Student name:\_\_\_\_\_\_\_\_\_\_

**TRUE/FALSE - Write 'T' if the statement is true and 'F' if the statement is false.
1)** A hypothesis must be tested many times before it can be considered a theory.

 ⊚ true
 ⊚ false

**2)** Many chronic medical conditions have been found to be associated with microbial agents.

 ⊚ true
 ⊚ false

**3)** All bacteria and archaea are microorganisms, but only some eukaryotes are microorganisms.

 ⊚ true
 ⊚ false

**4)** The scientific method involves formulating a tentative explanation, called the hypothesis, to account for what has been observed or measured.

 ⊚ true
 ⊚ false

**5)** Members of the same species share many more characteristics compared to those shared by members of the same kingdom.

 ⊚ true
 ⊚ false

**6)** The names of the three proposed domains are: Bacteria, Protista, and Eukarya.

 ⊚ true
 ⊚ false

**MULTIPLE CHOICE - Choose the one alternative that best completes the statement or answers the question.
7)** Microorganisms are best defined as organisms that \_\_\_\_\_\_\_.

 A) cause human disease
 B) lack a cell nucleus
 C) are infectious particles
 D) are too small to be seen with the unaided eye
 E) can only be found growing in laboratories

**8)** Which of the following are not considered microorganisms?

 A) Mosquitoes
 B) Protozoa
 C) Bacteria
 D) Viruses
 E) Fungi

**9)** Helminths are \_\_\_\_\_\_.

 A) bacteria
 B) protozoa
 C) molds
 D) parasitic worms
 E) infectious particles

**10)** Among these types of microorganisms, the \_\_\_\_\_\_ arenoncellular.

 A) viruses
 B) helminths
 C) protozoans
 D) bacteria

**11)** Studies of the immune response to an infection caused by microorganisms would be performed by a/an \_\_\_\_\_\_\_.

 A) hypersensitivity specialist
 B) epidemiologist
 C) immunologist
 D) geomicrobiologist

**12)** Which of the following pairs of career descriptions and work tasks is not correctly matched?

 A) Industrial microbiologist -- manipulate bacterial strains to be less pathogenic
 B) Agricultural microbiologist -- identify bacterial causes of crop disease
 C) Public health microbiologist -- track the incidence of AIDS in a population
 D) Medical microbiologist -- identify the cause of a bladder infection at a hospital lab

**13)** A scientist who studies the influence of microbes in the formation of caves is called a/an \_\_\_\_\_\_.

 A) geomicrobiologist
 B) astrobiologist
 C) epidemiologist
 D) immunologist

**14)** Astrobiology is considered a sub-discipline of microbiology because \_\_\_\_\_\_\_.

 A) life elsewhere in the universe is likely to be microbial
 B) microbes are known to exist on other planets
 C) all extraterrestrials known are microbial
 D) only microbes can reproduce under the extreme conditions in outer space

**15)** Which of the following does not indicate microbe involvement in energy and nutrient flow?

 A) Thermal hot springs warmed by heat from earth's interior
 B) Formation of greenhouse gases, CO 2 and methane
 C) Digestion of complex carbohydrates in animal diets
 D) Decomposition of dead matter and wastes

**16)** The microorganisms that recycle nutrients by breaking down dead matter and wastes are called \_\_\_\_\_\_.

 A) decomposers
 B) prokaryotes
 C) pathogens
 D) eukaryotes
 E) fermenters

**17)** The majority of oxygen in earth's atmosphere is a product of photosynthesis by \_\_\_\_\_\_.

 A) microorganisms
 B) rain forests
 C) agricultural lands
 D) green plants

**18)** The three cell types discussed, eukaryotes, archaea, and bacteria, all derived from \_\_\_\_\_\_.

 A) a common ancestral cell
 B) photosynthetic bacteria
 C) archaea
 D) cells with a true nucleus

**19)** The first cells appeared about \_\_\_\_\_ billion years ago.

 A) 5
 B) 4
 C) 3.5
 D) 2
 E) 1

**20)** Which area of biology states that living things undergo gradual structural and functional changes over long periods of time?

 A) Morphology
 B) Phylogeny
 C) Evolution
 D) Genetics
 E) Transformation

**21)** When humans manipulate the genes of microorganisms, the process is called \_\_\_\_\_\_.

 A) bioremediation
 B) genetic engineering
 C) epidemiology
 D) immunology
 E) taxonomy

**22)** Which activity is an example of biotechnology?

 A) Bacteria in the soil secreting an antibiotic to kill competitors
 B) A microbiologist using the microscope to view bacteria
 C) Egyptians usingmoldy bread on wounds
 D) *Escherichia coli* producing human insulin
 E) Public health officials monitoring diseases in a community

**23)** Which of the following is a traditional human use of microorganisms?

 A) Baking bread
 B) Treating water and sewage
 C) Mass-producing antibiotics
 D) Cleaning up oil spills

**24)** Using microbes to detoxify a site contaminated with heavy metals is an example of \_\_\_\_\_\_.

 A) biotechnology
 B) bioremediation
 C) decomposition
 D) immunology
 E) epidemiology

**25)** Disease-causing microorganisms are called \_\_\_\_\_\_.

 A) decomposers
 B) bacteria
 C) pathogens
 D) eukaryotes
 E) fermenters

**26)** The number one worldwide infectious diseases are \_\_\_\_\_\_.

 A) AIDS-related diseases
 B) diarrheal diseases
 C) malaria and other protozoan diseases
 D) measles and other rash diseases
 E) respiratory diseases

**27)** The incidence of deaths from communicable disease is \_\_\_\_\_\_ in the United States compared to the entire world.

 A) less
 B) greater
 C) about the same

**28)** In which way are bacteria and eukaryotes the same?

 A) Contain membrane-bound organelles
 B) Possess a cell membrane
 C) Contain a nucleus to hold DNA
 D) Always have a cell wall for rigidity

**29)** In which way are archaea and eukaryotesthe same?

 A) Contain membrane-bound organelles
 B) Have similar ssu rRNA sequences
 C) Contain mitochondria for energy production
 D) Possess RNA instead of DNA

**30)** Which of the following is a unique characteristic of viruses that distinguishes them from the other major groups of microorganisms?

 A) Cause human disease
 B) Lack a nucleus
 C) Cannot be seen without a microscope
 D) Contain genetic material
 E) Lack cell structure

**31)** Which group of microorganisms is composed only of hereditary material wrapped in a protein covering?

 A) Viruses
 B) Bacteria
 C) Parasites
 D) Fungi
 E) Yeasts

**32)** Eukaryotic cells are larger than bacterial or archaeal cells; allcells are larger than macromolecules. Where do viruses fit on this scale?

 A) Viruses are larger than eukaryotic cells.
 B) Viruses are smaller than eukaryotic cells, but larger than bacterial or archaeal cells.
 C) Viruses are smaller than bacterial or archaeal cells, but larger than macromolecules.
 D) Viruses are smaller than macromolecules.

**33)** In general, eukaryotic cells are about \_\_\_\_\_\_ times larger than bacterial or archaeal cells.

 A) 2
 B) 10
 C) 50
 D) 1000

**34)** Archaealcells are about \_\_\_\_\_\_ bacterial cells.

 A) the same size as
 B) ten times larger than
 C) ten times smaller than

**35)** Which of the following historical microbiologists is incorrectly paired with his contribution to the science?

 A) Francesco Redi: tested spontaneous generation with meat exposed to the air or covered with cloth
 B) Antonie van Leeuwenhoek:made and used quality magnifying lenses to observe and record microorganisms
 C) Louis Pasteur: demonstrated that anthrax was caused by a bacterium
 D) Joseph Lister: promoted disinfecting hands and air prior to surgery

**36)** In the experiments constructed by Pasteur to disprove spontaneous generation, swan-necked flasks were used. Why was this shape of flask used in this experiment?

 A) The glass necks needed to be open to the air, yet constructed so that bacteria would settle in the lowest part of the neck.
 B) These flask shapes were the easiest and cheapest to produce.
 C) The shape of the glass neck allowed the bacteria into the flask and then into the media, but air could not enter.
 D) Because the glass necks were stretched out, the heat used to sterilize the medium inside of the flask could not kill the bacteria in the neck.

**37)** Koch's postulates are criteria used to establish that \_\_\_\_\_\_.

 A) microbes are found on dust particles
 B) a specific microbe is the cause of a specific disease
 C) life forms can only arise from preexisting life forms
 D) a specific microbe should be classified in a specific kingdom
 E) microbes can be used to clean up toxic spills

**38)** Which of the following is NOT a recent discovery that has had a huge impact on the understanding of microbiology?

 A) Restriction enzymes
 B) PCR technique
 C) Human microbiome project
 D) Small RNAs
 E) All are significant discoveries.

**39)** The sum total of all the microbes in a certain environment is termed the \_\_\_\_\_\_.

 A) microbiome
 B) biofilm
 C) microbial niche
 D) domain
 E) phylogeny

**40)** Which of the following is not a process in the scientific method?

 A) Belief in a preconceived idea
 B) Formulation ofa hypothesis
 C) Systematic observation
 D) Laboratory experimentation
 E) Development of a theory

**41)** Experimentation \_\_\_\_\_\_\_.

 A) is designed to refute an hypothesis
 B) is designed to support an hypothesis
 C) provides a means to gather subjective data
 D) provides a means to gather objective data
 E) is the first step in the scientific method

**42)** The scientific method includes all of the following except \_\_\_\_\_\_.

 A) hypothesis
 B) experimentation
 C) observation
 D) publication

**43)** Caring for patients infected with a new virus requires safety precautions for medical personnel. Choosing appropriate procedures is an example of a/an \_\_\_\_\_\_ process.

 A) deductive
 B) inductive
 C) hypothetical
 D) pathogenic

**44)** Sterile is best described as \_\_\_\_\_\_.

 A) pathogen-free
 B) absence of spores
 C) absence of any life forms and viral particles
 D) pasteurized
 E) homogenized

**45)** Taxonomy does not involve \_\_\_\_\_\_.

 A) nomenclature
 B) classification
 C) identification
 D) a common name

**46)** Which scientific field is involved in the identification, classification, and naming of organisms?

 A) Nomenclature
 B) Taxonomy
 C) Phylogeny
 D) Pathology
 E) Epidemiology

**47)** The orderly arrangement of organisms into a hierarchy of taxa is called \_\_\_\_\_\_.

 A) classification
 B) identification
 C) nomenclature
 D) experimentation
 E) biotechnology

**48)** Which of the following is a taxon that contains all the other taxa listed?

 A) Species
 B) Phylum
 C) Kingdom
 D) Genus
 E) Family

**49)** The smallest and most significant taxon is a \_\_\_\_\_\_.

 A) genus
 B) species
 C) kingdom
 D) family
 E) phylum

**50)** Select the correct descending taxonomic hierarchy (left to right).

 A) Family, order, class
 B) Family, genus, species
 C) Genus, species, family
 D) Class, phylum, order
 E) Kingdom, domain, phylum

**51)** A mnemonic for remembering the taxonomic levels from Domain to Species is "Dear King Phillip Came Over for Good Soup." The word "came" here is a reminder of the taxonomic level of \_\_\_\_\_\_.

 A) class
 B) category
 C) chain
 D) colony
 E) culture

**52)** Which of the following is a scientific name?

 A) Gram-positive streptococcus
 B) *Streptococcus pyogenes*
 C) Anthrax
 D) Streptobacilli

**53)** When assigning a scientific name to an organism, \_\_\_\_\_\_\_.

 A) the species name is capitalized
 B) the species name is placed first
 C) the species name can be abbreviated
 D) both genus and species names are capitalized
 E) both genus and species names are italicized or underlined

**54)** Which scientific name is written correctly?

 A) Staphylococcus aureus
 B) staphylococcus aureus
 C) Staphylococcus Aureus
 D) *Staphylococcusaureus*
 E) S. aureus

**55)** A diagram of the three domains (Bacteria, Archaea, Eukarya) proceeding from the Last CommonAncestor would show Archaea \_\_\_\_\_\_\_.

 A) as the original cells from which the others derived
 B) branching off the Domain Eukarya
 C) branching off the Domain Bacteria

**56)** Analysis of the small subunit rRNAs from all organisms in the three current domains suggests that \_\_\_\_\_\_\_.

 A) the eukaryotes arose from prokaryotes
 B) the Archaea are more closely related to bacteria than eukaryotes
 C) all modern and extinct organisms on earth arose from a common ancestor
 D) bacteria, archaea, and eukaryotes are not related

**57)** The study of evolutionary relationships among organisms is called \_\_\_\_\_\_.

 A) biotechnology
 B) genetics
 C) recombinant DNA
 D) phylogeny
 E) taxonomy

**58)** A scientist studying the sequence of nucleotides in the rRNA of a bacterial species is working on \_\_\_\_\_\_\_.

 A) determining evolutionary relatedness
 B) bioremediation
 C) recombinant DNA
 D) nomenclature
 E) determining if that species is the cause of a new disease

**59)** Trees of life that illustrate the phylogenetic relationships of all organisms were traditionally based on \_\_\_\_\_\_; newer methods for determining phylogeny rely on \_\_\_\_\_\_.

 A) morphology; nucleic acid sequences
 B) nucleic acid sequences; morphology
 C) morphology; virology
 D) morphology; nutritional requirements
 E) nucleic acid sequences; microbiomes

**Answer Key**Test name: Microbiology1

1) TRUE

2) TRUE

3) TRUE

4) TRUE

5) TRUE

6) FALSE

7) D

8) A

9) D

10) A

11) C

12) A

13) A

14) A

15) A

16) A

17) A

18) A

19) B

20) C

21) B

22) D

23) A

24) B

25) C

26) E

27) A

28) B

29) B

30) E

31) A

32) C

33) B

34) A

35) C

36) A

37) B

38) E

Refer to the text and read about the recent discoveries that have had a huge impact on the understanding of microbiology.

39) A

40) A

41) D

42) D

43) A

44) C

45) D

46) B

47) A

48) C

49) B

50) B

51) A

52) B

53) E

54) D

55) B

56) C

Refer to "Systems of Presenting a Universal Tree of Life" for a discussion of the ssu rRNAs and their role in taxonomy.

57) D

58) A

59) A