3. MICROORGANISMS (Solutions)

TEACHING TASK (Page 50 – 53)

I) Single Answer Type

1) Pasteurization means -
Answer: C. Heating milk or other liquids to 60°C to 70°C for short duration.
Solution: Pasteurization, developed by Louis Pasteur, involves heating liquids (e.g., milk) to 60–70°C to kill harmful microbes without affecting quality.

2) Bacteria differ from other plants in that they do not have.
Answer: D. A well-defined nucleus
Solution: Bacteria are prokaryotes, lacking a membrane-bound nucleus, unlike plants, which have a well-defined nucleus in their eukaryotic cells.

3) Who proposed the germ theory of disease?
Answer: D. Louis Pasteur
Solution: Louis Pasteur proposed the germ theory, establishing that microorganisms cause diseases, building on earlier work by others like Robert Koch.

4) Comma-shaped bacteria are termed as -
Answer: D. Vibrio
Solution: Vibrio bacteria are comma-shaped, unlike bacilli (rod-shaped), cocci (spherical), or spirilla (spiral).

5) Food spoilage can be prevented by -
Answer: D. All of these
Solution: Food spoilage can be prevented by heating (e.g., pasteurization), using chemicals (e.g., preservatives), and canning (sealing to prevent microbial growth).

6) Yeast is used in the production of
Answer: B. Alcohol
Solution: Yeast (e.g., Saccharomyces cerevisiae) ferments sugars to produce alcohol, as in wine and beer production.

7) The fixation of free nitrogen by bacteria in the soil is done by-
Answer: A. Azotobacter
Solution: Azotobacter is a free-living nitrogen-fixing bacterium that converts atmospheric nitrogen into a form usable by plants.

8) Nitrifying bacteria convert the-
Answer: B. Ammonium salts into nitrates
Solution: Nitrifying bacteria (e.g., Nitrosomonas, Nitrobacter) convert ammonium salts into nitrites and then nitrates in the nitrogen cycle.

9) The bacterial genome is called:
Answer: C. Nucleoid
Solution: The bacterial genome, a single circular DNA molecule, is located in the nucleoid, an area without a membrane-bound nucleus.

10) Antibiotics are mostly obtained from-
Answer: A. Bacteria
Solution: Most antibiotics (e.g., streptomycin) are derived from bacteria (e.g., Streptomyces) or fungi (e.g., Penicillium), but bacteria are the primary source listed.

11) Nitrates are converted into nitrogen by-
Answer: A. Denitrifying bacteria
Solution: Denitrifying bacteria (e.g., Pseudomonas) convert nitrates back into nitrogen gas, completing the nitrogen cycle.

12) All bacteria have the following organelle.
Answer: A. Mesosomes
Solution: Mesosomes, invaginations of the plasma membrane, are present in many bacteria and aid in functions like respiration. Other organelles listed are eukaryotic.

13) Rounded bacteria are-
Answer: D. Cocci
Solution: Cocci are spherical or rounded bacteria, unlike bacilli (rod), vibrio (comma), or spirilla (spiral).

14) The following is an antibiotic
Answer: B. Streptomycin
Solution: Streptomycin is an antibiotic, unlike sodium bicarbonate (antacid), alcohol (disinfectant), or yeast (fungus).

15) Virus possess-
Answer: B. Nucleic acid, DNA or RNA
Solution: Viruses contain either DNA or RNA as their genetic material, along with a protein coat, but not both simultaneously.

16) Capsid is-
Answer: B. Protein cover of virus
Solution: The capsid is the protein coat surrounding a virus's genetic material, protecting it and aiding infection.

17) Carrier of malaria-causing protozoan is
Answer: A. Female Anopheles mosquito
Solution: The female Anopheles mosquito is the vector that transmits the malaria-causing protozoan Plasmodium.

18) Who discovered vaccination against smallpox.
Answer: A. Jenner
Solution: Edward Jenner developed the first smallpox vaccine using cowpox, pioneering vaccination.

19) Bacteriophage is-
Answer: A. Virus attacking bacteria
Solution: A bacteriophage is a virus that infects and replicates within bacteria.

20) The most common carrier of communicable diseases is –
Answer: B. Housefly
Solution: Houseflies commonly carry pathogens on their bodies, spreading diseases like typhoid and cholera.

21) Thread-like fungal structures are-
Answer: A. Hyphae
Solution: Hyphae are the thread-like filaments that form the structure of fungi, making up the mycelium.

22) Fungal cell wall is composed of-
Answer: A. Chitin
Solution: Fungal cell walls are made of chitin, a polysaccharide, unlike plant cell walls (cellulose) or bacterial walls (peptidoglycan).

23) Fleming discovered penicillin from-
Answer: A. Penicillium notatum
Solution: Alexander Fleming discovered penicillin from the fungus Penicillium notatum in 1928.

24) Yeast are economically important because they-
Answer: D. Are used in wine and baking industry
Solution: Yeast (Saccharomyces cerevisiae) ferments sugars for wine production and produces CO_2 for dough rising in baking.

25) The bread or idli dough rises because of –
Answer: C. Growth of yeast cells
Solution: Yeast cells ferment sugars, producing CO_2 gas that causes dough to rise in bread and idli preparation.

II) Advanced Questions: One or More Than One Answer Type

1) Which of the following statements are incorrect
Answer: A, C
Solution: A. Viruses do not make bread; yeast (fungi) does (incorrect).

B. Euglena can perform photosynthesis (correct, as it has chloroplasts).

C. Protozoa are animal-like, not plant-like (incorrect).

2) Which of the following statements are incorrect
Answer: A, B, C
Solution:

A. Viruses contain either DNA or RNA, not both (incorrect).

B. Lichen is a symbiotic association of algae and fungi, not just an alga (incorrect).

C. Foot and mouth disease is caused by a virus, not bacteria (incorrect).

3) Which of the following statements are correct
Answer: C
Solution:

A. Cocci are spherical, not spiral (incorrect).

B. Bacteria lack a well-developed nucleus (incorrect).

C. Spirogyra is a filamentous alga (correct).

4) Which of the following statements are correct
Answer: B, C
Solution:

A. Tobacco mosaic is caused by a virus, not a fungus (incorrect).

B. Milk is preserved by pasteurization (correct).

C. Moulds are a type of fungi (correct).

5) Which of the following statements are correct
Answer: A
Solution:

A. Study of algae is called phycology (correct).

B. Agar is obtained from red algae (e.g., Gelidium), not blue-green algae (incorrect).

C. Malaria is caused by Plasmodium via mosquito bites, not fleas (incorrect).

III) Match the Following

A)
Answer:

Phycology → c. Study of algae

Spirilla → e. A kind of bacterium

Chlorella → a. An alga

Measles → b. A disease

Bacteria → d. Curd making

Solution:

Phycology is the study of algae (1-c).

Spirilla are spiral-shaped bacteria (2-e).

Chlorella is a unicellular alga (3-a).

Measles is a viral disease (4-b).

Bacteria (e.g., Lactobacillus) are used in curd making (5-d).

B)
Answer:

Mycelium → d. Rhizopus

Potato blight → g. Fungal disease

Paramaecium → a. Slipper shaped

Malaria causing protozoan → b. Plasmodium

Sodium metabisulphite → c. Jam, jelly, etc.

Rabies → e. Viral disease

Ethyl alcohol → f. Fermentation of molasses

Solution:

Mycelium is the fungal structure in Rhizopus (1-d).

Potato blight is a fungal disease caused by Phytophthora (2-g).

Paramecium is a slipper-shaped protozoan (3-a).

Plasmodium causes malaria (4-b).

Sodium metabisulphite is a preservative for jams and jellies (5-c).

Rabies is a viral disease (6-e).

Ethyl alcohol is produced by fermentation of molasses by yeast (7-f).

LEARNER'S TASK (Page 53 – 56)

Single Correct Answer Type

1) Botulism is caused by :-
Answer: B. Clostridium botulinum
Solution: Botulism is caused by the bacterium Clostridium botulinum, which produces a neurotoxin.

2) Bacterial infection of food can be prevented by :-
Answer: D. Both (A) and (C)
Solution: Covering food prevents bacterial contamination, and heating to 70°C kills bacteria.

3) Elephantiasis is caused by :-
Answer: B. Culex mosquito
Solution: Elephantiasis (filariasis) is caused by parasitic worms transmitted by Culex mosquitoes.

4) Bacteria bearing flagella all over body are-
Answer: A. Peritrichous
Solution: Peritrichous bacteria have flagella distributed all over their surface.

5) BCG stands for :
Answer: B. Bacillus Chalmette Guerin
Solution: BCG (Bacillus Calmette-Guérin) is a vaccine for tuberculosis.

6) DPT Vaccine is for:
Answer: B. Diphtheria, Pertussis, Tetanus
Solution: DPT vaccine protects against diphtheria, pertussis (whooping cough), and tetanus.

7) MMR vaccine is given for :
Answer: C. Mumps, Measles, Rubella
Solution: MMR vaccine protects against mumps, measles, and rubella.

8) Ringworm spreads through :
Answer: B. Direct skin contact
Solution: Ringworm, a fungal infection, spreads through direct skin contact or contaminated surfaces.

9) World TB day is celebrated on :
Answer: B. March 24
Solution: World TB Day is observed on March 24 to commemorate Robert Koch's discovery of Mycobacterium tuberculosis.

10) Who discovered antibiotic streptomycin effective against Tuberculosis: -
Answer: A. Selman A. Waksman
Solution: Selman Waksman discovered streptomycin, an antibiotic effective against tuberculosis.

13) Match the following pairs
Answer: B. 1-II, 2-IV, 3-III, 4-I
Solution:

Tuberculosis → Mycobacterium (II)

Typhoid → Salmonella (IV)

Malaria → Plasmodium (III)

Dysentery → Entamoeba (I)

12) In Blue-green algae, the structure specialised for nitrogen fixation is

Answer: C. Heterocyst
Solution: Heterocysts in cyanobacteria (blue-green algae) are specialized cells for nitrogen fixation.

13) The similarity between bacterium and cyanobacterium is in the presence of
Answer: B. Nucleoid
Solution: Both bacteria and cyanobacteria (prokaryotes) have a nucleoid, a region containing DNA without a nuclear membrane.

14) The figure given below shows microorganisms W, X, and Y. Identify them.
Answer: None (Correct answer not determinable without figure)
Solution: Without the figure, identification is not possible. However, typical options suggest W, X, Y could represent virus, protozoan, or fungus based on common microbial classifications.

15) Rocky mountain spotted fever is caused by
Answer: A. Rickettsias
Solution: Rocky Mountain spotted fever is caused by Rickettsia bacteria, transmitted by ticks.

16)The figure given below shows the method of reproduction of a microorganism.
Answer: D. Fungi, Spore formation
Solution: Fungi commonly reproduce via spore formation, unlike viruses (no binary fission), fungi (not typically budding for all), or algae (conjugation in some cases).

17) Mycoplasma differ from bacteria in
Answer: A. Not having a cell wall
Solution: Mycoplasma lack a cell wall, unlike most bacteria, which have a peptidoglycan cell wall.

18) Escherichia coli in human intestine synthesises
Answer: D. Vitamin B and K

Solution: E. coli in the human gut synthesizes vitamins B (e.g., B12) and K, aiding digestion and health.

19) The smallest bacterium is
Answer: B. Dialister pneumosintes
Solution: Dialister pneumosintes is among the smallest known bacteria, smaller than others listed.

20) Bacteria having a tuft of flagella at one end are called-
Answer: C. Lophotrichous
Solution: Lophotrichous bacteria have a tuft of flagella at one end, unlike other arrangements listed.

21) The figures given below shows four types of microorganisms P, Q, R, and S.
Answer: None (Correct answer not determinable without figure)
Solution: Without the figure, identification is not possible. Options typically include combinations of bacteria, protozoa, viruses, and algae.

22) Saccharomyces cerevisiae is
Answer: C. Both a and b
Solution: Saccharomyces cerevisiae is used as baker's yeast (baking) and beer yeast (brewing).

23) Yeast contains maximum amount of
Answer: C. Protein
Solution: Yeast is rich in protein (up to 50% dry weight), making it a valuable nutritional source.

24) Which of the following are represented by P, Q, R, and S in figure given below?
Answer: None (Correct answer not determinable without figure)
Solution: Without the figure, specific algae (e.g., Diatom, Chlamydomonas, Spirogyra, Volvox) cannot be identified.

25) Identify the organism that can photosynthesize but lack the cell wall.
Answer: None (Correct answer not determinable without options)
Solution: Euglena is an organism that photosynthesizes (has chloroplasts) but lacks a cell wall, but without specific options, the answer cannot be confirmed.

26) Contractile vacuole of Amoeba is analogous to
Answer: A. Kidneys
Solution: The contractile vacuole in Amoeba regulates water balance, analogous to kidneys in animals.

27) Viruses are
Answer: C. Complete parasites
Solution: Viruses are obligate (complete) parasites, requiring a host to replicate.

28) Protein coat of virus is called
Answer: B. Capsid
Solution: The capsid is the protein coat surrounding a virus's genetic material.

29) Cell organelles that resemble viruses in chemical nature are
Answer: B. Ribosomes
Solution: Ribosomes, composed of protein and RNA, resemble viruses in their chemical makeup (nucleic acid and protein).

30) Virus possessing only proteins are called:
Answer: B. Prions
Solution: Prions are infectious agents composed solely of proteins, lacking nucleic acids.