23 Micro-organisms and humans - answers

1The term micro-organism includes viruses, bacteria, protozoa (protista), some fungi and some algae.

Bacteria

2 Bacteria do not have a nuclear membrane or cellulose.

3 Saprophytic bacteria release *enzymes* (A) into their surroundings and then absorb *the soluble products/digested products/dissolved substances* (B).

4 Aerobic bacteria differ from anaerobic bacteria because they need *oxygen* (A) for their respiration.
Note: Air is not an appropriate answer because most bacteria grow and reproduce in water.

5 (a) Boiling at 100°C kills most bacteria, (b) refrigeration slows down the rate of bacterial growth and reproduction, (c) freezing at -20°C stops the growth and reproduction of most bacteria.

6 (a) In a natural environment bacteria bring about decay. In this way they prevent accumulation of dead material and make available essential compounds such as nitrates.
(b) Bacteria are used in industrial processes to produce certain kinds of food (e.g. cheese, yoghurt), to make single-cell protein, to purify sewage and in the manufacture of certain chemicals (eg lactic acid).

7 Diseases caused by bacteria include tonsillitis, blood poisoning, scarlet fever, tuberculosis, typhoid, diphtheria, food poisoning, gonorrhoea, syphilis (any three).

8 Bacteria which cause diseases are called *pathogenic/pathogens* (A). The disease symptoms are usually the result of *toxins* (B) produced by the bacteria. Disease-causing bacteria feed parasitically on or in the body of their *host* (C).

9 (a) Salmonella bacteria are most likely to be present in poultry (chicken, duck, turkey), eggs, beef or pork, and unpasteurised milk.
(b) *Salmonella typhimurium* causes food poisoning.
(c) Cooking usually kills *Salmonella* bacteria in food.

10 Resistant bacteria are resistant to drugs, particularly antibiotics.

11 (b) A cooked chicken leg straight from the refrigerator is unlikely to contain *Salmonella* bacteria. Cooking should have killed the bacteria and refrigeration should have prevented the reproduction of any bacteria which survived the cooking.

12 (a), (b) and (c) are not recognised ways in which syphilis or gonorrhoea can be transmitted.

13 (a) During birth, a baby may be infected with gonorrhoea bacteria as it passes through the vagina of an infected women.
(b) Syphilis bacteria can pass through the placenta and infect the fetus before birth.

14 The most likely size for a virus is 0.001 mm

Micro-organisms and human - answers (continued)

15 A virus consists of a central core of *DNA* (A) or *RNA* (B) surrounded by a coat made up of *protein* (C) units.

16 Viruses cannot respire, grow or excrete, but they can reproduce.

17 Virus diseases include colds, influenza, herpes, mumps, measles, chicken pox, rubella, hepatitis and AIDS (any three).

18 Virus infection may, in many cases, be prevented by immunisation.

19 (a) The HIV (AIDS) virus attacks the white cells (lymphocytes).
(b) The body thus loses its ability to fight disease organisms or cancerous cells (i.e. a loss of immunological response).

20 AIDS may be transmitted by sexual intercourse (heterosexual or homosexual) with an infected person, by using a syringe needle that has been used by an infected person, by receiving a blood transfusion (or blood products) from an infected person.

21 Most fungi are made up of *hyphae* (A) which form a *mycelium* (B) which spreads throughout the material on which the fungus feeds. Many fungi are saprophytic. They secrete *enzymes* (C) into the substrate and then *absorb* (D) the soluble products.

22 Saprophytic fungi are useful in bringing about decay of dead material. They are harmful when they grow on our food and make it unfit to eat, or when they invade timber in buildings.

23 (a) Crops are attacked by rust, mildew and blight fungi. (b) Humans are attacked by the athlete's foot fungus, *Tinea*.

24 Human fungus diseases are very *contagious* (A).

25 Athlete’s foot is caused by a fungus, and so is treated with a *fungicide.*

26 Protozoa do not have a cell wall (unlike bacteria), but they do have a nuclear membrane.

27 The malarial parasite attacks red blood cells.

28 The malarial parasite is transmitted when a healthy person is bitten by a mosquito which has fed on an infected person.

29 (a) Anti-malarial drugs do not kill the parasites in the liver.
(b) Mosquitoes became resistant to the DDT insecticide.

Biotechnology

30 The yeasts are most commonly used to convert sugar to alcohol.

31 (a) In addition to alcohol, fermentation of sugar produces carbon dioxide.
(b) (i) Bubbles of carbon dioxide cause the bread dough to rise and so give the bread a light texture. (ii) Carbon dioxide dissolved in the beer makes it fizzy and gives it a sharp taste.

32 Flour is not a product of biotechnology.

33 Purification of sewage makes use of protozoa, at one stage of the process; the protozoa ingest bacteria and solid particles. Protozoa also help in the filtration process at the water works.

34 Antibiotics are obtained from fungi, or organisms closely related to fungi. Most of them live in the soil.

30 Micro-organisms and humans

1 List the main types of organism included under the heading of 'Micro-organisms'

Bacteria

2 Which of the following are not found in bacteria?
cytoplasm, cell wall, nuclear membrane, DNA, chromosome, glycogen, cellulose

3 Saprophytic bacteria release ….. A ….. into their surroundings and then absorb the …. B …..

4 Choose the most appropriate word from the list below to complete the following sentence.
Aerobic bacteria differ from anaerobic bacteria because they need ….. A ….. for their respiration.

air, oxygen, food, light

5 In what ways are bacteria affected by (a) boiling at 100 °C, (b) refrigerating at 4^{o}C,
(c) freezing at -20°C?

6 Give one example in each case of the usefulness of bacteria in (a) a natural environment,
(b) an industrial process.

7 Give three examples of diseases caused by bacteria,

8 Complete the following paragraph.
Bacteria which cause diseases are called ….. A ….. The disease symptoms are usually the result of …..B ….. produced by the bacteria. Disease-causing bacteria feed parasitically on or in the body of their ….. C …...

9 (a) What kind of food is most likely to contain *Salmonella* bacteria?
(b) What illness is caused by *Salmonella typhimurium*?
(c) What is the usual method of killing *Salmonella* bacteria in food?

10 When a particular strain of bacteria is called 'resistant', what is it resistant to?

11 Which one of the following is least likely to give rise to food poisoning?
(a) Cooking and eating a partially defrosted turkey.
(b) Eating a cooked chicken leg straight from the refrigerator:
(c) Preparing a fresh chicken for the oven and immediately making a lettuce and tomato salad.
(d) Putting an uncooked chicken on the same plate as some cold ham.

12 Which of the following are not ways in which gonorrhoea and syphilis can be transmitted?
(a) Using a towel that has been used by an infected person.
(b) Touching an infected person.
(c) Kissing an infected person.
(d) Having sexual intercourse with an infected person.

13 How can a baby become infected with (a) gonorrhoea, (b) syphilis?

Micro-organisms and humans (continued)

Viruses

14 Which one of the following is the most likely size of a virus?
1mm, 0.1 mm, 0.l mm, 0.01 mm, 0.001 mm .

15 A virus consists of a central core of ….. A ….. or ….. B ….. surrounded by a coat made up of ….. C ….. units.

16 Which one of the following processes can be carried out by a virus?
respiration, growth, excretion, reproduction

17 Name three diseases caused by viruses.

18 By what method may virus diseases be prevented?

19 (a) Which body cells are attacked by the HIV (AIDS) virus?
(b) What general effect does this have on the body?

20 State three ways by which the AIDS virus might be transmitted from an infected person to a healthy person.

Fungi

21 Most fungi are made up of ….. A ….. which form a ….. B ….. which spreads throughout the material on which the fungus feeds (the substrate). Many fungi are saprophytic. They secrete ….. C ….. into the substrate and then ….. D ….. the soluble products.

22 In what ways may saprophytic fungi be (a) useful, (b) harmful?

23 Name one fungus, in each case, which attacks (a) crops, (b) humans;

24 Choose the most appropriate word, from the list below, to complete the following sentence.
Human fungus diseases are very ….. A …...
dangerous, infectious, contagious, catching

25 Which one of the following would be used to treat athlete's foot? A bacteriocide a fungicide., a pesticide, an insecticide.

Protozoa

26 State two ways in which protozoa differ from bacteria.

27 Which body cells are attacked by the malarial parasite?

28 By what means can malarial parasites be transmitted from an infected person to a healthy person?

Micro-organisms and humans (continued)

29 (a) Anti-malarial drugs kill the parasites in the blood but they do not cure the disease. Why is this?
(b) Why was the use of DDT insecticide not successful in eradicating malaria?

Biotechnology

30 Which group of fungi is most commonly used to convert sugar to alcohol?

31 (a) When sugar is fermented, alcohol is produced. What other substance is produced?
(b) What effect does this substance have in (i) baking, (ii) beer brewing?

32 Which one of the following is not a product of biotechnology?

flour, cheese, antibiotics, yoghurt

33 Name one biotechnological process which makes use of protozoa,

34 From what type of organisms are antibiotics obtained?