

# 10/29/2016 Houston ISD

## Science II Contest

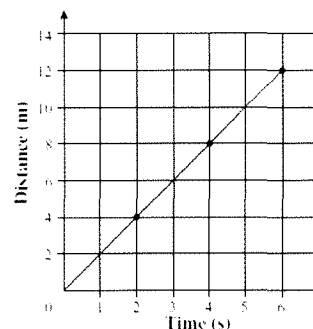
CONTESTANT NUMBER

### Contest General Directions

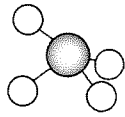
1. DO NOT open this test until told to do so.
2. You may be given up to 45 minutes to take this test.
3. There are 35 problems on the test.
4. Problems that are skipped are not considered wrong.
5. All answers must be written in the answer blanks on the answer sheet. If a scantron/chatsworth answer card is provided all answers must be recorded (bubbled in) on the card. You may write anywhere on the test, but only answers are allowed on the answers sheet or answer card.
6. If an answer is changed be sure to erase the answer thoroughly before entering in a new answer.
7. All problems have at least one best answer.
8. Use CAPITAL LETTERS if writing answers on an answer sheet.
9. Each correct answer receives +5 points and each wrong answer receives -2 points.

## 10/29/2016 Houston ISD Science Test II

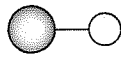
- (1) Of the four general types of biological molecules, which one typically accounts for the majority of dietary calories in the human diet?  
A) carbohydrates  
B) nucleic acids  
C) lipids  
D) proteins
- (2) Silicon dioxide is made of what two elements?  
A) Silicon and carbon  
B) Silicon and water  
C) Silicon and hydrogen  
D) Silicon and oxygen
- (3) Which of the following is the closest value to the mass of a nickel coin?  
A) 5 milligrams  
B) 5 grams  
C) 50 nanograms  
D) 0.50 kilograms
- (4) If the density of a certain type of soil is 2070 kilograms per cubic meter then one gram of this soil would have a mass of what amount?  
A) 207 grams  
B) 0.0207 grams  
C) 2.07 grams  
D) 2070 grams
- (5) What process involves a nucleated cell doubling its DNA and duplicating chromosomes so the cell can then divide and produce two identical daughter cells?  
A) budding  
B) mitosis  
C) meiosis  
D) gamete-cytosis
- (6) How many electrons are in the outer shell of a noble gas with an atomic mass greater than three?  
A) 8  
B) 4  
C) 2  
D) 1
- (7) What planet in our Solar System is about the same size as the Earth, is tectonically active, and has a thick atmosphere composed of carbon dioxide?  
A) Ganymede  
B) Mars  
C) Venus  
D) Neptune
- (8) Where is an igneous rock such as pumice most likely formed?  
A) in a desert  
B) near a volcano  
C) in a creek bed  
D) under a glacier
- (9) The graph to the right relates distance to time for a rolling ball. What is the average speed of the ball?  
A) 2 m/s  
B) 8 m/s  
C) 6 m/s  
D) 72 m/s
- (10) The Moon orbits Earth at a speed of approximately one kilometer per second. The Moon is kept in orbit by which of the following?  
A) magnetism  
B) lunar phases  
C) gravity  
D) ocean tides



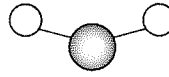
- (11) Below are four ball-and-stick models representing compounds. Which of these models best represents ammonia —  $\text{NH}_3$ ?



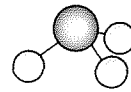
A)



B)



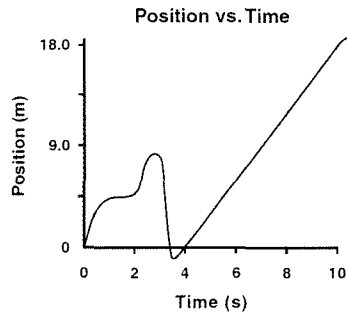
C)



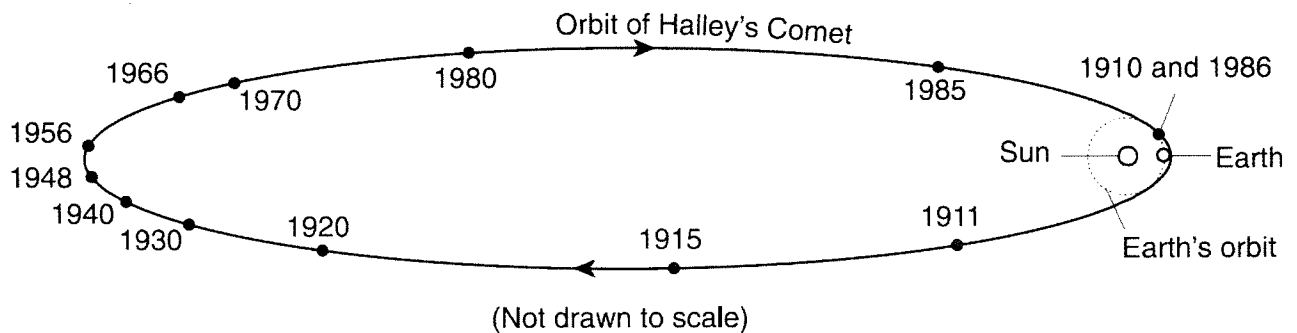
D)

- (12) Scientists can determine the location of foxes in the forest habitat using a radio collar. Which question could be answered by using these radio collars?
- A) When do foxes climb hills?                      C) When do foxes have offspring?  
 B) What types of food do foxes eat?              D) What habitat do foxes use most?
- (13) Black bears have thick fur that traps air. How does this air insulate the bear in winter?
- A) The air reduces thermal (heat) energy flow to the environment.  
 B) The air produces thermal (heat) energy to keep the bear warm.  
 C) The air transforms chemical energy into thermal (heat) energy.  
 D) The air transfers thermal (heat) energy to the bear.
- (14) A ball is dropped from the top of a tall building. As the ball falls, the upward force of air resistance becomes equal to the downward pull of gravity. When these two forces become equal in magnitude, the ball will
- A) flatten due to the forces.                      C) fall at a constant speed.  
 B) continue to speed up.                          D) slow to a stop.
- (15) A force of 5 N is required to increase the speed of a box from a rate of 1.0 m/s to 3.0 m/s within 5 s along a level surface. What change would most likely require additional force to produce the same results?
- A) reduce the mass of the box                      C) increase the mass of the box  
 B) make the surfaces of the box smooth              D) make the surface of the floor smooth
- (16) The table to the right shows properties of four different sample materials. One of these materials is cork, a type of wood that floats in water. Given that the density of water is 1g/mL, which of the samples is most likely cork?
- A) 1  
 B) 2  
 C) 3  
 D) 4

| Physical Properties |       |        |
|---------------------|-------|--------|
| Sample Number       | Mass  | Volume |
| 1                   | 89 g  | 10 mL  |
| 2                   | 26 g  | 10 mL  |
| 3                   | 24 g  | 100 mL |
| 4                   | 160 g | 100 mL |

- (18) To express the distance between the Milky Way galaxy and other galaxies, the most appropriate unit of measurement is the  
 A) nanometer.  
 B) light-year.  
 C) kilometer.  
 D) astronomical unit.
- (19) As a sample of water turns to ice,  
 A) new molecules are formed.  
 B) the arrangement of the molecules changes.  
 C) the mass of the sample is increased.  
 D) energy is absorbed by the molecules.
- (20) What characteristic of carbon (C) makes it essential to living organisms?  
 A) Carbon forms crystal structures under certain conditions.  
 B) Carbon can exist as a solid, liquid, or gas.  
 C) Carbon bonds in many ways with itself to form chains.  
 D) Carbon exists in radioactive forms.
- (21) The graph to the right shows how the position of an object changes over time. What is the speed of the object during the time interval from 4 seconds to 10 seconds?
- 
- A) 2 m/s  
 B) 3 m/s  
 C) 8 m/s  
 D) 16 m/s
- (22) Fossils of warm-weather plants were found on an island in the Arctic Ocean. What can best be concluded from this discovery?  
 A) Spores of plants drifted by air currents to the island.  
 B) Ocean currents carried the plants to the island.  
 C) The island drifted from a tropical region to its present location.  
 D) Seeds of plants have been carried to the island by migratory birds.
- (23) Which statement best explains the reason muscle cells have more mitochondria than skin cells?  
 A) Muscle cells use more energy than skin cells.  
 B) Muscle cells have fewer proteins than skin cells.  
 C) Muscle cells have a smaller nucleus than skin cells.  
 D) Muscle cells have more excess water than skin cells.
- (24) What does the hardness of water indicate?  
 A) high levels of calcium and magnesium  
 B) increased pressure in pipelines to faucets  
 C) low levels of calcium and magnesium  
 D) decreased pressure in pipelines to faucets
- (25) Which element is a poor conductor of heat?  
 A) F  
 B) Fe  
 C) K  
 D) Ag
- (26) Information about the heredity of a cell is stored in which organelle?  
 A) flagellum  
 B) nucleus  
 C) mitochondrion  
 D) vacuole

- (27) What increases as a rock falls to the ground?  
 A) the density of the rock  
 B) the inertia of the rock  
 C) the pull of gravity on the rock  
 D) the momentum of the rock
- (28) Which statement best explains why there are fewer carnivores living in tundra environments than in other environments?  
 A) The short growing season limits the number of herbivores that support carnivores.  
 B) There is not enough sunlight for primary producers to carry out photosynthesis.  
 C) The large number of predators limits the number of carnivores that live in the tundra.  
 D) There are more disease-causing insects present in the tundra environment.
- (29) Which type of environment is mostly populated with oak, hickory, beech, and maple trees?  
 A) taiga  
 B) tundra  
 C) deciduous forest  
 D) tropical rain forest
- (30) Which best describes a correct order of the water cycle?  
 A) precipitation, runoff, condensation, evaporation, precipitation  
 B) precipitation, runoff, evaporation, condensation, precipitation  
 C) precipitation, evaporation, condensation, runoff, precipitation  
 D) precipitation, evaporation, runoff, condensation, precipitation
- (31) The diagram below shows the orbit of Halley's Comet around the Sun as viewed from space. Earth's orbit is also shown. The only years shown in which Halley's Comet could be viewed from Earth without the use of a telescope were 1910 and 1986. What is the next year in which Halley's Comet will be visible from the Earth without the use of a telescope?



- A) 2010  
 B) 2062  
 C) 2086  
 D) 2110
- (32) Under which conditions would a sugar cube dissolve most quickly when placed in a liter of water at room temperature?  
 A) A whole sugar cube is added and the water is stirred.  
 B) A whole sugar cube is added and the water is not stirred.  
 C) A crushed sugar cube is added and the water is stirred.  
 D) A crushed sugar cube is added and the water is not stirred.
- (33) Sound waves are not able to travel through which of the following?  
 A) a cloud  
 B) a vacuum  
 C) metal  
 D) water

- (34) Bernoulli's principle states that as the speed of a moving fluid increases, its pressure
- A) decreases.
  - B) stays the same.
  - C) increases.
  - D) decreases, then increases.
- (35) The water-pumping station in your town increases the water pressure by 20 Pa. At which of the following locations will the water pressure be increased the most?
- A) the kitchen at the pumping station
  - B) a supermarket two blocks away
  - C) a home 2 km away
  - D) The water pressure will be the same at all of the stations.

**10/29/2016 Houston ISD Science II Test**  
**Answer Key**

- (1)    \_\_\_A\_\_\_
- (2)    \_\_\_D\_\_\_
- (3)    \_\_\_B\_\_\_
- (4)    \_\_\_C\_\_\_
- (5)    \_\_\_B\_\_\_
- (6)    \_\_\_A\_\_\_
- (7)    \_\_\_C\_\_\_
- (8)    \_\_\_B\_\_\_
- (9)    \_\_\_A\_\_\_
- (10)   \_\_\_C\_\_\_
- (11)   \_\_\_D\_\_\_
- (12)   \_\_\_D\_\_\_
- (13)   \_\_\_A\_\_\_
- (14)   \_\_\_C\_\_\_
- (15)   \_\_\_C\_\_\_
- (16)   \_\_\_C\_\_\_
- (17)   \_\_\_B\_\_\_
- (18)   \_\_\_B\_\_\_
- (19)   \_\_\_B\_\_\_
- (20)   \_\_\_C\_\_\_

- (21)   \_\_\_B\_\_\_
- (22)   \_\_\_C\_\_\_
- (23)   \_\_\_A\_\_\_
- (24)   \_\_\_A\_\_\_
- (25)   \_\_\_A\_\_\_
- (26)   \_\_\_B\_\_\_
- (27)   \_\_\_D\_\_\_
- (28)   \_\_\_A\_\_\_
- (29)   \_\_\_C\_\_\_
- (30)   \_\_\_B\_\_\_
- (31)   \_\_\_B\_\_\_
- (32)   \_\_\_C\_\_\_
- (33)   \_\_\_B\_\_\_
- (34)   \_\_\_A\_\_\_
- (35)   \_\_\_D\_\_\_

**For Graders Use Only**

Initials    \_\_\_        \_\_\_        \_\_\_

\_\_\_\_\_ Correct  $\times (+5) =$  \_\_\_\_\_

\_\_\_\_\_ Wrong  $\times (-2) =$  \_\_\_\_\_

Total Score =        \_\_\_\_\_

Rank        \_\_\_\_\_