the following broad questions (3 marks each)

1. Describe the different techniques used in bioremediation process
2. Write Mechanisms of Heavy Metal Remediation by Microorganisms
3. Describe the role of microbes in remediation of inorganic contaminants
4. Describe the role of microbes in remediation of organic contaminants

Unit 6

Answer the following questions in one or two words (1 mark each)

1. Why is MPN called so?
2. During confirmatory test of coliform detection, methylene blue is used in the media. Explain the reason.
3. What are coliforms?
4. What are indicator organisms?
5. Name an indicator organism other than *E. coli*
6. Define water treatment.
7. State the APHA guidelines about allowable coliform count in potable and recreational water.
8. What is the function of a Durham's tube?

Answer the following short questions (2 marks each)

1. What is FC/FS ratio?
2. State one example each of water borne disease caused by a) bacteria b) virus c) protozoa d) fungi
3. What is the full form of SIM agar? For what purpose is it used?
4. How does UV light inactivate microorganisms?
5. Chlorine di-oxide is more efficient than chlorines and monochloramines in disinfecting water. Explain the reason.
6. Explain the mechanism of ozonation mediated disinfection of water.
7. Apart from MPN, what is the other direct method of determining the no. of coliforms present in a water sample?

Answer the following broad questions (more than 2 marks)

5. What are the major advantages and disadvantages of superheating and flushing in treatment of potable water? 3
6. What are the potential merits and demerits associated with treatment of water by chlorination? 3
7. Why are monochloramines often more preferred in treatment of water as compared to simple chlorination? State its limitations. (2+2)
8. Explain clearly the basis of each of the four tests of IMViC used to discriminate between typical and atypical coliforms. (2x4=8)
9. What is a TSI test? State clearly the different zones of bacterial growth used in a TSI slant?