1. Corn belongs to the kingdom
   A. Plantae.
   b. Animalia.
   c. Fungi.
   d. Protista.
   e. Monera.

2. Which statement is false?
   a. Science improved our life by the discovery of antibiotics.
   b. Science helps us to understand cancer mechanisms.
   C. Science is a basis for all ethical or moral decisions.
   d. Science can ease the feeding of the world population by producing new plant strains.

3. Organs are composed of tissues, which are composed of cells. This is an example of which characteristic of life?
   a. Living things grow and develop.
   b. Living things respond to stimuli.
   c. Living things maintain themselves by homeostasis.
   D. Living things have levels of biological organization.
   e. Living things are adapted to the environment.

4. What is the correct format for the binomial name of human beings?
   a. Homo Sapiens
   b. homo Sapiens
   c. homo sapiens
   D. Homo sapiens

5. The body temperature in humans is maintained around 37°C. Which characteristic of life does this statement represent?
   a. Living things acquire materials and energy from the environment.
   B. Living things are homeostatic.
   c. Living things are adapted.
   d. Living things grow and develop.
   e. Living things respond to stimuli.

6. In the hypothesis, "A summer pea/winter wheat rotation will cause winter wheat production to increase as well as or better than the use of nitrogen fertilizer" the experimental data showed that after the first year, the wheat yield for test groups 1 and 2 were greater than the control and the summer pea/winter wheat rotation group did not have as high a yield as the control. The conclusion stated,
   a. The hypothesis was supported
   B. The hypothesis was not supported
   c. There was not enough data to form a conclusion
   d. None of the choices are correct.

7. The class to which human beings belong is
   a. Animalia.
   B. Mammalia.
   c. Primates.
   d. Hominidae.
   e. Homo.

8. As the human population size increases,
   a. more ecosystems are modified.
   b. more fossil fuels are burned and carbon dioxide levels increase.
   c. it becomes more critical to preserve the biosphere for our own benefit.
   d. more ecosystems are destroyed, resulting in a biodiversity reduction crisis.
All of the choices are correct.

9. The major factor that determines where major ecosystems are located on the globe is
a. soil type.
b. available vegetation.
C. climate.
d. oxygen levels.
e. political boundaries.

10. "Like begets like", i.e., life comes only from life, is an example of which characteristic of life?
a. Living things grow and develop.
b. Living things utilize materials and energy from the environment.
C. Living things reproduce.
d. Living things are adapted.
e. Living things are homeostatic.

11. The common name for "cat" in Spanish is "gatto" and in Chinese is "mao." Why can't such names be used instead of scientific names?
a. Common names may include different sets of organisms.
b. To recognize an organism in the literature, a scientist would have to know all languages.
c. The scientific name begins to tie the organism into related groups.
d. The common name blends into the literature while the italicized scientific name is unique.
E. All of the choices are true.

12. Which sequence of classification categories is in the proper order?
a. genus, class, kingdom, order, phylum, species, family
b. class, genus, family, species, order, phylum, kingdom
C. species, genus, family, order, class, phylum, kingdom
d. genus, species, order, class, family, kingdom, phylum
e. species, genus, family, class, order, phylum, kingdom

13. Growth and/or development is NOT observed in the human organism during
a. the conversion of a fertilized egg into a newborn.
b. childhood.
c. adolescence.
d. repair of an injury.
E. death.

14. A physician specializes on surgery involving the following group of organs: mouth, esophagus, stomach and intestines. Overall, this physician is specialized at which level of organization?
a. cell
b. tissue
c. organ
D. organ system
e. organism

15. When comparing energy and chemicals in the ecosystem,
a. both chemicals and energy cycle over and over again.
B. chemicals cycle over and over again but energy flows through once.
c. both chemicals and energy flow through once.
d. energy cycles over and over again but chemicals flow through once.
e. neither cycle or flow but both are simply present.

16. When researchers test a new human cancer drug using mice, the mice constitute the
a. hypothesis.
b. data.
c. experimental design.
D. model.
e. control.

17. The ____ theory states that all living things have a common ancestor.
18. The three domains of organisms are based mainly on
   a. differences in structural complexity.
   B differences in metabolic complexity.
   c. presence or absence of photosynthetic pigments.
   d. size.
   e. DNA, RNA, or protein replication mechanisms.

19. If a new anti-cancer drug is found effective in the first tests with mice, what do researchers conclude?
   a. If the drug was effective in a large number of mice, it will therefore be effective in humans.
   b. If the drug was effective in a small proportion of mice, it will be effective in a small proportion of humans.
   c. The mice have provided a positive control in this experiment that proves the drug is effective in humans.
   D The drug is effective in the mouse model; it must still be tested in humans, which was the original goal of the test regime.

20. The scientists decided to continue the summer pea/winter wheat experiment using the same design as the first. The new hypothesis stated, "A sustained summer pea/winter wheat rotation will eventually cause an increase in winter wheat production." What was the reason for this second experiment?
   A The scientists wanted to see if the crop rotation will eventually increase wheat production.
   b. The scientists thought that they had erred.
   c. The scientists changed the pot type and fertilizer.
   d. None of the choices are correct.

21. The ____ theory states that life comes only from life.
   a. cell
   B biogenesis
   c. evolution
   d. gene

22. Regarding the scientific method, which statement is false?
   a. Inductive reasoning is used to form a hypothesis.
   b. Observations are used to form a hypothesis.
   c. Experiments need to be repeatable.
   D Original hypotheses are formed after an experiment.
   e. The control and experimental group are identical except for one variable.

23. Biologists who classify living things are
   a. taxidermists.
   B taxonomists.
   c. nominologists.
   d. ecologists.
   e. zoologists.

24. The order to which human beings belong is
   a. Animalia.
   b. Chordata.
   c. Mammalia.
   D Primates.
   e. Hominidae.

25. The application of scientific knowledge for practical purposes is called
   a. pure science
   b. applied science
   c. theory
26. Which statement is NOT true concerning reproduction?
   a. Hereditary information is passed on to the next generation.
   b. Hereditary information is in the form of genes.
   c. The offspring of asexual organisms have the same genes as the single parent.
   d. The offspring of sexual organisms have roughly one half of the genes from each parent.
   E. The offspring of multicellular organisms tend to be identical to the parent.

27. Which statement is false regarding science?
   a. Science helps us to understand the natural world.
   b. Science strives to be objective rather than subjective.
   C. Correct scientific conclusions are permanent and never subject to change or refinement.
   d. Information is gathered by scientific methods.
   e. Information is gained by observing and testing.

28. The bones in a bird are hollow so as to reduce its weight for flight. This is an example of which characteristic of life?
   a. Living things grow and develop.
   b. Living things acquire materials and energy from the environment.
   c. Living things reproduce.
   D. Living things are adapted.
   e. Living things are homeostatic.

29. The science of ________________ is largely devoted to altering the genes in living organisms.
   a. technology
   B. biotechnology
   c. biology
   d. ecology

30. It is recommended that a person consume no more than 2400 mg of sodium per day. A can of soda is labeled as containing 200 mg of sodium. Which of the following is true?
   a. The soda will taste very salty.
   B. Drinking 12 cans would consume your recommended sodium limit for one day.
   c. It would therefore provide 200 calories of food energy.
   d. The sodium in the soda is not important since only sodium in salt is harmful.
   e. If you drank lots of other fluids, the sodium in the soda would be a smaller proportion and not count as much toward total intake.

31. Which of the following molecules is NOT a compound?
   a. \( \text{H}_2\text{O} \)
   b. \( \text{HCl} \)
   c. \( \text{H}_2 \)
   d. \( \text{C}_6\text{H}_{12}\text{O}_6 \)
   e. \( \text{NaOH} \)

32. Maltose is classified as a
   a. nucleic acid.
   b. fatty acid.
   c. protein.
   D. carbohydrate.
   e. lipid.

33. In the search to discover the agents that caused mad cow disease, scrapie in sheep, and CJD and kuru in humans, the diseased brain tissues were filtered and still found to be infective, indicating they are not bacteria but either viruses or chemical molecules. If it was a virus, the infective agent would contain either RNA or DNA. Other possibilities were that the agent was a carbohydrate or a fat or a protein. Infective tissues were treated with agents that destroyed just one of these chemicals and then injected into a healthy animal, with the results as follows. What is the infective agent?
• Amylase digests carbohydrates; tissue still infects healthy test animal.
• Lipase digests fats; tissue still infects healthy test animal.
• Formaldehyde and/or heat denatures DNA and RNA; tissue still infects healthy test animal.
• Trypsin digests protein; tissue does not infect healthy test animal.

a. carbohydrate  
b. fat  
C protein  
d. DNA or RNA  
e. Could be carbohydrate, fat, or DNA or RNA but not protein.

34. Buffers
a. can be acids or bases.  
B keep the pH within normal limits.  
c. are monomers of a polymer.  
d. are polymers of a monomer.  
e. are dipeptide molecules.

35. All carbohydrate molecules
a. contain amino acids.  
b. contain nitrogen and phosphate.  
c. are organic acids.  
D are composed of atoms of C, H, and OH.  
e. are composed of atoms of C, H, O, and N.

36. An ion is an atom that
a. exists in a gaseous state.  
B carries an electrical charge.  
c. does not carry an electrical charge.  
d. shares electrons with other atoms.  
e. shares neutrons with other atoms.

37. The lower the pH
a. the lower the hydrogen ion concentration.  
B the more acidic the solution.  
c. the higher the pH number.  
d. the greater the hydroxyl ion concentration.

38. If the atomic number is 15, then
a. the atomic weight must be 15.  
B the atom has 15 electrons.  
c. there are 7 electrons in the outermost shell.  
d. the atom has 15 neutrons.

39. Soaps are
A emulsifying agents.  
b. steroids.  
c. phospholipids.  
d. carbohydrates.  
e. proteins.

40. Which statement is correct regarding acids and bases?
a. Acids increase the pH, and bases decrease the pH.  
B Acids release hydrogen ions, and bases release hydroxyl ions.  
c. Acids are harmful but bases are not harmful.  
d. Acids combine with bases to form a buffer.  
e. Acids combine with bases to form sugars.

41. The Golgi apparatus apparently directs its protein products to the correct location in the cell based on
A which sugar chain is added and the sugar chain determines the destination in the cell.

b. the DNA extending its long molecular helix to direct the protein through the Golgi apparatus and on
to the final destination.
c. vesicles that constantly shuttle back-and-forth from the various cell destinations and these vesicles determine which protein in the Golgi apparatus to pick up and deliver.
d. proteins drifting away in all directions and are only used at the cell sites that need them.

42. In plants, chloroplasts are necessary for
a. respiration.
b. secretion.
C. photosynthesis.
d. storage.
e. both respiration AND secretion.

43. Stem cells are immature cells that develop into mature, differentiated cells that make-up the adult body.
Stem cells may be obtained from
a. baby's umbilical cord
b. aborted embryos
c. frozen embryos
d. brain
e. All of the choices are correct.

44. Tissues that produce large amounts of secretions, such as the gastric glands of the stomach, contain cells with large numbers of
A. lysosomes.
b. nucleoli.
c. centrioles.
d. mitochondria.
e. Golgi apparatus.

45. The origin of cell organelles in eukaryotes is possibly attributed to
a. invagination of the plasma membrane to form endoplasmic reticulum.
b. incorporation of engulfed heterotrophic bacteria to form mitochondria.
c. incorporation of engulfed autotrophic cyanobacteria to form chloroplasts.
d. an elongated bacterium that became attached to a host cell
E. All of the choices are speculated.

46. Which of the following structures are NOT found in the cytoplasm?
a. mitochondria
b. chloroplast
c. nucleolus
D. ribosomes
e. lysosome

47. Which eukaryotic organelle can best be seen by a light microscope?
a. ribosome
b. nucleosome
B. nucleus
c. endoplasmic reticulum
d. mitochondria
e. chromatin

48. The ____ will store pigments and toxins in plant cells.
a. chloroplast
b. chromoplasts
c. leucoplasts
D. vacuole
e. mitochondria

49. Protein synthesis occurs at the
a. mitochondria.
b. leucoplast.
c. Golgi apparatus.
Which describes the advantages of various types of microscopy?

a. The distance needed to distinguish two points is much greater for an electron microscope than a light microscope.
b. The electron microscope is superior for viewing very small details, such as changes in living organisms.
c. A light microscope is actually a form of transmission electron microscope.

**D** An electron microscope has dramatically greater magnification power than a light microscope.
e. All of the choices are correct.

Considering the history of microscopy, which of these organelles would have been discovered first?

a. endoplasmic reticulum
b. ribosomes
c. nucleus
d. lysosomes
e. microtubules

If we move cells to a low-gravity environment, such as in space exploration, we could most likely expect

a. nucleus and the genetic process.
b. chloroplast and energy capture.
c. cytoskeleton.
d. vacuoles and lysosomes.
e. mitochondrion and energy release.

If an active cell produces an important protein secretion, what sequence of organelles might we examine for the origin of that secretion?

a. endoplasmic reticulum-to-ribosomes-to-Golgi apparatus

**B** ribosomes-to-endoplasmic reticulum-to-Golgi apparatus

b. endoplasmic reticulum-to-Golgi apparatus-to-ribosomes
c. Golgi apparatus-to-endoplasmic reticulum-to-ribosomes
d. ribosomes-to-Golgi apparatus-to-endoplasmic reticulum

Which is NOT a correct association of cell organelles and function?

a. lysosome-intracellular digestion
b. mitochondrion-cell respiration
c. ribosome-production of proteins

**D** cell wall-regulate molecule passage in and out of animal cells
e. vacuole-storage of chemicals

What evidence suggests that the fluid in the nucleus is different from the cytoplasm?

a. There is a pH difference between the two fluids.
b. The nuclear membrane encloses the nucleoplasm.
c. Nuclear pores only permit passage of certain molecules into and out of the nucleus.

**D** All of the choices are correct.

The "powerhouse" of the cell is the

a. chloroplast.

**B** mitochondria.
c. Golgi apparatus.
d. ribosome.
e. centriole.

If the chloroplast is the result of endosymbiosis, what membrane of the chloroplast represents the plasma membrane of the original prokaryote?

a. the outer chloroplast membrane

**B** the inner chloroplast membrane
c. cristae
58. Which of these is mismatched?
   a. cilia-microtubules
   b. chloroplasts-grana
   C. mitochondria-stroma
   d. lysosomes-hydrolytic enzymes
   e. ribosomes-RNA

59. Both plant and animal cells have mitochondria because they both
   a. carry on photosynthesis.
   b. have a large central vacuole.
   c. have endoplasmic reticulum.
   D. need ATP for energy.
   e. have lysosomal hydrolytic enzymes.

60. Mucus moves up the respiratory tract by
   a. flagella.
   b. cilia.
   c. Golgi apparatus.
   d. centrioles.
   e. endoplasmic reticulum.

61. Which is NOT a function of the cytoskeleton?
   a. maintains a cell’s shape
   b. anchors organelles in place within a cell
   c. allows cell and its organelles to move
   D. secretes the calcium for bone tissue
   e. All of the choices are correct.

62. When viewed through a microscope, one characteristic of living cells is that their internal structures
   move. What organelles are most directly responsible for this motion we see?
   a. cell membrane and nucleus
   b. ribosomes and endoplasmic reticulum
   c. centrioles and cell wall
   D. mitochondria and cytoskeleton
   e. chloroplasts and lysosomes

63. The endosymbiotic hypothesis argues that prokaryotes became some of the organelles of early eukaryotic
   cells. This would be supported by what evidence?
   a. The vacuoles can “come and go” across the plasma membrane.
   b. The mitochondria and chloroplasts have their own DNA.
   c. Mitochondria and chloroplasts are nearly identical to some free living prokaryotes.
   D. The mitochondria and chloroplasts have their own DNA AND are nearly identical to some free living
      prokaryotes.
   e. Prokaryotes lack a nucleus.

64. An agent would make a good antibiotic if it affected a structure or process only found in bacterial cells
   and not in our (eukaryotic) cells. Which of the following actions would theoretically make a good
   candidate antibiotic?
   A. prevents repair of the peptidoglycan cell wall
   b. damages the nuclear membrane
   c. damages DNA
   d. prevents ribosomes from producing proteins
   e. stops cellular respiration

65. If a cell lacked ribosomes, it would NOT be able to
   a. form a spindle apparatus.
   B. synthesize proteins.
c. respire.
d. hydrolyze fat.
e. form a Golgi vesicle.

66. The atomic weight of an atom
   A. equals the number of protons plus the number of neutrons.
   b. equals the number of protons plus the number of electrons.
   c. equals the number of neutrons.
   d. changes after each reaction.

67. Organic molecules
   a. always contain carbon.
   b. always contain hydrogen.
   C. always contain carbon and hydrogen.
   d. are found only in organisms, hence their name.
   e. are always food molecules.

68. In the cell theory
   a. Virchow asserted that all cells come from preexisting cells.
   b. Schleiden determined that all plants are made of cells.
   c. Schwann researched animal tissues and discovered that they were all made of cells.
   d. Hooke first used the term for “cells”
   E. All of the choices are correct.

69. The ____ is surrounded by a double membrane and carries the coding that determines protein synthesis.
   a. mitochondria
   b. chloroplast
   c. nucleolus
   D. nucleus
   e. rough endoplasmic reticulum

70. Which organelle forms a membranous system of channels for intracellular transport?
   A. endoplasmic reticulum
   b. centrioles
   c. Golgi apparatus
   d. lysosome