

RASHTRIYA MILITARY SCHOOL BENGALURU

CHAPTER-WISE TEST CH 10 MICROBES IN HUMAN WELFARE

Class 12 - Biology

Time Allowed: 3 hours

Maximum Marks: 70

General Instructions:

1. All questions are compulsory.
2. The question paper has five sections and 33 questions. All questions are compulsory.
3. Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
4. There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
5. Wherever necessary, neat and properly labeled diagrams should be drawn.

Section A

1. Wastewater treatment generates a large quantity of sludge, which can be treated by: [1]
 - a) Anaerobic digesters
 - b) Chemicals
 - c) Oxidation pond
 - d) Floc
2. Pollution from animal excreta and organic waste from the kitchen can be most profitably minimized by: [1]
 - a) Vermiculture
 - b) Storing them in underground storage tanks
 - c) Using them for producing biogas
 - d) Using them directly as biofertilizers.
3. Activated sludge should have the ability to settle quickly so that it can: [1]
 - a) Be rapidly pumped back from the sedimentation tank to the aeration tank.
 - b) Be discarded and anaerobically digested.
 - c) Absorb colloidal organic matter.
 - d) Absorb pathogenic bacteria present in waste water while sinking to the bottom of the settling tank.
4. IPM programme is related with: [1]
 - a) Biocontrol agents
 - b) Biofertilisers
 - c) Biogas
 - d) Organic farming
5. Which of the following organisms not fix atmospheric nitrogen? [1]
 - a) Oscillatoria
 - b) Nostoc
 - c) Spirogyra
 - d) Anabaena
6. The biological control of agricultural pests, unlike chemical control, is: [1]
 - a) Very expensive
 - b) Self-perpetuating

- c) Polluting d) Toxic
7. A nitrogen-fixing microbe associated with Azolla in rice fields is: [1]
 a) Frankia b) Spirulina
 c) Anabaena d) Tolypothrix
8. Which of the following is a gram-negative bacterium? [1]
 a) Streptomyces coelicolor b) Bacillus subtilis
 c) Escherichia coli d) Amycolatopsis orientali
9. During anaerobic digestion of organic waste, such as in producing biogas, which one of the following is left undergraded? [1]
 a) Lipids b) Lignin
 c) Cellulose d) Hemi-cellulose
10. Fleming, Chain and Florey were awarded the Nobel Prize in 1945 for discovery of: [1]
 a) Antacid b) Antibodies
 c) Insulin d) Antibiotic
11. In which of the following microbes are not used extensively? [1]
 A. Converting milk into curd.
 B. Making cheese of different flavors and tastes.
 C. Production of viral drugs.
 D. Production of antibiotics.
 E. As bio-fertilizers.
 F. Production of inorganic fertilizers.
 a) Only C and F b) Only B and C
 c) Only C and D d) Only A and B
12. Methanogenic bacteria are not found in: [1]
 a) Gobar gas plant b) Activated sludge
 c) Rumen of cattle d) Bottom of water-logged paddy fields
13. **Assertion:** Sewage treatment plants allow treated water to accumulate in large tanks. [1]
Reason: Treated water when gets exposed to UV rays of the sun, gradually becomes fit for reuse.
 a) Assertion and reason both are correct statements and reason is correct explanation for assertion. b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
 c) Assertion is correct statement but reason is wrong statement. d) Assertion is wrong statement but reason is correct statement.
14. **Assertion:** Different type of alcoholic drinks depending on the type of raw material used for fermentation. [1]
Reason: With or without distillation different types of alcoholic drinks are obtained.
 a) Assertion and reason both are correct statements and reason is correct explanation b) Assertion and reason both are correct statements but reason is not correct

for assertion.

explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.

15. **Assertion:** Microbes are present even at sites where no other life-form could possibly exist. [1]

Reason: It cannot survive deep inside the geysers (thermal vents) where the temperature may be as high as 100°C, deep in the soil, under the layers of snow several metres thick, and is highly acidic environments.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.

16. **Assertion (A):** After 24 hours, toddy becomes unpalatable. [1]

Reason (R): The fermentation of toddy is continued by naturally occurring yeasts.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

Section B

17. Antibiotics are sold in combination with Lactobacillus (reason) [2]

OR

How BOD is related to water pollution?

18. Give two examples of natural predators of insect-pests. [2]

19. During the secondary treatment of the primary effluent how does the significant decrease in BOD occur? [2]

20. Mention the common bacterium found in the anaerobic sludge during sewage treatment and also in the rumen of cattle. How is this bacterium commercially useful? [2]

21. State the impact of constant mechanical agitation and pumping of air in the aeration tank on the sewage during the biological treatment. [2]

Section C

22. What are methanogens? How do they help to generate biogas? [3]

23. Define Biological control of pests. Give few examples of biological control. [3]

24. Write a short note on microbial biocontrol agents. [3]

OR

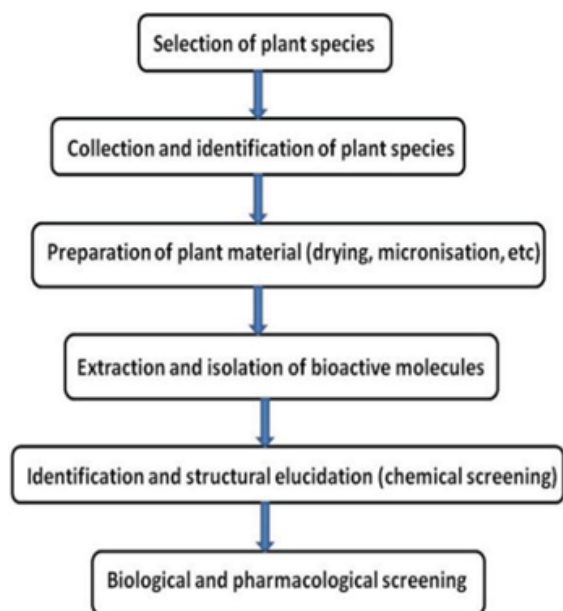
Explain the role of baculoviruses as biological control agents. Mention their importance in organic farming.

25. After a rainy day Rahul found many dragon flies flying over stagnant water. He thinks these flies come to drink water. Is Rahul's explanation correct? Give your views. [3]

26. How is Lactic acid produced? Write down its uses. [3]

27. How are biofertilisers different from fertilizers such as NPK that we buy in the market? Justify the role of Rhizobium as a biofertilizer. [3]

28. Observe the flow chart and answer the following questions: [3]



- i. Write the name of three bioactive molecules of fungal origin and their functions that help in restoring the good health of humans?
- ii. Give the source and significance of streptokinase.

Section D

29. Read the text carefully and answer the questions:

[4]

Discovery of penicillin by Alexander Fleming in 1928 marked the beginning of the remarkable era in the medical field. Penicillin was the first antibiotic extracted from *Penicillium notatum*. Antibiotics are used to treat bacterial diseases. These can be broad-spectrum which can kill a diverse group of disease-causing bacteria and narrow spectrum which is effective only against one group of pathogenic strains. Antibiotics can act as bactericides or bacteriostatic. Bactericidal antibiotics kill bacteria by-disruption of cell wall synthesis (e.g., penicillin, cephalosporin, etc.), inhibition of 50S ribosome function (e.g., erythromycin), inhibition of 30S ribosome function (e.g., streptomycin, neomycin), inhibition of amino acid-tRNA binding to the ribosome (e.g., tetracycline), etc. Bacteriostatic antibiotics do not kill the bacteria rather they restrict the growth of bacteria. Penicillin belongs to β -lactum group of antibiotics and it inhibits bacterial cell wall synthesis by binding and inactivating protein. It inhibits transpeptidation of reaction and blocks cross-linking of the cell wall. It is used to treat tonsillitis, sore throat, gonorrhoea, rheumatic fever and some pneumonia types.

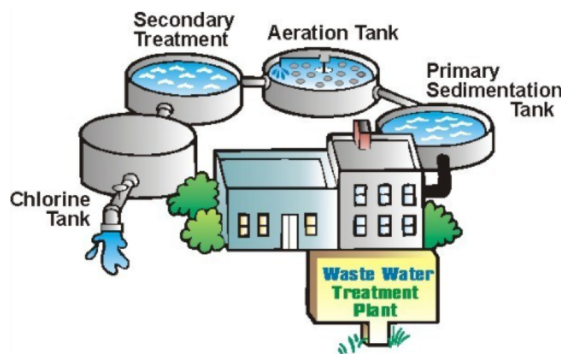
- (i) Which is the first antibiotic and from where it was extracted?
- (ii) Which kills bacteria by interfering with 50S ribosome function?
- (iii) How β -lactum group of antibiotics kill the bacterial pathogen?
- (iv) Does penicillin is not used to treat candidiasis?

30. Read the text carefully and answer the questions:

[4]

We know that large quantities of waste water are generated everyday in cities and towns. A major component of this waste water is human excreta. This municipal waste-water is also called sewage. It contains large amounts of organic matter and microbes. Many of which are pathogenic. Have you ever wondered where this huge quantity of sewage or urban waste water is disposed off daily? This cannot be discharged into natural water bodies like rivers and streams directly - you can understand why. Before disposal, hence, sewage is treated in sewage treatment plants (STPs) to make it less polluting. Treatment of waste water is done by the heterotrophic microbes naturally present in the sewage. This treatment is carried out in two stages: Primary treatment: These treatment steps basically involve physical removal of particles – large and small – from the sewage through

filtration and sedimentation.



- (i) Mention other word for municipal waste water.
- (ii) What happens when sewage is treated in STPs or Sewage treatment plants?
- (iii) What is the name of the physical processes employed in the primary treatment of sewage
- (iv) Write the usage of the aeration tank in the treatment of sewage?

Section E

31. List the events that reduce the Biological Oxygen Demand (BOD) of a primary effluent during sewage treatment. [5]

OR

Observe the picture related to the alcoholic fermentation and answer the following questions:



- i. What is the raw material for the alcoholic fermentation?
 - ii. Which growth hormone is added to speed up the malting process in brewing industry?
 - iii. State one difference between wine and whisky.
32. Secondary treatment of the sewage is also called biological treatment. Justify this statement and explain the process. [5]

OR

Observe the picture showing the utilization of microbes as a household product and answer the following questions:



- i. Write the name of bacteria used to produce swiss cheese?
 - ii. Why does Swiss Cheese have big holes?
 - iii. *Propionibacterium* consume which acid during the late stage of cheese production?
33. Describe how do flocs and activated sludge help in sewage treatment. [5]

OR

Describe the process of secondary treatment given to municipal wastewater (sewage) before it can be released into fresh water bodies. Mention another benefit provided by this process.

