Microorganisms

Q1. What is a microscope? What does it help us to view?
Ans: An instrument that makes use of lenses to make smaller objects appear larger is called a microscope. It is used to view tiny organisms.

Q2. What are microorganisms? Name five major groups of microbes.
Ans: Organisms that are visible only through a microscope are called microorganisms or microbes. The five major groups of microbes are bacteria, protozoa, fungi, algae, and viruses.

Q3. Where do fungi derive their nutrition from?
Ans: Fungi derive their nutrition from decaying matter.

Q4. What is a virus? Give two examples of viruses.
Ans: Viruses are a group of microorganisms. They are so small that they can be seen only with the help of powerful microscopes called electron microscopes. Viruses are hard to classify as living or non-living as, on their own, they show no signs of life. Examples are Tobacco mosaic virus (TMV) and Human Immunodeficiency Virus (HIV).

Q5. What is an antibiotic?
Ans: Medicines that are made from bacteria and fungi to destroy disease causing microbes are called antibiotics.

Q6. What is a vaccine? Name two diseases that can be prevented by a vaccine.
Ans: A vaccine is a preparation of killed or weakened disease-causing microbes. Polio and smallpox can be prevented by vaccines.

Q7. Define nitrogen fixation.
Ans: Nitrogen fixation is the process by which free atmospheric nitrogen is converted into nitrogen compounds.

Q8. What are pathogens? How do they get spread?
Ans: Microorganisms that cause diseases in human beings, animals, and plants are called pathogens. They can enter the human body through air, water, and food.

Q9. What are communicable diseases? Give two examples of communicable diseases in animals.

Ans: Diseases that can spread from one person to another are called communicable diseases. Rinderpest and Anthrax are examples of communicable diseases in animals.

Q10. Define food preservation. Name any three methods of food preservation.
Ans: Food preservation is the process of treating and handling food with an aim to stop or slow down its spoilage while maintaining its nutritional value, texture, and flavour. Boiling, refrigeration and canning are some methods of food preservation.

Long answer type questions

Q11. Explain how microscopic objects can be viewed under a microscope.
Ans: The basic steps to use a compound microscope are as follows.
a. Clean the mirror using a soft, clean cloth, if required.
b. Place the slide (with the specimen) on the stage.
c. Adjust the focus of the eyepiece and the objective lens with the help of your teacher.
d. View the slide through the eyepiece.

Q12. Discuss with examples some commercial uses of microorganisms.
Ans: Some of the commercial uses of microorganisms are given below.

1. **Making curd and cheese**: Bacteria like *Lactobacillus* and *Streptococcus* are used.Rennet (from young cattle) is added to speed up the process by increasing acidity (lactic acid).
2. **Making alcoholic beverages**: Yeast ferments sugars in barley and grapes to produce beer and wine.
3. **Making bread**: Flour, salt, sugar, yeast, and water are kneaded into dough. Yeast converts sugar into alcohol and carbon dioxide, causing the dough to rise and become spongy. Baking at 180°C kills the yeast and ends fermentation.
4. **Making vinegar, coffee, and tobacco**: Bacteria are used to produce vinegar (acetic acid). Also help in processing tea, coffee, and tobacco.

Q13. How are microorganisms useful in the field of medicine?

Ans: Some of the medicinal uses of microorganisms are given below.

1. **Making antibiotics**: Certain Bacteria and fungi are used to produce antibiotics like penicillin (*Penicillium*), streptomycin, and tetracycline (*Streptomyces*).They are also used to treat diseases in humans, animals, and plants.

2. **Making vaccines**: Vaccines contain killed or weakened microbes.
   When a person is vaccinated, they trigger antibody production against the disease, helping prevent diseases like polio, cholera, typhoid, smallpox, and hepatitis.
3. **Making food supplements**: Algae like *Chlorella* and *Spirulina* are rich in nutrients and used as dietary supplements.
4. **In the human body**: Bacteria like *Lactobacillus acidophilus* and *Escherichia coli*(E.Coli) help in digestion and fight harmful microbes in the intestines.

Q14. Draw a neat labelled diagram of nitrogen cycle.
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Q15. Describe briefly three diseases caused by microbes in plants.

Disease	Mode of transmission	Causative pathogen
Citrus canker	Air	Bacterium
Rust of wheat	Air	Fungus
Apple scab	Air	Fungus

Q16. What is food poisoning? How do we detect whether a foodstuff is fit for consumption or not?
Ans: Eating food contaminated by microorganisms which is unfit for consumption causes an illness called food poisoning.
The pointers given below can help us detect food that has become unfit for consumption because of microbial action:
• foul odour, • slimy surface or cotton-like growth on the surface • surface discolouration • sour taste, and • gas formation.

Q17. Write a short note on some common food preservation methods.

Ans: Different methods of food preservation are used for different types of foods. Some of which are discussed below.

Boiling: Heating liquids like milk and water to kill harmful microbes.

Dehydration: Drying foods like cereals and pulses in the sun to remove moisture and stop microbial growth.

Refrigeration & Freezing: Storing food at low temperatures to slow or stop the growth of microbes. When fresh fruits and vegetables are frozen, water present in them also freezes, suitable for foods like meat, fruits, and vegetables.

Canning: Sealing food like jams, fish, and cooked meals in airtight cans to keep microbes out.

Chemical Preservatives: Using chemical substances like sodium benzoate or potassium metabisulphite can prevent spoilage of squashes, ketchups, and sherbets.

Salt, Sugar, Oil, or Vinegar: These create conditions that stop microbes from growing. Used in pickles, jams, jellies, and meat.

Pasteurization: It involves heating a foodstuff(like milk) to a high temperature and then cooling it rapidly to kill microbes without changing taste or nutrition.