

## 2019 TAME High School Practice State Science Test

- (1) The name *streptococcus* tells you that the bacteria are arranged as  
A) pairs of round cells. C) chains of rods.  
B) groups of spirals. D) long chains of round cells.
- (2) You hold a rubber ball in your hand. The Newton's third law companion force to the force of gravity on the ball is the force exerted by the  
A) hand on the ball. C) ball on the Earth.  
B) Earth on the ball. D) ball on the hand.
- (3) All of the following are part of a prokaryotic cell **except**  
A) a plasma membrane. C) a cell wall.  
B) an endoplasmic reticulum. D) ribosomes.
- (4) Why is cobalt (Co) placed before nickel (Ni) on the periodic table of the elements even though it has a higher average atomic mass than nickel?  
A) Nickel has fewer electrons. C) Cobalt has a lower density.  
B) Nickel has one more proton. D) Cobalt was discovered first.
- (5) Which of the following elements is classified as a metal?  
A) helium C) lithium  
B) sulfur D) bromine
- (6) A force  $F$  directed at an angle of  $\theta$  above the horizontal is used to pull a crate a distance  $D$  across a level floor. What is the work done by the force  $F$  ?  
A)  $FD$  C)  $FD\sin\theta$   
B)  $FD\cos\theta$  D)  $mg\sin\theta$
- (7) What is a structured procedure for collecting information to test a hypothesis?  
A) a theory C) an experiment  
B) a control group D) a principle
- (8) A gene is a segment of DNA that controls the production of  
A) proteins. C) microtubules.  
B) carbohydrates. D) centromeres.
- (9) Which of the following atoms has the largest atomic radius?  
A) iodine C) chlorine  
B) magnesium D) barium
- (10) When cations and anions join, they form what kind of chemical bond?  
A) hydrogen C) covalent  
B) metallic D) ionic

- (11) Under the same conditions of pressure and temperature, a liquid differs from a gas because the molecules of the liquid
- A) have stronger forces of attraction between them. C) have no regular arrangement.  
 B) take the shape of the container they are in. D) are in constant motion.
- (12) The volume of 400 mL of chlorine gas at 400 mm Hg is decreased to 200 mL at constant temperature. What is the new gas pressure?
- A) 300 mm Hg C) 650 mm Hg  
 B) 400 mm Hg D) 800 mm Hg
- (13) What is the pH of a  $1.0 \times 10^{-10}$  M  $\text{HNO}_3(\text{aq})$  solution?
- A) 5.00 C) 8.00  
 B) 7.00 D) 10.0
- (14) What is the frequency of the station that broadcasts with 3.27-meter radio waves?
- A) 91.7 MHz C) 102.5 MHz  
 B) 98.5 MHz D) 106.3 MHz
- (15) Astronaut A and astronaut B are free-floating, but loosely tethered, to the International Space Station. In a moment of playfulness, astronaut A pushes on the larger astronaut B. During the push which of the following quantities will have the same magnitude for both astronauts?
- A) acceleration C) force  
 B) change in velocity D) speed
- (16) Which organ filters blood that has collected wastes from cells throughout the body and maintains the homeostasis of body fluids?
- A) lungs C) larynx  
 B) heart D) kidneys
- (17) Fish have great flexibility when they swim because they have
- A) separate vertebrae. C) scales.  
 B) no limbs. D) no skin.
- (18) Which of the following may affect the rate of a reaction?
- A) reactant concentration C) temperature  
 B) addition of a catalyst D) all of these
- (19) In the reaction below, what is the reducing agent?
- $$4\text{BCl}_3(\text{g}) + 3\text{SF}_4(\text{g}) \rightarrow 4\text{BF}_3(\text{g}) + 3\text{SCl}_2(\text{l}) + 3\text{Cl}_2(\text{g})$$
- A)  $\text{BCl}_3$  C)  $\text{SF}_4$   
 B)  $\text{Cl}_2$  D)  $\text{SCl}_2$
- (20) Lysosomes
- A) are assembled in the cell nucleus.  
 B) play a key role in the building of body tissue.  
 C) are storage vessels for powerful digestive enzymes.  
 D) are storage vessels for energy-rich macromolecules.

- (21) Which of the following ecological locations has the greatest species diversity?  
A) deciduous forests C) islands  
B) grasslands D) tropics
- (22) Although extinction is a natural process, current extinctions are of concern to environmentalists because  
A) the rate of extinction is unusually high.  
B) more animals than ever before are going extinct.  
C) current extinction is primarily affecting plant diversity.  
D) most current extinctions are caused by introduced species.
- (23) At a certain time, an object in free fall has velocity 4.0 m/s in the upward direction. What is the approximate velocity of the object one second later?  
A) 6 m/s down C) 10 m/s down  
B) 4 m/s up D) 14 m/s up
- (24) What is the total number of valence electrons in one  $\text{S}_4\text{O}_6^{2-}$  ion?  
A) 60 C) 112  
B) 62 D) 114
- (25) A compressed spring has 16 Joules of potential energy. What is the maximum speed it can impart to a 2.0-kg object?  
A) 2.8 m/s C) 8.0 m/s  
B) 4.0 m/s D) 16.0 m/s
- (26) A 5000-kg freight car moving at 4.0 km/h collides and couples with an 8000-kg freight car which is initially at rest. What is the approximate common final speed of these two cars?  
A) 1.0 km/h C) 2.5 km/h  
B) 1.5 km/h D) 4.0 km/h
- (27) An object is placed 60 cm from a convex converging lens. The image produced is inverted and half the size of the object. What would be focal length of the lens?  
A) 20 cm C) 45 cm  
B) 30 cm D) 60 cm
- (28) How many mL of 8.00 M HCl are needed to prepare 150. mL of a 1.60 M HCl solution?  
A) 12.0 mL C) 24.0 mL  
B) 18.8 mL D) 30.0 mL
- (29) Which forms a link between parent and offspring, living species and their extinct ancestors, and humans and the earliest, most primitive cellular organisms?  
A) homologues C) daughter cells  
B) cytokinesis D) DNA
- (30) Which of the following is **not** one of the major processes controlled by hormones?  
A) body coordination  
B) growth and development  
C) maintaining electrolyte balance  
D) mobilizing body defenses against stressors

- (31) What is the stoppage of blood flow called?  
A) homeostasis  
B) erythropoiesis  
C) coagulation  
D) hemostasis
- (32) What was one of the problems during early blood tests? (Around 1875)  
A) microscopic examination could not be applied to dried blood  
B) human blood could not be distinguished from animal blood  
C) blood types could not be identified  
D) All of the above
- (33) Which of the following organelles releases energy from sugars?  
A) mitochondria  
B) chloroplasts  
C) vacuoles  
D) ribosomes
- (34) Which of the following produces identical nuclei in cells?  
A) fertilization  
B) osmosis  
C) mitosis  
D) pollination
- (35) Analysis of a compound known to contain only Mg, P, and O gives the analysis below.  
21.8% – Mg; 27.7% – P; 50.3% – O  
What is its empirical formula?  
A)  $\text{Mg}_3\text{P}_2\text{O}_8$   
B)  $\text{MgPO}_2$   
C)  $\text{Mg}_2\text{P}_2\text{O}_7$   
D)  $\text{MgPO}_3$
- (36) How many neutrons, protons and electrons are there in one  $^{17}_8\text{O}^{2-}$  ion?  
A) 17 protons, 8 electrons and 8 neutrons  
B) 8 protons, 6 electrons and 9 neutrons  
C) 8 protons, 6 electrons and 17 neutrons  
D) 8 protons, 10 electrons and 9 neutrons
- (37) If the percent yield of the reaction below is 98.5%, then what mass of  $\text{O}_2$  is needed to produce 49.0 grams of  $\text{NO}_2$ ?  
$$\text{N}_2\text{H}_4(\text{g}) + 3\text{O}_2(\text{g}) \rightarrow 2\text{NO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{g})$$
  
A) 11.5 grams  
B) 23.1 grams  
C) 31.1 grams  
D) 51.9 grams
- (38) As a positively charged rod is brought close to the knob of a positively charged electroscope, the leaves of the electroscope will  
A) not move because of electrostatic shielding.  
B) spread farther apart because the leaves become more positively charged.  
C) come closer together because the leaves become more positively charged.  
D) come closer together because the leaves become more negatively charged.
- (39) Two resistors in series in an operating circuit will necessarily have the same  
A) current.  
B) resistance.  
C) power dissipated.  
D) potential difference.

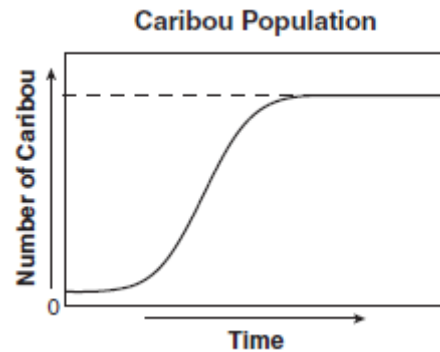
- (40) A CubeSat satellite was recently placed in a circular orbit around Earth. If the speed of the satellite is constant, the force acting on the satellite
- A) is zero.
  - B) is decreasing.
  - C) points toward the center of Earth at all times.
  - D) points in the direction that the satellite is moving.

- (41) The diagram below shows a marine food chain. The zooplankton in this food chain are



- A) primary producers.
- B) primary consumers.
- C) secondary consumers.
- D) tertiary consumers.

- (42) The graph to the right shows changes in a caribou population over time. Based on the graph, which of the following is a possible explanation for the stabilization of the caribou population?



- A) an equal number of deaths and births
- B) an unequal number of deaths and births
- C) an equal number of immigrants and births
- D) an unequal number of immigrants and deaths

- (43) Which one of the following compounds is the most acidic oxide?

- A)  $\text{Na}_2\text{O}$
- B)  $\text{SiO}_2$
- C)  $\text{MgO}$
- D)  $\text{SO}_2$

- (44) Which of the following processes allows the cells of an organism to use carbon from the environment?

- A) fertilization
- B) transpiration
- C) photosynthesis
- D) mitosis

- (45) A student in a lab experiment jumps upward off a common bathroom scale as the lab partner records the scale reading. What does the lab partner observe during the instant the student pushes off?

- A) The scale reading will increase during the entire time the student is in contact with the scale.
- B) The scale reading will remain unchanged during the entire time the student is in contact with the scale.
- C) The scale reading will decrease momentarily then will increase as the student is moving upward from the scale.
- D) The scale reading will increase momentarily then will decrease as the student is moving upward from the scale.

- (46) An apple is held completely submerged just below the surface of a container of water. The apple is then moved to a deeper point in the water. Compared with the force needed to hold the apple just below the surface, what is the force needed to hold it at a deeper point?

- A) smaller
- B) larger
- C) essentially the same
- D) impossible to determine



# 2019 TAME High School Practice State Science Test Answer Key

- (1) D
- (2) C
- (3) B
- (4) B
- (5) C
- (6) B
- (7) C
- (8) A
- (9) D
- (10) D
- (11) A
- (12) D
- (13) B
- (14) A
- (15) C
- (16) D
- (17) A
- (18) D
- (19) A
- (20) C
- (21) D
- (22) A
- (23) A
- (24) B
- (25) B

- (26) B
- (27) A
- (28) D
- (29) D
- (30) A
- (31) D
- (32) D
- (33) A
- (34) C
- (35) C
- (36) D
- (37) D
- (38) B
- (39) A
- (40) C
- (41) B
- (42) A
- (43) D
- (44) C
- (45) D
- (46) C
- (47) B
- (48) D
- (49) B
- (50) B