CHAPTER 10

MICROBES IN HUMAN WELFARE

MULTIPLE-CHOICE QUESTIONS

1. The vitamin whose content increases following the conversion of milk into curd by lactic acid bacteria is:
   a. vitamin C
   b. vitamin D
   c. vitamin B_{12}
   d. vitamin E.

2. Wastewater treatment generates a large quantity of sludge, which can be treated by:
   a. anaerobic digesters
   b. floc
   c. chemicals
   d. oxidation pond.

3. Methanogenic bacteria are not found in:
   a. rumen of cattle
   b. gobar gas plant
   c. bottom of water-logged paddy fields
   d. activated sludge.

4. Match the following list of bacteria and their commercially important products:

	Bacterium		**Product**
A.	*Aspergillus niger*	i.	Lactic acid
B.	*Acetobacter aceti*	ii.	Butyric acid
C.	*Clostridium butylicum*	iii.	Acetic acid
D.	*Lactobacillus*	iv.	Citric acid

   Choose the correct match:
   a. A-ii, B-iii, C-iv, D-i
   b. A-ii, B-iv, C-iii, D-i

c. A-iv, B-iii, C-ii, D-i
d. A-iv, B-i, C-iii, D-ii

5. Match the following list of bioactive substances and their roles:

	Bioactive Substance		Role
A.	Statin	i.	Removal of oil stains
B.	Cyclosporin A	ii.	Removal of clots from blood vessels
C.	Streptokinase	iii.	Lowering of blood cholesterol
D.	Lipase	iv.	Immuno-suppressive agent

Choose the correct match:
a. A-ii, B-iii, C-i, D-iv
b. A-iv, B-ii, C-i, D-iii
c. A-iv, B-i, C-ii, D-iii
d. A-iii, B-iv, C-ii, D-i

6. The primary treatment of waste water involves the removal of:
a. dissolved impurities
b. stable particles
c. toxic substances
d. harmful bacteria.

7. BOD of waste water is estimated by measuring the amount of:
a. total organic matter
b. biodegradable organic matter
c. oxygen evolution
d. oxygen consumption.

8. Which one of the following alcoholic drinks is produced without distillation?
a. Wine
b. Whisky
c. Rum
d. Brandy

9. The technology of biogas production from cow dung was developed in India largely due to the efforts of:
a. Gas Authority of India
b. Oil and Natural Gas Commission
c. Indian Agricultural Research Institute and Khadi & Village Industries Commission
d. Indian Oil Corporation.

10. The free-living fungus *Trichoderma* can be used for:
    a. killing insects
    b. biological control of plant diseases
    c. controlling butterfly caterpillars
    d. producing antibiotics

11. What would happen if oxygen availability to activated sludge flocs is reduced?
    a. It will slow down the rate of degradation of organic matter
    b. The center of flocs will become anoxic, which would cause death of bacteria and eventually breakage of flocs.
    c. Flocs would increase in size as anaerobic bacteria would grow around flocs.
    d. Protozoa would grow in large numbers.

12. Mycorrhiza does not help the host plant in:
    a. Enhancing its phosphorus uptake capacity
    b. Increasing its tolerance to drought
    c. Enhancing its resistance to root pathogens
    d. Increasing its resistance to insects.

13. Which one of the following is not a nitrogen-fixing organism?
    a. *Anabaena*
    b. *Nostoc*
    c. *Azotobacter*
    d. *Pseudomonas*

14. Big holes in Swiss cheese are made by a:
    a. a machine
    b. a bacterium that produces methane gas
    c. a bacterium producing a large amount of carbon dioxide
    d. a fungus that releases a lot of gases during its metabolic activities.

15. The residue left after methane production from cattle dung is:
    a. burnt
    b. burried in land fills
    c. used as manure
    d. used in civil construction.

16. Methanogens do not produce:
    a. oxygen
    b. methane

c. hydrogen sulfide
d. carbon dioxide.

17. Activated sludge should have the ability to settle quickly so that it can:
a. be rapidly pumped back from sedimentation tank to aeration tank
b. absorb pathogenic bacteria present in waste water while sinking to the bottom of the settling tank
c. be discarded and anaerobically digested
d. absorb colloidal organic matter.

18. Match the items in Column 'A' and Column 'B' and choose correct answer.

	Column I		Column II
A.	Lady bird	i.	Methano bacterium
B.	Mycorrhiza	ii.	*Trichoderma*
C.	Biological control	iii.	Aphids
D.	Biogas	iv.	*Glomus*

The correct answer is:
a. A-ii, B-iv, C-iii, D-i
b. A-iii, B-iv, C-ii, D-i
c. A-iv, B-i, C-ii, D-iii
d. A-iii, B-ii, C-i, D-iv

VERY SHORT ANSWER TYPE QUESTIONS

1. Why does 'Swiss cheese' have big holes?
2. What are fermentors?
3. Name a microbe used for statin production. How do statins lower blood cholesterol level?
4. Why do we prefer to call secondary waste water treatment as biological treatment?
5. What for Nucleopolyhydro viruses are being used now a days?

6. How has the discovery of antibiotics helped mankind in the field of medicine?
7. Why is distillation required for producing certain alcoholic drinks?
8. Write the most important characteristic that *Aspergillus niger*, *Clostridium butylicum*, and *Lactobacillus* share.
9. What would happen if our intestine harbours microbial flora exactly similar to that found in the rumen of cattle?
10. Give any two microbes that are useful in biotechnology.
11. What is the source organism for ECORI, restriction endonuclease?
12. Name any genetically modified crop.
13. Why are blue green algae not popular as biofertilisers?
14. Which species of *Penicillium* produces Roquefort cheese?
15. Name the states involved in Ganga action plan.
16. Name any two industrially important enzymes.
17. Name an immune immunosupressive agent?
18. Give an example of a rod shaped virus.
19. What is the group of bacteria found in both the rumen of cattle and shidge of sewage treatment?
20. Name a microbe used for the production of Swiss cheese.

SHORT ANSWER TYPE QUESTIONS

1. Why are flocs important in biological treatment of waste water?
2. How has the bacterium *Bacillus thuringiensis* helped us in controlling caterpillars of insect pests?
3. How do mycorrhizal fungi help the plants harbouring them?
4. Why are cyanobacteria considered useful in paddy fields?
5. How was penicillin discovered?
6. Name the scientists who were credited for showing the role of Penicillin as an antibiotic?
7. How do bioactive molecules of fungal origin help in restoring good health of humans?

8. What roles do enzymes play in detergents that we use for washing clothes? Are these enzymes produced from some unique microorganisms?

9. What is the chemical nature of biogas. Name an organism which is involved in biogas production?

10. How do microbes reduce the environmental degradation caused by chemicals?

11. What is a broad spectrum antibiotic? Name one such antibiotic.

12. What are viruses parasitising bacteria called? Draw a well labelled diagram of the same.

13. Which bacterium has been used as a clot buster? What is its mode of action.

14. What are biofertilisers? Give two examples.

LONG ANSWER QUESTIONS

1. Why is aerobic degradation more important than anaerobic degradation for the treatment of large volumes of waste waters rich in organic matter. Discuss.

2. (a) Discuss about the major programs that the Ministry of Environment and Forests, Government of India, has initiated for saving major Indian rivers from pollution.

   (b) Ganga has recently been declared the national river. Discuss the implication with respect to pollution of this river.

3. Draw a diagrammatic sketch of biogas plant, and label its various components given below: Gas Holder, Sludge Chamber, Digester, Dung+water chamber.

4. Describe the main ideas behind the biological control of pests and diseases.

5. (a) What would happen if a large volume of untreated sewage is discharged into a river?

   (b) In what way anaerobic sludge diagestion is important in sewage treatments?

6. Which type of food would have lactic acid bacteria. Discuss their useful application.