

- 1 Define mineralization and immobilization and give examples (3 points)

- 2 Why do you think some bacteria can reduce Fe^{3+} only in acidic conditions? (3 points)

- 3 Why do you think the anamox reaction was so difficult for microbiologists to discover the microbes that perform this reaction? (3 points)

- 4 Describe the buffering system that regulates the pH of seawater. What might be the implications of this stable buffering on microbial evolution? (4 points)

- 5 What terms can be used to describe the different parts of a lake? (3 points)

- 6 Nitrogen is an important element of the soil ecosystem and often considered in relation to the soil carbon content (e.g. C/N ratio). What is the effect of C/N ratio on the nitrogen cycle in the soil ecosystem? (4 points)

- 7 What is syntrophism? Is physical contact required for this relationship? (4 points)

- 8 Why is nitrification a good example of a commensalistic process? (3 points)

- 9 What is the mechanism of action of lysozyme? (3 points)

- 10 Aflatoxins are fungal toxins produced by *Aspergillus flavus*. How do they damage animals that eat the contaminated food with Aflatoxins? (3 points)
- 11 What is an indicator organism? And what properties should it have? (5 points)
- 12 Why is the 'meta effect' important for understanding biodegradation? (3 points)
- 13 Why do penicillins and cephalosporins have a high therapeutic index than most other antibiotics? (4 points)
- 14 What are the five major ways in which bacteria become resistant to drugs? (5 points)
- (1)
 - (2)
 - (3)
 - (4)
 - (5)
- 15 Beer and Makori (막걸리) are different types of alcohol beverage but in principle they share common process in preparation. Discuss about the similarity in the process of making them (5 points)
- * Write full name and simple description of following terms (2 points each)
- 16 AZT
- 17 TOC
- 18 MRSA
- 19 VRE
- 20 PABA

21 HAB

22 LAB

23 LTH (pasteurization)

24 GRAS

25 MIC

26 iGEM

* Define briefly (2 points each)

27 synbiotics, probiotics

28 phytoremediation

29 opportunist pathogens

30 competitive exclusion principle

31 lignin

32 autochthonous, allochthonous

33 ergotism

34 thermocline

35 symbiosome

36 lichen

37 sludge, activated sludge

38 secondary metabolite

39 microbial leaching

40 gnotobiotic

* Extra points

41 List fermented foods as far as you know.