

Package Title: Test Bank
Course Title: Wessner1e
Chapter Number: 1

Question Type: Multiple Choice

1) Which of these is considered to be the smallest unit of life?

- a) the nucleus
- b) the mitochondrion
- c) a plasmid
- d) the cell
- e) a prion

Answer: d

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

2) The study of microbiology includes all of the following EXCEPT ____ .

- a) plants
- b) viruses
- c) bacteria
- d) fungi
- e) algae

Answer: a

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

3) Which of these is an example of a macromolecule?

- a) an amino acid
- b) a nucleoside
- c) a protein
- d) a purine

e) a monosaccharide

Answer: c

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

4) Which one of the following is NOT a macromolecule?

- a) a protein
- b) a polypeptide
- c) DNA
- d) mRNA
- e) an amino acid

Answer: e

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

5) Which of these is the most abundant cellular macromolecule (on a dry weight basis)?

- a) polypeptides.
- b) lipids.
- c) DNA.
- d) mRNA.
- e) rRNA.

Answer: a

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

6) What percent of the dry weight of the cell is composed of DNA?

- a) 2 – 5
- b) 12 -15

- c) 25 - 30
- d) 35 -40
- e) 50 – 55

Answer: a

Difficulty: Medium

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

7) What are the three Domains of life?

- a) Monera, Animals, and Plants
- b) Bacteria, Archaea, and Eukarya
- c) Prokaryote, Eukaryote, and Fungi
- d) Animals, Plants, and Bacteria
- e) Animals, Plants, and Protista

Answer: b

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

8) Which term represents the history of an organisms' evolution?

- a) taxonomy
- b) descent
- c) classification
- d) phylogeny
- e) relative

Answer: d

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

9) Viruses are considered “nonliving” for all of the following reasons EXCEPT that they:

- a) need a host cell for replication.
- b) are metabolically inert.
- c) possess DNA that can evolve.
- d) do not maintain internal homeostasis.
- e) are not responsive to environmental changes.

Answer: c

Difficulty: Medium

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

10) In the study of which of these fields have unicellular microbes played an important role?

- a) biochemical pathways
- b) protein synthesis
- c) DNA replication
- d) mRNA synthesis
- e) all of the above

Answer: e

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

11) All of the following are properties that make microbes excellent models for studying basic processes in biology, EXCEPT that they:

- a) are easy to grow.
- b) are easy to manipulate genetically.
- c) contain a very large number of genes.
- d) are relatively inexpensive to maintain in the lab.
- e) are easy to manipulate for the production of proteins and enzymes.

Answer: c

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

12) Which of the following statements is NOT correct?

- a) All cells contain DNA as the main informational macromolecule.
- b) All cells contain mitochondria for energy production.
- c) All cells possess a plasma membrane.
- d) All cells utilize a similar genetic code.
- e) All cells contain ribosomes for protein synthesis.

Answer: b

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

13) Which is a macromolecular difference between the Domains Bacteria and Archaea?

- a) Archaea contain a nucleus and Bacteria do not.
- b) Bacteria contain DNA and Archaea do not.
- c) Bacteria contain a plasma membrane and Archaea do not.
- d) Bacteria cell wall contains peptidoglycan and the Archaea cell wall does not.
- e) Archaea contain multiple types of RNA polymerase and Bacteria has only one type.

Answer: d

Difficulty: Medium

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

14) Which of these is a yeast that is commonly used as a model organism to study many cellular features and processes in biological research?

- a) *Escherichia coli*
- b) *Penicillium notatum*
- c) *Bacillus subtilis*
- d) *Aspergillus niger*
- e) *Saccharomyces cerevisiae*

Answer: e

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

15) Approximately when did primitive cells first appear on Earth?

- a) 1 billion years ago
- b) 2 billion years ago
- c) 2.5 billion years ago
- d) 3 billion years ago
- e) 3.8 billion years ago

Answer: e

Difficulty: Easy

Learning Objective: LO 1.2 Define the conserved model of genetic transfer of information found in all organisms on Earth, discussing the possible origins of life on Earth.

Section Reference: Section 1.2 Microbial genetics

16) Which of these are fossilized microbial mats containing photosynthetic bacteria?

- a) Stromatolites
- b) Biofilms
- c) Resin
- d) Cyanobacteria
- e) Stalagmites

Answer: a

Difficulty: Easy

Learning Objective: LO 1.2 Define the conserved model of genetic transfer of information found in all organisms on Earth, discussing the possible origins of life on Earth.

Section Reference: Section 1.2 Microbial genetics

17) Which statement below is FALSE concerning the atmosphere of early earth?

- a) The atmosphere was a reducing atmosphere.
- b) Oxygen was present in very minute amounts.
- c) Carbon dioxide was present in very minute amounts.
- d) Hydrogen gas was present.
- e) Nitrogen gas was present in very large amounts.

Answer: c

Difficulty: Easy

Learning Objective: LO 1.2 Define the conserved model of genetic transfer of information found in all organisms on Earth, discussing the possible origins of life on Earth.

Section Reference: Section 1.2 Microbial genetics

18) The discovery of ribozymes provide evidence that life on the early Earth may have been based on:

- a) DNA.
- b) proteins.
- c) RNA.
- d) lipids.
- e) polysaccharides.

Answer: c

Difficulty: Easy

Learning Objective: LO 1.2 Define the conserved model of genetic transfer of information found in all organisms on Earth, discussing the possible origins of life on Earth.

Section Reference: Section 1.2 Microbial genetics

19) What is the Endosymbiotic Theory is used to explain?

- a) the rapid evolution of viruses
- b) antiphagocytic abilities of parasitic protozoa
- c) pathogenicity of parasitic bacteria
- d) presence of mitochondria in eukaryotes
- e) development of the nucleus in eukaryotes

Answer: d

Difficulty: Easy

Learning Objective: LO 1.2 Define the conserved model of genetic transfer of information found in all organisms on Earth, discussing the possible origins of life on Earth.

Section Reference: Section 1.2 Microbial genetics

20) What is a progenote?

- a) a type of Bacteria
- b) a type of Archaea
- c) a type of Bacteria or Archaea
- d) an early type of mitochondrion

e) the earliest form of cellular life

Answer: e

Difficulty: Easy

Learning Objective: LO 1.2 Define the conserved model of genetic transfer of information found in all organisms on Earth, discussing the possible origins of life on Earth.

Section Reference: Section 1.2 Microbial genetics

21) What is the he most prolific source of genetic variation in living organisms?

- a) mutation
- b) mitosis
- c) transcription
- d) translation
- e) viral insertion

Answer: a

Difficulty: Easy

Learning Objective: LO 1.2 Define the conserved model of genetic transfer of information found in all organisms on Earth, discussing the possible origins of life on Earth.

Section Reference: Section 1.2 Microbial genetics

22) Which of these best describes horizontal gene transfer?

- a) mitosis followed by cytokinesis
- b) meiosis and subsequent formation of a zygote
- c) transfer of genes from mother cell to daughter cell
- d) DNA replication followed by crossing over
- e) acquisition of genes from another organism in the same generation

Answer: e

Difficulty: Medium

Learning Objective: LO 1.2 Define the conserved model of genetic transfer of information found in all organisms on Earth, discussing the possible origins of life on Earth.

Section Reference: Section 1.2 Microbial genetics

23) Which is the correct distinction between a heterotroph and an autotroph?

- a) An autotroph utilizes organic compounds as a carbon source and a heterotroph uses carbon dioxide as a carbon source.

- b) An autotroph utilizes carbon dioxide as a carbon source and a heterotroph utilizes organic compounds as a carbon source.
- c) An autotroph utilizes complex organic compounds as a carbon source and a heterotroph utilizes simple organic compounds as a carbon source.
- d) An autotroph utilizes carbon dioxide as an energy source and a heterotroph utilizes organic compounds as an energy source.
- e) an autotroph utilizes organic compounds as an energy source and a heterotroph utilizes carbon dioxide as an energy source .

Answer: b

Difficulty: Easy

Learning Objective: LO 1.3 Discuss the various forms of microbial metabolism and the possible ways which microbes may interact with the environment, each other and other organisms.

Section Reference: Section 1.3 Microbial metabolism and ecology

24) Which best describes a photoautotroph?

- a) Utilizes sunlight for energy and organic molecules as a carbon source.
- b) Utilizes sunlight as an energy source to fix carbon dioxide.
- c) Emits light from the breakdown of organic carbon.
- d) Emits light from the fixation of carbon dioxide.
- e) Uses organic compounds as a source of carbon and energy.

Answer: b

Difficulty: Easy

Learning Objective: LO 1.3 Discuss the various forms of microbial metabolism and the possible ways which microbes may interact with the environment, each other and other organisms.

Section Reference: Section 1.3 Microbial metabolism and ecology

25) Which best describes the Cyanobacteria?

- a) First prokaryote to contain mitochondria.
- b) First appeared on earth about 3.5 billion years ago.
- c) Carry out oxygenic photosynthesis.
- d) Members of the Archaea domain.
- e) A type of eukaryotic algae.

Answer: c

Difficulty: Medium

Learning Objective: LO 1.3 Discuss the various forms of microbial metabolism and the possible ways which microbes may interact with the environment, each other and other organisms.

Section Reference: Section 1.3 Microbial metabolism and ecology

26) A chemoautotroph:

- a) obtains carbon and energy from organic molecules.
- b) obtains energy from the sun and carbon from organic molecules.
- c) obtains energy from the sun and carbon from inorganic molecules.
- d) obtains carbon and energy from inorganic molecules.
- e) obtains energy from the sun and carbon from carbon dioxide only.

Answer: d

Difficulty: Medium

Learning Objective: LO 1.3 Discuss the various forms of microbial metabolism and the possible ways which microbes may interact with the environment, each other and other organisms.

Section Reference: Section 1.3 Microbial metabolism and ecology

27) What term applies to the oxidation of glucose to pyruvate for the generation of energy?

- a) gluconeogenesis
- b) Krebs cycle
- c) lactate fermentation
- d) pentose phosphate pathway
- e) glycolysis

Answer: e

Difficulty: Easy

Learning Objective: LO 1.3 Discuss the various forms of microbial metabolism and the possible ways which microbes may interact with the environment, each other and other organisms.

Section Reference: Section 1.3 Microbial metabolism and ecology

28) Which of these is required during aerobic respiration?

- a) oxygen
- b) glucose
- c) nitrate
- d) pyruvate

e) water

Answer: a

Difficulty: Medium

Learning Objective: LO 1.3 Discuss the various forms of microbial metabolism and the possible ways which microbes may interact with the environment, each other and other organisms.

Section Reference: Section 1.3 Microbial metabolism and ecology

29) In regards to metabolic diversity, which statement below is true?

- a) Eukaryotic cells possess the greatest metabolic diversity.
- b) Archaea and Bacteria possess greater metabolic diversity than Eukarya.
- c) Animals possess greater metabolic diversity than bacteria.
- d) Plants possess greater metabolic diversity than bacteria.
- e) Protozoa possess greater metabolic diversity than bacteria.

Answer: b

Difficulty: Medium

Learning Objective: LO 1.3 Discuss the various forms of microbial metabolism and the possible ways which microbes may interact with the environment, each other and other organisms.

Section Reference: Section 1.3 Microbial metabolism and ecology

30) The Earth's ozone layer protects surface microbes from the harmful effects of:

- a) the sun's heat.
- b) gamma radiation.
- c) ultraviolet light.
- d) radio waves.
- e) infrared radiation.

Answer: c

Difficulty: Easy

Learning Objective: LO 1.3 Discuss the various forms of microbial metabolism and the possible ways which microbes may interact with the environment, each other and other organisms.

Section Reference: Section 1.3 Microbial metabolism and ecology

31) During nitrogen fixation, microorganisms convert:

- a) nitrate to dinitrogen gas.
- b) dinitrogen gas to ammonia.
- c) ammonia to dinitrogen gas.
- d) dinitrogen gas to nitrate.
- e) ammonia to nitrate.

Answer: b

Difficulty: Medium

Learning Objective: LO 1.3 Discuss the various forms of microbial metabolism and the possible ways which microbes may interact with the environment, each other and other organisms.

Section Reference: Section 1.3 Microbial metabolism and ecology

32) This early microbiology pioneer developed a set of criteria for linking a specific microorganism to a specific disease.

- a) Louis Pasteur
- b) Edward Jenner
- c) Robert Koch
- d) John Tyndall
- e) Anton van Leeuwenhoek

Answer: c

Difficulty: Easy

Learning Objective: LO 1.4 Discuss the work of microbiologists, like Louis Pasteur and Robert Koch, and the history of this exciting field that combines medicine and biology.

Section Reference: Section 1.4 Microbes and disease

33) This early microbiologist used a swan-necked flask to help disprove the Theory of Spontaneous Generation.

- a) Louis Pasteur
- b) Edward Jenner
- c) Robert Koch
- d) John Tyndall
- e) Anton van Leeuwenhoek

Answer: a

Difficulty: Easy

Learning Objective: LO 1.4 Discuss the work of microbiologists, like Louis Pasteur and Robert Koch, and the history of this exciting field that combines medicine and biology.
Section Reference: Section 1.4 Microbes and disease

34) Who was the first person to provide a written description of bacteria?

- a) Louis Pasteur
- b) Edward Jenner
- c) Robert Koch
- d) John Tyndall
- e) Anton van Leeuwenhoek

Answer: e

Difficulty: Easy

Learning Objective: LO 1.4 Discuss the work of microbiologists, like Louis Pasteur and Robert Koch, and the history of this exciting field that combines medicine and biology.
Section Reference: Section 1.4 Microbes and disease

Question Type: True/False

35) Polypeptides are the most abundant macromolecule in the cell on a dry weight basis.

Answer: True

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.
Section Reference: Section 1.1 The microbes

36) DNA contributes about 2 to 5% to the dry weight of the cell.

Answer: True

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.
Section Reference: Section 1.1 The microbes

37) Viruses are able to infect all types of cellular life forms.

Answer: True

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

38) The atmosphere of the early earth contained very small amounts of carbon dioxide.

Answer: False

Difficulty: Easy

Learning Objective: LO 1.2 Define the conserved model of genetic transfer of information found in all organisms on Earth, discussing the possible origins of life on Earth.

Section Reference: Section 1.2 Microbial genetics

39) The process of glycolysis is used to produce energy from simple sugars.

Answer: True

Difficulty: Easy

Learning Objective: LO 1.3 Discuss the various forms of microbial metabolism and the possible ways which microbes may interact with the environment, each other and other organisms.

Section Reference: Section 1.3 Microbial metabolism and ecology

40) Microbial nitrogen fixation is the conversion of ammonia into dinitrogen gas.

Answer: False

Difficulty: Easy

Learning Objective: LO 1.3 Discuss the various forms of microbial metabolism and the possible ways which microbes may interact with the environment, each other and other organisms.

Section Reference: Section 1.3 Microbial metabolism and ecology

41) The first person to describe bacteria observed under a microscope was Anton van Leeuwenhoek.

Answer: True

Difficulty: Easy

Learning Objective: LO 1.4 Discuss the work of microbiologists, like Louis Pasteur and Robert Koch, and the history of this exciting field that combines medicine and biology.
Section Reference: Section 1.4 Microbes and disease

Question Type: Text Entry

42) Macromolecules that catalyze chemical reactions in the cell are called _____.

Answer: enzymes

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

43) The main difference between the two cell types, prokaryote and eukaryote, is the presence of a _____ in the eukaryote.

Answer: nucleus

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

44) The three domains of life are _____, _____, and _____.

Answer: Bacteria, Archaea, Eukarya.

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

45) The _____ is an extremely important molecular technique that allowed scientists to specifically amplify a specific DNA sequence.

Answer: polymerase chain reaction

Difficulty: Easy

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

46) The _____ Theory is used to explain the origins of mitochondria and chloroplasts in eukaryotic cells.

Answer: endosymbiotic, endosymbiont, endosymbiosis

Difficulty: Easy

Learning Objective: LO 1.2 Define the conserved model of genetic transfer of information found in all organisms on Earth, discussing the possible origins of life on Earth.

Section Reference: Section 1.2 Microbial genetics

47) The accumulation of the _____ layer from increased levels of oxygen in the atmosphere offered protection from ultraviolet light to terrestrial microbes growing on Earth's surface.

Answer: ozone

Difficulty: Easy

Learning Objective: LO 1.3 Discuss the various forms of microbial metabolism and the possible ways which microbes may interact with the environment, each other and other organisms.

Section Reference: Section 1.3 Microbial metabolism and ecology

Question Type: Essay

48) Carl Woese proposed using ribosomal RNA as a molecule to compare the evolutionary relationship between organisms. Explain why these molecules are considered excellent molecular chronometers for studying evolutionary time.

Answer:

Difficulty: Medium

Learning Objective: LO 1.1 Discuss what microbiology is and what separates it from other biological sciences.

Section Reference: Section 1.1 The microbes

Solution: The use of ribosomal RNA, especially the small-subunit RNA, as a molecular chronometer is very popular because the molecule is found in all living organisms. Ribosomal RNA changes very slowly overtime because of functional constraints. Minor point mutations may have a devastating effect on the functioning of this molecule. Thus, change occurs very

slowly over time for this molecule, which makes it an excellent molecule to study change over evolutionary time.

49) What is the Endosymbiotic Theory? What evidence supports this theory?

Answer:

Difficulty: Easy

Learning Objective: LO 1.2 Define the conserved model of genetic transfer of information found in all organisms on Earth, discussing the possible origins of life on Earth.

Section Reference: Section 1.2 Microbial genetics

Solution: The endosymbiotic theory is used to explain the origin of mitochondria and chloroplasts in eukaryotic cells. Morphological and molecular evidence support this theory. Both mitochondria and chloroplast are approximately the same size as bacteria and cyanobacteria; both replicate independently of the nucleus and contain 16S rRNA (same size as found in bacteria); and both structures contain DNA with sequence similarity to bacteria and cyanobacteria.

50) What is the importance of Koch's Postulates? List the postulates.

Answer:

Difficulty: Medium

Learning Objective: LO 1.4 Discuss the work of microbiologists, like Louis Pasteur and Robert Koch, and the history of this exciting field that combines medicine and biology.

Section Reference: Section 1.4 Microbes and disease

Solution: The importance of Koch's postulates is that they were able to link a specific infectious disease to a specific microorganism. Prior to this discovery, infectious diseases were not linked to any specific cause, including any microbial cause. Koch was able to demonstrate through his postulates that specific microorganisms caused specific diseases. The postulates he used were: 1) you must be able to find this microbe in all individuals with the disease and it must be absent in those without the disease; 2) you must be able to isolate the microbe in pure culture from an individual with the disease; 3) when a healthy individual is inoculated with the microbe, that individual must present with the disease; 4) you must be able to re-isolate the microbe from the experimental infection.