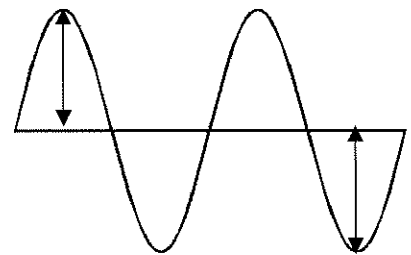
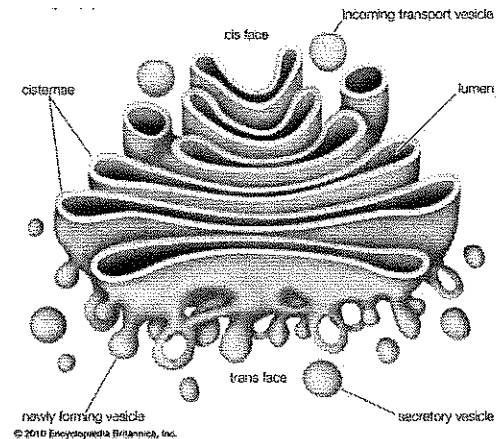


Student Instructions:

- Write your complete ID code on your answer sheet.
 - If you change your answer, erase well.
1. Steel, bronze, and brass are examples. Which choice below names a mixture made of a metal and one or more metallic or non-metallic elements?
 - A. allotrope
 - B. alkane
 - C. albedo
 - D. alloy
 2. Which one of the following mixtures is a colloid?
 - A. whipped cream
 - B. vinegar
 - C. saltwater
 - D. rubbing alcohol
 3. Which one of these below is an example of a substance with an ionic bond?
 - A. water (H_2O)
 - B. table salt ($NaCl$)
 - C. carbon dioxide (CO_2)
 - D. ozone (O_3)
 4. Which one of the following choices names a physical, as opposed to a chemical, property of matter?
 - A. boiling point
 - B. reactivity
 - C. ability to rust
 - D. flammability
 5. A seesaw is an example of what simple machine?
 - A. inclined plane
 - B. wedge
 - C. lever
 - D. pulley
 6. In the diagram at right, the arrows illustrate what property of a wave?
 - A. wavelength
 - B. period
 - C. frequency
 - D. amplitude
 7. Which of the following equations does Newton's Second Law of Motion define?
 - A. speed equals distance divided by time
 - B. power equals work divided by time
 - C. density equals mass divided by volume
 - D. force equals mass times acceleration

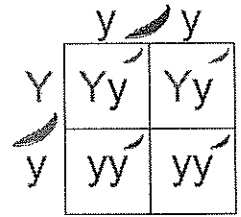


8. Which one of the materials below is classified as a superconductor?
- wood
 - aluminum
 - rubber
 - glass
9. In a battery, the chemical medium that allows electrical charge to flow between the anode and cathode has which of the following names?
- electrolyte
 - calorimeter
 - inductor
 - electromagnet
10. Match each method of heat transfer with its example.
- | | |
|---------------|--|
| x. radiation | 1. Warmer ocean water rises, while colder ocean water sinks. |
| y. conduction | 2. A stove's burner heats the bottom of a tea kettle. |
| z. convection | 3. The sun warms you. |
- x-3, y-2, z-1
 - x-1, y-2, z-3
 - x-2, y-3, z-1
 - x-1, y-3, z-2
11. The organelle at right transports, modifies, and packages lipids and proteins into vesicles. What is its name?
- cytoskeleton
 - plasma membrane
 - centriole
 - Golgi apparatus
12. They are hair-like projections that beat rhythmically to help certain protists, including the paramecium, move. Which choice below names these organelles?
- flagella
 - pseudopodia
 - cilia
 - villi
13. Which one of the following choices is NOT made of keratin?
- a rhino's horn
 - a crab's shell
 - a human's hair
 - a horse's hooves
14. Roots often exhibit the negative version of it. Which choice below describes plant growth in response to touch, or to contact with a solid object?
- heliotropism
 - geotropism
 - chemotropism
 - thigmotropism



15. Many animals release chemical substances to influence the behavior or physiology of other members of their species. These chemicals are called which of the following?
- hormone
 - chyme
 - pheromone
 - adrenaline
16. Certain birds and mammals exhibit which one of the behaviors below during the “critical period” shortly after their hatching or birth?
- imprinting
 - estivation
 - migration
 - hibernation

17. Assume Y is the allele for yellow coloring and is dominant in pea plants and y is the recessive allele for green coloring in pea plants. According to the Punnett square at right, what is the probability of the pea plants’ offspring being green?
- 25%
 - 50%
 - 75%
 - 100%



18. Barring genetic mutation, how many pairs of autosomes do human cells contain?
- 1
 - 2
 - 22
 - 23
19. In which of the following methods of asexual reproduction does an egg develop into a complete individual without being fertilized?
- parthenogenesis
 - fission
 - fragmentation
 - budding
20. Match each phase of meiosis with its description.
- | | |
|----------------|---|
| x. Prophase I | 1. chromosome pairs line up along the cell’s equator |
| y. Metaphase I | 2. crossing over |
| z. Anaphase I | 3. meiotic spindle pulls chromosomes to opposite cellular poles |
- x-2, y-3, z-1
 - x-1, y-2, z-3
 - x-3, y-1, z-2
 - x-2, y-1, z-3
21. Which of the following ecological divisions is the smallest?
- community
 - population
 - species
 - ecosystem

22. Which insect below is bioluminescent?
- A. dung beetle
 - B. dragonfly
 - C. firefly
 - D. ladybug
23. According to a well-known ecological rule, approximately what percentage of an ecosystem's energy is passed from one trophic level to the next in a food web?
- A. 10%
 - B. 20%
 - C. 30%
 - D. 40%
24. Which of the following is NOT a primary cause of erosion?
- A. wind
 - B. ice
 - C. water
 - D. lightning
25. The Intertropical Convergence Zone is a low-pressure area where meeting trade winds effectively cancel each other out. Which of the following choices gives an alternate name for this region around the equator?
- A. westerlies
 - B. doldrums
 - C. roaring forties
 - D. horse latitudes
26. Subduction zones occur at them. Which choice below names a boundary at which two or more tectonic plates collide?
- A. transverse boundary
 - B. divergent boundary
 - C. transform boundary
 - D. convergent boundary
27. Auroras occur in which specialized atmospheric layer, which can also interfere with radio and satellite signals?
- A. troposphere
 - B. ionosphere
 - C. ozone layer
 - D. exosphere
28. The equinoxes—the days when the sun is directly above the equator—occur in which two months?
- A. March and September
 - B. April and October
 - C. January and July
 - D. June and December
29. Which of the following choices names the fuzzy, dusty cloud that develops around a comet's nucleus?
- A. apogee
 - B. parsec
 - C. coma
 - D. perigee

30. Match each NASA mission with the planet it studied.

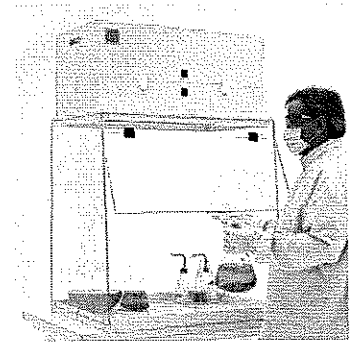
- | | |
|--------------|------------|
| x. Messenger | 1. Mercury |
| y. Cassini | 2. Saturn |
| z. Magellan | 3. Venus |
- A. x-3, y-1, z-2
B. x-2, y-3, z-1
C. x-1, y-2, z-3
D. x-1, y-3, z-2

31. Sirius B is the nearest known example of which star class below, whose members lie in the lower left-hand corner of the Hertzsprung-Russell diagram?

- A. supergiant
B. white dwarf
C. red giant
D. main sequence

32. What piece of lab safety equipment is pictured at right?

- A. fume hood
B. eyewash station
C. safety can
D. chemical spill kit



33. Three of the following pieces of lab equipment are for dealing with liquid. Which one is used to grind or crush materials?

- A. buret
B. pipet
C. mortar and pestle
D. graduated cylinder

34. The scientific method relies MOST heavily on what type of reasoning—moving from generalities to specifics?

- A. adductive
B. deductive
C. reductive
D. inductive

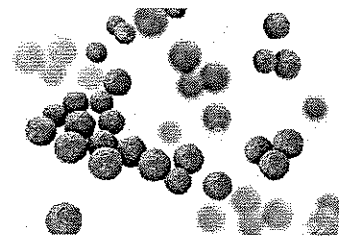
35. Which of the following choices is part of a plant's male reproductive system?

- A. filament
B. stigma
C. style
D. sepals

36. Which one of the following plants is a gymnosperm?

- A. maple tree
B. giant sequoia
C. magnolia tree
D. saguaro cactus

37. They are primarily found on leaves, although some can exist on stems. Guard cells open and close which of the following plant parts?
- xylem
 - rhizomes
 - meristem
 - stomata
38. Which animal below is a monotreme?
- platypus
 - kangaroo
 - rattlesnake
 - beaver
39. Which one of the following choices names a stage of incomplete metamorphosis that is NOT a part of complete metamorphosis?
- larva
 - egg
 - nymph
 - adult
40. Match each animal with its phylum.
- | | |
|--------------|------------------|
| x. starfish | 1. echinodermata |
| y. squid | 2. cnidaria |
| z. jellyfish | 3. mollusca |
- x-2, y-1, z-3
 - x-1, y-3, z-2
 - x-3, y-1, z-2
 - x-2, y-3, z-1
41. A fungus causes which one of the conditions below?
- AIDS
 - ringworm
 - influenza
 - salmonella poisoning
42. A virus's outer protein shell that protects its nucleic acid core has which of the following names?
- capsid
 - paramecium
 - spore
 - chitin
43. What shape, common to the bacteria that cause strep throat and staph infections, is pictured at right?
- spirillum
 - bacillus
 - coccus
 - filamentous



44. Jacques Cousteau spent his career in which of the following earth science branches?
- astronomy
 - meteorology
 - geology
 - oceanography
45. He published the treatise *A Method of Reaching Extreme Altitudes* in 1919. Which scientist below do historians widely credit as the “father of modern rocketry”?
- Robert Hooke
 - Guglielmo Marconi
 - Robert Goddard
 - Edwin Hubble
46. Which of the following choices names the virtual assistant developed by Samsung?
- Bixby
 - Alexa
 - Cortana
 - Siri
47. In 1974, two scientists discovered 40 percent of a hominin skeleton in Ethiopia. Which choice below names that *Australopithecus afarensis* specimen?
- Prudence
 - Eleanor
 - Rita
 - Lucy
48. Folic acid, thiamin, niacin, and riboflavin are all variations of what vitamin, which helps the body convert food into energy?
- A
 - B
 - C
 - D
49. Leukocyte is another name for what part of human blood, which produces antibodies and destroys infectious agents?
- red blood cell
 - platelet
 - white blood cell
 - plasma
50. Match each endocrine gland with its description.
- | | |
|------------------|--------------------------------------|
| x. pancreas | 1. secretes epinephrine and steroids |
| y. adrenal gland | 2. secretes metabolism hormones |
| z. thyroid | 3. secretes insulin and glucagon |
- x-1, y-3, z-2
 - x-2, y-1, z-3
 - x-3, y-2, z-1
 - x-3, y-1, z-2

