

***Microbiology: An Introduction, 13e* (Tortora et al.)**  
**Chapter 1 The Microbial World and You**

1.1 Multiple-Choice Questions

1) Microorganisms are involved in each of the following processes EXCEPT

- A) infection.
- B) decomposition of organic material.
- C) O<sub>2</sub> production.
- D) food production.
- E) smog production.

Answer: E

Section: 1.1

Bloom's Taxonomy: Remembering

Learning Outcome: 1.1

Global Outcome: 5

2) Each of the following organisms would be considered a microbe EXCEPT

- A) yeast.
- B) protozoan.
- C) bacterium.
- D) mushroom.
- E) virus.

Answer: D

Section: 1.1

Bloom's Taxonomy: Remembering

Learning Outcome: 1.4

3) The term used to describe a disease-causing microorganism is

- A) microbe.
- B) bacterium.
- C) virus.
- D) pathogen.
- E) infection.

Answer: D

Section: 1.1

Bloom's Taxonomy: Remembering

Learning Outcome: 1.1

4) Common commercial benefits of microorganisms include synthesis of

- A) riboflavin.
- B) acetone.
- C) insulin.
- D) aspirin.
- E) riboflavin, acetone and insulin.

Answer: E

Section: 1.1

Bloom's Taxonomy: Remembering

ASMcue Outcome: 6.3

Learning Outcome: 1.1

5) What factors contribute to the rising incidence of antibiotic resistance?

- A) overuse of the specific drugs
- B) misuse of the specific drugs
- C) random mutations in bacterial genomes
- D) random mutations, overuse and misuse of specific drugs
- E) overuse and misuse of specific drugs

Answer: D

Section: 1.5

Bloom's Taxonomy: Understanding

ASMcue Outcome: 4.1

Learning Outcome: 1.19

Global Outcome: 5

6) The formal system for classifying and naming organisms was developed by

- A) Robert Koch.
- B) Ignaz Semmelweis.
- C) Aristotle.
- D) Carolus Linnaeus.
- E) Louis Pasteur.

Answer: D

Section: 1.2

Bloom's Taxonomy: Remembering

Learning Outcome: 1.3

7) In the name *Staphylococcus aureus*, *aureus* is the

- A) genus.
- B) domain name.
- C) species.
- D) kingdom.
- E) family name.

Answer: C

Section: 1.2

Bloom's Taxonomy: Understanding

Learning Outcome: 1.3

8) A prokaryotic cell may possess each of the following cellular components EXCEPT

- A) flagella.
- B) a nucleus.
- C) ribosomes.
- D) a cell wall.
- E) a cell membrane.

Answer: B

Section: 1.2

Bloom's Taxonomy: Remembering

ASMcue Outcome: 2.1

Learning Outcome: 1.4

9) Which of the following is NOT associated with viruses?

- A) organelles
- B) nucleic acid
- C) envelope
- D) chemical reactions
- E) protein coat

Answer: A

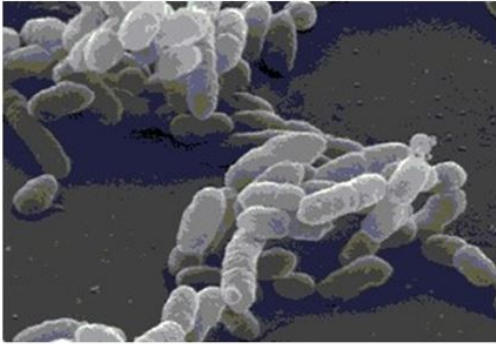
Section: 1.2

Bloom's Taxonomy: Understanding

ASMcue Outcome: 2.1

Learning Outcome: 1.4

10) Figure 1.1



The bacterial shape of the cells in the scanning electron micrograph shown in Figure 1.1 would best be described as

- A) bacillus.
- B) spiral.
- C) coccus.
- D) ovoid.
- E) columnar.

Answer: A

Section: 1.2

Bloom's Taxonomy: Understanding

ASMcue Outcome: 2.1

Learning Outcome: 1.4

11) Protozoan motility structures include

- A) cilia.
- B) flagella.
- C) pseudopods.
- D) cilia and pseudopods only.
- E) cilia, flagella, and pseudopods.

Answer: E

Section: 1.2

Bloom's Taxonomy: Remembering

Learning Outcome: 1.4

12) Viruses are not considered living organisms because they

- A) cannot reproduce by themselves.
- B) are structurally very simple.
- C) can only be visualized using an electron microscope.
- D) are typically associated with disease.
- E) are ubiquitous in nature.

Answer: A

Section: 1.2

Bloom's Taxonomy: Remembering

ASMcue Outcome: 4.4

Learning Outcome: 1.4

13) Microbes that live stably in and on the human body are called the

- A) transient microbiota.
- B) human microbiome.
- C) pathogenic microorganisms.
- D) virulent microorganisms.
- E) opportunistic microbiota.

Answer: B

Section: 1.1

Bloom's Taxonomy: Remembering

ASMcue Outcome: 5.4

Learning Outcome: 1.2

14) Which of the following is NOT a domain in the three-domain system?

- A) animalia
- B) archaea
- C) bacteria
- D) eukarya

Answer: A

Section: 1.2

Bloom's Taxonomy: Remembering

ASMcue Outcome: 1.5

Learning Outcome: 1.5

15) A system of classification grouping organisms into 3 domains based on the cellular organization of organisms was devised by

- A) Carolus Linnaeus.
- B) Anton van Leewenhoek.
- C) Carl Woese.
- D) Louis Pasteur.
- E) Robert Koch.

Answer: C

Section: 1.2

Bloom's Taxonomy: Remembering

ASMcue Outcome: 1.5

Learning Outcome: 1.5

- 16) Archaea differ from bacteria in that archaea
- A) have cell walls composed of substances other than peptidoglycan.
  - B) lack nuclei.
  - C) use organic compounds for food.
  - D) reproduce by binary fission.
  - E) are prokaryotic.

Answer: A

Section: 1.2

Bloom's Taxonomy: Understanding

ASMcue Outcome: 2.3

Learning Outcome: 1.4

- 17) Who is credited with first observing cells?

- A) Robert Hooke
- B) Anton van Leeuwenhoek
- C) Robert Koch
- D) Louis Pasteur
- E) Carolus Linnaeus

Answer: A

Section: 1.3

Bloom's Taxonomy: Remembering

ASMcue Outcome: 2.1

Learning Outcome: 1.6

- 18) Who is credited with first observing microorganisms?

- A) Robert Hooke
- B) Anton van Leeuwenhoek
- C) Robert Koch
- D) Louis Pasteur
- E) Carolus Linnaeus

Answer: B

Section: 1.3

Bloom's Taxonomy: Remembering

ASMcue Outcome: 2.1

Learning Outcome: 1.6

- 19) Biogenesis refers to the

- A) spontaneous generation of organisms from nonliving matter.
- B) development of life forms from preexisting life forms.
- C) development of aseptic technique.
- D) germ theory of disease.

Answer: B

Section: 1.3

Bloom's Taxonomy: Remembering

Learning Outcome: 1.7

20) If you were setting up an experiment to disprove spontaneous generation in a liquid medium, which of the following would be essential to the experiment?

- A) supplying the liquid with nutrients
- B) starting with a liquid that contains microorganisms
- C) adding antibiotics to the liquid
- D) using a sterile liquid and eliminating exposure to microorganisms
- E) adding carbon dioxide to the liquid

Answer: D

Section: 1.3

Bloom's Taxonomy: Understanding

Learning Outcome: 1.7

21) The arguments supporting spontaneous generation were finally disproved by

- A) Louis Pasteur.
- B) Francesco Redi.
- C) Rudolf Virchow.
- D) John Needham.
- E) Lazzaro Spallanzani.

Answer: A

Section: 1.3

Bloom's Taxonomy: Remembering

Learning Outcome: 1.8

22) Regarding Louis Pasteur's experiments with the S-neck flask, which of the following statements is TRUE?

- A) Air exchange was involved.
- B) A food source was provided.
- C) The possibility of contamination was removed.
- D) All preexisting microorganisms were killed.
- E) Air exchange occurred, a food source was provided, preexisting microorganisms were killed and contamination was prevented

Answer: E

Section: 1.3

Bloom's Taxonomy: Understanding

Learning Outcome: 1.8

23) The microbial process of converting sugars to alcohol is known as

- A) fermentation.
- B) pasteurization.
- C) tyndallization.
- D) lyophilization.
- E) alcoholism.

Answer: A

Section: 1.3

Bloom's Taxonomy: Remembering

ASMcue Outcome: 3.1

Learning Outcome: 1.8

24) Proof that a microbe could cause disease was provided by

- A) Pasteur.
- B) Lister.
- C) Koch.
- D) Wasserman.
- E) Semmelweis.

Answer: C

Section: 1.3

Bloom's Taxonomy: Remembering

ASMcue Outcome: 5.4

Learning Outcome: 1.10

25) The use of phenol (carbolic acid) as a wound disinfectant was first practiced by

- A) Lister.
- B) Semmelweis.
- C) Pasteur.
- D) Holmes.
- E) Koch.

Answer: A

Section: 1.3

Bloom's Taxonomy: Remembering

ASMcue Outcome: 3.4

Learning Outcome: 1.9

26) Mycology is the study of

- A) mycoplasma.
- B) mushrooms.
- C) protozoa.
- D) molds.
- E) molds, yeast, and mushrooms.

Answer: E

Section: 1.3

Bloom's Taxonomy: Remembering

Learning Outcome: 1.13



- 27) The first step for directly linking a microbe to a specific disease according to Koch's postulates is to
- A) culture the blood or other body fluid from a diseased animal using nutrient medium.
  - B) inject a sample of blood or other body fluid from a diseased animal into a healthy animal.
  - C) obtain a sample of blood or other body fluid from a diseased animal.
  - D) compare the blood of a sick animal to blood obtained from a healthy animal.
  - E) isolate microbes from the blood of healthy animals.

Answer: C

Section: 1.3

Bloom's Taxonomy: Applying

ASMcue Outcome: 5.4

Learning Outcome: 1.10

- 28) In which of the following situations would Koch's postulates be utilized?
- A) determination of the cause of a new emerging disease by scientists studying disease transmission
  - B) development of a new antibiotic in a pharmaceutical lab
  - C) determination of the cause of cancer in a patient
  - D) formulation of a vaccine against a new pathogen in a genetic engineering lab
  - E) whenever the scientific method is used to investigate a microbiological problem

Answer: A

Section: 1.3

Bloom's Taxonomy: Applying

ASMcue Outcome: 5.4

Learning Outcome: 1.10

Global Outcome: 5

- 29) Robert Koch identified the cause of
- A) smallpox.
  - B) anthrax.
  - C) diphtheria.
  - D) AIDS.
  - E) rabies.

Answer: B

Section: 1.3

Bloom's Taxonomy: Remembering

ASMcue Outcome: 5.4

Learning Outcome: 1.10

Global Outcome: 5

30) Which physician is first associated with vaccination?

- A) Ehrlich
- B) Jenner
- C) Lister
- D) Koch
- E) Escherich

Answer: B

Section: 1.3

Bloom's Taxonomy: Remembering

ASMcue Outcome: 6.3

Learning Outcome: 1.11

Global Outcome: 5

31) Which of the following findings was essential for Edward Jenner's vaccination process?

- A) Exposure to a milder disease form may produce immunity.
- B) A weakened microorganism will not cause disease.
- C) Someone who recovers from a disease will not acquire that disease again.
- D) Disease is caused by viruses.
- E) Pathogenic microorganisms infect all humans and animals in the same manner.

Answer: A

Section: 1.3

Bloom's Taxonomy: Understanding

ASMcue Outcome: 6.3

Learning Outcome: 1.11

Global Outcome: 5

32) Penicillin was discovered by accident by

- A) Alexander Fleming.
- B) Paul Ehrlich.
- C) Edward Jenner.
- D) Robert Koch.
- E) Joseph Lister.

Answer: A

Section: 1.3

Bloom's Taxonomy: Remembering

ASMcue Outcome: 3.4

Learning Outcome: 1.12

Global Outcome: 5

33) Who was the first scientist to pursue a "magic bullet" that could be used to treat infectious disease?

- A) Jenner
- B) Pasteur
- C) Ehrlich
- D) Lister
- E) Semmelweis

Answer: C

Section: 1.3

Bloom's Taxonomy: Remembering

ASMcue Outcome: 3.4

Learning Outcome: 1.12

Global Outcome: 5

34) Fungal infections are studied by

- A) virologists.
- B) bacteriologists.
- C) parasitologists.
- D) mycologists.
- E) herpetologists.

Answer: D

Section: 1.3

Bloom's Taxonomy: Remembering

ASMcue Outcome: 5.4

Learning Outcome: 1.13

35) When our bodies overcome the offensive tactics of a particular microorganism, this is referred to as

- A) therapy.
- B) colonization.
- C) disease.
- D) resistance.
- E) deficiency.

Answer: D

Section: 1.5

Bloom's Taxonomy: Remembering

ASMcue Outcome: 5.4

Learning Outcome: 1.17

- 36) Recombinant DNA refers to the
- A) study of bacterial ribosomes.
  - B) study of the function of genes.
  - C) interaction between human and bacterial cells.
  - D) synthesis of proteins from genes.
  - E) DNA resulting when genes from one organism are inserted into another organism.

Answer: E

Section: 1.3

Bloom's Taxonomy: Remembering

ASMcue Outcome: 4.5

Learning Outcome: 1.14

- 37) Molecular biology includes the study of
- A) DNA synthesis.
  - B) RNA replication.
  - C) protein synthesis.
  - D) enzyme function.
  - E) how genetic information directs protein synthesis.

Answer: E

Section: 1.3

Bloom's Taxonomy: Understanding

ASMcue Outcome: 4.2

Learning Outcome: 1.14

- 38) Microorganisms are essential to our life. Each of the following is an example of a beneficial function of microorganisms EXCEPT

- A) alternative fuel production.
- B) bioremediation.
- C) gene therapy.
- D) agriculture.
- E) increased number of illnesses.

Answer: E

Section: 1.4

Bloom's Taxonomy: Remembering

ASMcue Outcome: 6.3

Learning Outcome: 1.15

Global Outcome: 5

39) The major food producers for other living organisms is/are

- A) higher plants.
- B) cyanobacteria.
- C) algae.
- D) higher plants and algae.
- E) higher plants, cyanobacteria, and algae.

Answer: E

Section: 1.4

Bloom's Taxonomy: Remembering

ASMcue Outcome: 6.1

Learning Outcome: 1.15

40) Gene therapy is currently used to treat all of the following diseases EXCEPT

- A) severe combined immunodeficiency disease (SCID).
- B) Duchenne's muscular dystrophy.
- C) cystic fibrosis.
- D) LDL-receptor deficiency.
- E) colon cancer.

Answer: E

Section: 1.4

Bloom's Taxonomy: Remembering

ASMcue Outcome: 6.3

Learning Outcome: 1.16

Global Outcome: 5

41) Recombinant DNA technology has become an increasingly important part of our life. It is used for all of the following EXCEPT

- A) vaccine production.
- B) enhancing food longevity.
- C) synthesis of water.
- D) drug production.
- E) increasing the nutritional value of food.

Answer: C

Section: 1.4

Bloom's Taxonomy: Remembering

ASMcue Outcome: 6.3

Learning Outcome: 1.16

Global Outcome: 5

42) Normal microbiota

- A) indefinitely colonize the body.
- B) take up residence in sites such as the colon and mouth.
- C) almost always cause disease in the host.
- D) are normally found in blood.
- E) both indefinitely colonize the body and take up residence in sites such as the colon and mouth.

Answer: E

Section: 1.1

Bloom's Taxonomy: Understanding

ASMcue Outcome: 5.4

Learning Outcome: 1.2

43) Which of the following statements about biofilms is FALSE?

- A) Compared to free-living bacteria, biofilms are more sensitive to antibiotics.
- B) Biofilms in pipes can block the flow of water.
- C) Biofilms in your body protect mucous membranes from harmful microbes.
- D) Biofilms on medical devices cause infections.
- E) Biofilms on rocks provide food for animal life.

Answer: A

Section: 1.5

Bloom's Taxonomy: Remembering

ASMcue Outcome: 6.1

Learning Outcome: 1.18

44) Development of emerging infectious disease can be a result of all of the following EXCEPT

- A) microbial mutation.
- B) modern transportation.
- C) use of genetically modified foods.
- D) changes in the environment.
- E) overuse of antibiotics.

Answer: C

Section: 1.5

Bloom's Taxonomy: Remembering

ASMcue Outcome: 1.3

Learning Outcome: 1.19

45) Who challenged the idea of spontaneous generation with the concept of biogenesis?

- A) Louis Pasteur
- B) Rudolf Virchow
- C) Anton van Leewenhoek
- D) John Needham
- E) Francesco Redi

Answer: B

Section: 1.3

Bloom's Taxonomy: Remembering

Learning Outcome: 1.8

46) All of the following are true concerning emerging infectious diseases EXCEPT

- A) they always involve sporadic cases in endemic areas.
- B) they include newly described infectious agents.
- C) known pathogens develop evolutionary changes.
- D) known diseases spread to new regions or populations.
- E) they result from human exposure to a pathogen due to ecological changes.

Answer: A

Section: 1.5

Bloom's Taxonomy: Understanding

ASMcue Outcome: 1.3

Learning Outcome: 1.19

47) Microorganisms are beneficial to humans in all of the following ways EXCEPT

- A) marine and freshwater organisms form the basis of the food web.
- B) soil microorganisms break down matter.
- C) some microorganisms live symbiotically with plants and transform nitrogen gas into organic compounds.
- D) *Pseudomonas*, molds and other microorganisms break down lettuce and strawberries at refrigeration temperatures.
- E) Fermenting microorganisms produce yogurt and sauerkraut from milk and cabbage.

Answer: D

Section: 1.1

Bloom's Taxonomy: Understanding

ASMcue Outcome: 6.3

Learning Outcome: 1.1

48) What mistake did John Needham make that caused him to conclude that spontaneous generation for microorganisms occurred?

- A) He failed to seal his flasks of boiled broth.
- B) He allowed his assistant to conduct the experiment which he did not monitor closely.
- C) He did not boil his broth solutions, only warmed them.
- D) He re-contaminated his boiled broth solutions.
- E) He destroyed the vital force in the solutions.

Answer: D

Section: 1.3

Bloom's Taxonomy: Remembering

Learning Outcome: 1.8

49) From the list below, which would NOT be considered an emerging pathogen?

- A) Zika virus
- B) Avian influenza
- C) smallpox virus
- D) Ebola virus
- E) Lyme disease

Answer: C

Section: 1.5

Bloom's Taxonomy: Understanding

ASMcue Outcome: 1.3

Learning Outcome: 1.19

50) All of the below are examples of a biofilm EXCEPT

- A) archaea as part of the plankton community in the open ocean.
- B) dental plaque.
- C) vegetations on a patient heart valve.
- D) slimy layer on riverbed rocks.
- E) infection of a patient catheter.

Answer: A

Section: 1.5

Bloom's Taxonomy: Understanding

ASMcue Outcome: 5.2

Learning Outcome: 1.18

## 1.2 True/False Questions

1) Infectious disease is almost totally eradicated in our world.

Answer: FALSE

Section: 1.5

Bloom's Taxonomy: Remembering

ASMcue Outcome: 5.4

Learning Outcome: 1.19

2) A student has obtained a sample of pond water for study. Using the high-power lens, he observes several cells with nuclei. He can conclude that the cells are NOT bacteria.

Answer: TRUE

Section: 1.2

Bloom's Taxonomy: Remembering

ASMcue Outcome: 2.1

Learning Outcome: 14



3) The process of pasteurization to reduce food spoilage utilizes high heat to kill all bacteria present.

Answer: FALSE

Section: 1.3

Bloom's Taxonomy: Remembering

ASMcue Outcome: 3.4

Learning Outcome: 1.8

Global Outcome: 5

4) Anton van Leeuwenhoek was the first microbiologist to use a microscope to examine environmental samples for the presence of microorganisms.

Answer: TRUE

Section: 1.3

Bloom's Taxonomy: Remembering

ASMcue Outcome: 2.1

Learning Outcome: 1.6

5) Spontaneous generation refers to living cells arising only from other living cells.

Answer: FALSE

Section: 1.3

Bloom's Taxonomy: Remembering

Learning Outcome: 1.7

6) Microbes are associated with life-sustaining benefits as well as life-threatening diseases.

Answer: TRUE

Section: 1.1

Bloom's Taxonomy: Remembering

ASMcue Outcome: 5.4

Learning Outcome: 1.1

7) All cells possess a cell wall.

Answer: FALSE

Section: 1.2

Bloom's Taxonomy: Remembering

ASMcue Outcome: 2.1

Learning Outcome: 1.4

8) All pathogens known to infect humans have been identified at this point in time.

Answer: FALSE

Section: 1.5

Bloom's Taxonomy: Remembering

ASMcue Outcome: 1.3

Learning Outcome: 1.19

9) The first antibiotic was discovered by Paul Ehrlich.

Answer: FALSE

Section: 1.3

Bloom's Taxonomy: Remembering

ASMcue Outcome: 6.3

Learning Outcome: 1.12

10) Enzymes from *Bacillus* organisms are used to remove spots on clothing.

Answer: TRUE

Section: 1.4

Bloom's Taxonomy: Remembering

ASMcue Outcome: 6.3

Learning Outcome: 1.15

### 1.3 Essay Questions

1) What is an emerging disease, and what are some of the sources for these "new" infectious diseases?

Section: 1.5

Bloom's Taxonomy: Understanding

ASMcue Outcome: 1.3

Learning Outcome: 1.19

Global Outcome: 8

2) Compare and contrast prokaryotic and eukaryotic cells.

Section: 1.2

Bloom's Taxonomy: Analyzing

ASMcue Outcome: 2.4

Learning Outcome: 1.4

Global Outcome: 8

3) What was the function and importance of S-necked flasks in Louis Pasteur's experiments in disproving spontaneous generation?

Section: 1.3

Bloom's Taxonomy: Understanding

Learning Outcome: 1.8

Global Outcome: 5

4) Explain the germ theory of disease and discuss why this theory is essential to the treatment of infectious disease.

Section: 1.3

Bloom's Taxonomy: Evaluating

ASMcue Outcome: 5.4

Learning Outcome: 1.9

Global Outcome: 5

5) Explain the concept of the formation and maintenance of the human microbiome and discuss the effect of the microbiome on transient microbiota and potential pathogens.

Section: 1.1

Bloom's Taxonomy: Evaluating

ASMcue Outcome: 5.4

Learning Outcome: 1.2

Global Outcome: 8