

CONTESTANT NUMBER:

**FOR GRADER USE ONLY**

Score Test Below:

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

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

Papers contending to place:

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



**University Interscholastic League  
A+ Science Contest • Answer Sheet**

*Write your contestant number in the upper right corner, and circle your level below.*

**Circle Level:**

Science I

Science II

1. \_\_\_\_\_

19. \_\_\_\_\_

2. \_\_\_\_\_

20. \_\_\_\_\_

3. \_\_\_\_\_

21. \_\_\_\_\_

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17. \_\_\_\_\_

35. \_\_\_\_\_

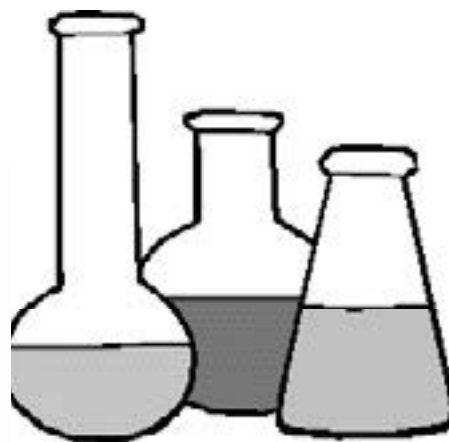
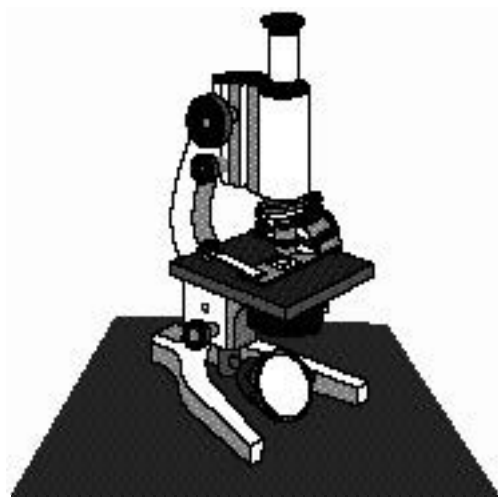
18. \_\_\_\_\_

**INVITATIONAL 2018-2019**

**A+ ACADEMICS**



University Interscholastic League



# Science I

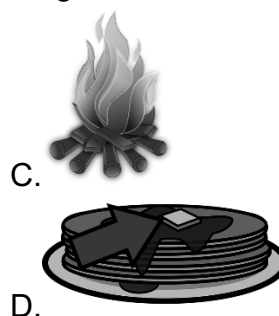
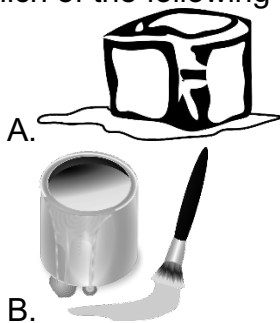
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**UNIVERSITY INTERSCHOLASTIC LEAGUE  
2018-2019 A+ SCIENCE I  
INVITATIONAL TEST**

1. Which of the following are considered the products of photosynthesis?



- A. Water & Sucrose  
B. Carbon Dioxide & Oxygen  
C. Oxygen & Water  
D. Oxygen & Glucose
2. The rate of blood flow depends on both blood pressure and the resistance to flow due to vessels in the body. What other force is able to affect the flow of blood in a body?
- A. Gravity  
B. Tension  
C. Air Pressure  
D. Magnetism
3. In an energy pyramid, approximately how much energy is transferred to another organism when it is consumed?
- A. .01  
B. .1  
C. .001  
D. 1/100
4. Which of the following best illustrates a chemical change?



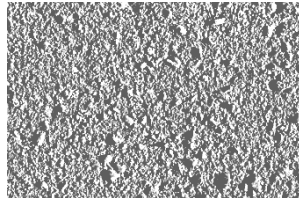
5. A pot of water heating on a stove best demonstrates which of the following forms of heat transfer?
- I. Conduction  
II. Convection  
III. Radiation
- A. Only I  
B. Only II  
C. I & III  
D. I & II  
E. I, II, & III

6. Which of the following is not an immediate impact to a region that has been flooded?
- |                     |                                     |
|---------------------|-------------------------------------|
| A. Crop destruction | C. Loss of life                     |
| B. Rip tides        | D. Increase of water borne diseases |
7. According to NASA, which of the following is not a requirement for life to arise and thrive on a planet?
- |                  |             |
|------------------|-------------|
| A. Energy source | C. Nitrogen |
| B. Liquid water  | D. Carbon   |
8. Which of these geological features in Texas was formed by erosion?
- Palo Duro Canyon
  - Guadalupe Mountains
  - Caprock
  - Western portions of the Edward's Plateau
9. The SEV (space exploration vehicle) has many surface and in-space components that enable space exploration. Which of the following best shows an in-space characteristic of the SEV?



- |                                 |                   |
|---------------------------------|-------------------|
| A. International docking system | C. Both of these  |
| B. Pivoting wheels              | D. Neither A or B |
10. Which of the following is not true about groundwater?
- There is not a relationship between ground and surface water
  - Groundwater is a renewable resource
  - Groundwater is a significant source of water supply
  - Groundwater is trapped through wells or rocks beneath the surface of the Earth
11. A school project requires that students create a biome in a bottle. If the student uses rocks, dirt, and perennial grasses in their project, which biome would most likely be represented?
- |           |                |
|-----------|----------------|
| A. Desert | C. Rain forest |
| B. Taiga  | D. Grassland   |
12. According to the United Nations Environment Programme (UNEP), biodiversity measures variation at all of the following except:
- Within a species
  - Between a species
  - Atmospheric
  - Ecosystem

13. Students observe a garden as shown:



Using your knowledge of succession, order the following statements chronologically.

- I. Small seedlings emerge from soil.
- II. Some plants begin to flower.
- III. There is a lot of variety of plants.
- IV. Soil is loose and there is no plant growth.

- A. I, II, III, IV
- B. IV, I, III, II

- C. IV, II, III, I
- D. III, IV, I, II

14. Digestive systems of mammals are adapted to maximize the digestion and absorption of food. Which of the following is not a part of the digestive system?

- A. Intestine
- B. Gallbladder
- C. Larynx
- D. Stomach

15. Frogs hibernate to escape freezing temperatures during winter. Which is not a feature that aids in their survival during this time?

- A. Slow respiration rate
- B. Decreased heart rate
- C. Increased body temperature

16. This gland functions to regulate many body functions.

- A. Pituitary
- B. Thyroid
- C. Adrenal
- D. Reproductive

17. Which of the following does not show an example of selective breeding?

- A. Cattle that produce lots of meat
- B. Longevity
- C. Crops resistant to certain diseases
- D. Stature of a horse

18. Which of the following is a correct response for gravitropism?

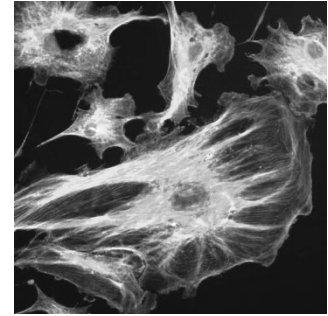
- A. Negative upward growth
- B. Growth toward radiant energy
- C. Growth towards the point of contact
- D. Negative growth downward

19. Which of the following scientists did not help to summarize our modern cell theory?

- A. Schleiden
- B. Koch
- C. Schwann
- D. Virchow

20. The framework for a cell within the cytoplasm is most similar to which organ system?

- A. Respiratory
- B. Immune
- C. Circulatory
- D. Skeletal



21. Which condition arises when more water is lost by evaporation than is absorbed by the roots from the soil?

- A. Hunger
- B. Wilting
- C. Excretion
- D. Tropism

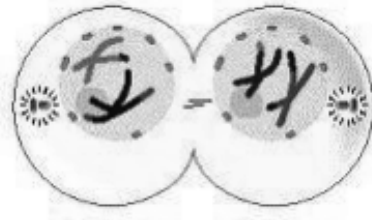
22. The picture refers to a \_\_\_ cell.

- A. Prokaryotic
- B. Eukaryotic
- C. Plasmid
- D. Basic



23. Which stage of meiosis is shown?

- A. Prophase I
- B. Prophase II
- C. Telophase I
- D. Telophase II



24. Which structure synthesizes proteins that are used by a cell?

- A. Chromatin
- B. Nucleons
- C. Ribosome
- D. Endoplasmic reticulum

25. For the given genotypes,  $Rr \times Rr$ , what is the percent of offspring that are recessive?

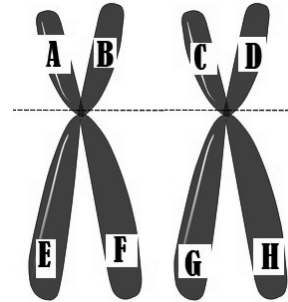
- A. 25%
- B. 50%
- C. 75%
- D. 0%

26. Many scientific discoveries begin with observations. Which of the following is a direct observation?

- A. Animals communicating by airborne chemicals
- B. Animals navigating using the Earth's magnetic field
- C. Organisms eating nectar from flowering plants
- D. Marine animals feeling vibration in the water

27. Which correctly shows where crossing over would occur?

- A. E & H
- B. B & C
- C. C & F
- D. A & B



28. An experiment requires the use of a triple beam balance or an electronic balance. Which quantity is being directly measured?

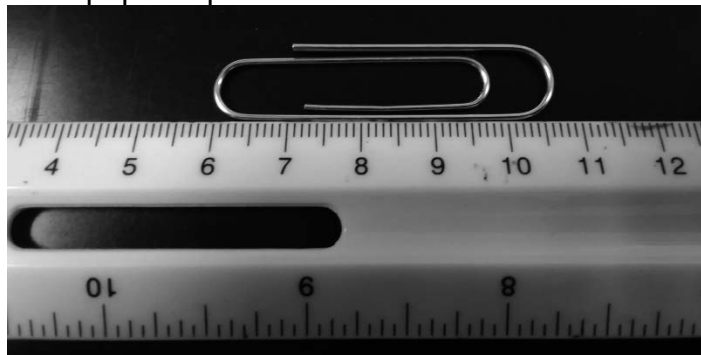
- A. Density
- B. Volume
- C. Mass
- D. Temperature

29. If you observe this symbol in a lab investigation, which of the following is the best remedy?



- A. Dispose of the waste as directed
- B. Notify teacher of contact with the material
- C. Wash your hands before and after the experiment
- D. Go to the first aid kit

30. Record the length of the paper clip shown to the nearest millimeter.



- A. 6 cm
- B. 10.6 cm
- C. 4.6 cm
- D. 16.6 cm

31. A graph is a pictorial representation of information recorded in a data table. Which type of graph shows information that is connected in a way, such as a rate?

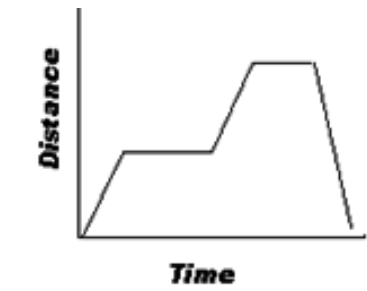
- A. Line graph
- B. Bar graph
- C. Scatter plot
- D. Pie graph

32. What conclusion can be formed by analyzing the following data table?

Elevation	Number of Flowers	Number of Pollinators
6,500 m	2	1
3,250 m	6	7
1,150 m	20	11
750 m	18	37
150 m	31	39
25 m	30	35

- A. 3,250 meters is the best elevation for pollinators to survive and thrive
  - B. Pollinators thrive with less precipitation
  - C. Higher elevations have more rain, therefore flowers survive better
  - D. There is a correlation between number of flowers and number of pollinators
33. Scientific models represent objects, systems, or events and are used as a tool to understand the world around us. Which of the following is not an example of a scientific model?
- A. Model of Jupiter
  - B. Prototype of a robot
  - C. Data table
  - D. Dinosaur fossil replica

34. The graph represents a person walking their dog. What would be the independent variable in this situation?
- A. Time
  - B. Distance
  - C. Dog
  - D. Person



35. A scientist needs to measure the volume of water at  $-12^{\circ}\text{C}$ . Which of following equipment would be best to obtain the volume?
- A. Ruler
  - B. Graduated cylinder
  - C. Beaker
  - D. Electronic balance



**UNIVERSITY INTERSCHOLASTIC LEAGUE  
2018-2018 SCIENCE I  
INVITATIONAL TEST**

Answer Key

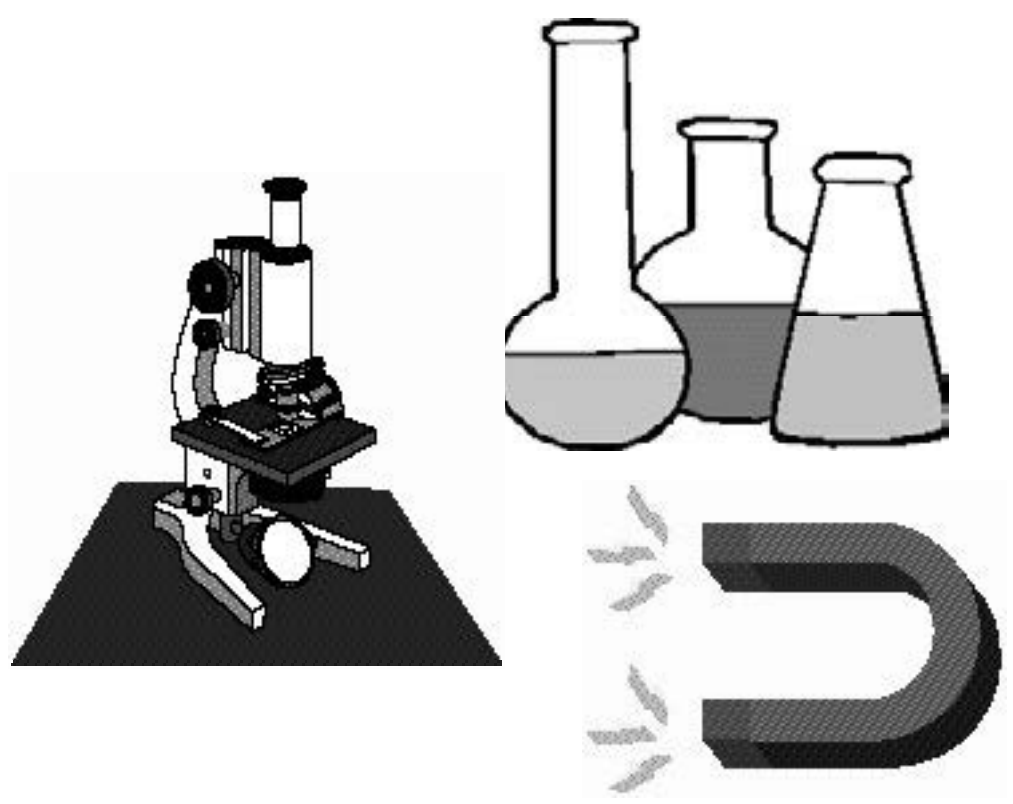
- |       |       |
|-------|-------|
| 1. D  | 19. B |
| 2. A  | 20. D |
| 3. B  | 21. B |
| 4. C  | 22. B |
| 5. D  | 23. C |
| 6. B  | 24. C |
| 7. C  | 25. A |
| 8. C  | 26. C |
| 9. A  | 27. B |
| 10. A | 28. C |
| 11. D | 29. A |
| 12. C | 30. C |
| 13. B | 31. A |
| 14. C | 32. D |
| 15. C | 33. C |
| 16. A | 34. A |
| 17. B | 35. A |
| 18. A |       |

# INVITATIONAL 2018-2019

## A+ ACADEMICS



University Interscholastic League



# Science II

**DO NOT OPEN TEST  
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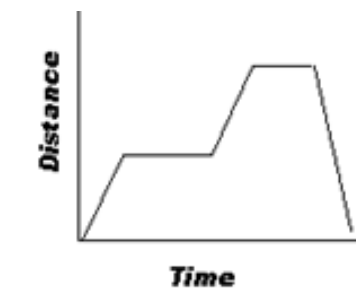
**UNIVERSITY INTERSCHOLASTIC LEAGUE  
2018-2019 A+ SCIENCE II  
INVITATIONAL TEST**

1. A graph is a pictorial representation of information recorded in a data table. Which type of graph shows quantitative comparisons between ordered pairs?
- A. Line graph  
B. Bar graph  
C. Scatter plot  
D. Pie graph
2. What conclusion can be formed by analyzing the following data table?

Elevation	Number of Flowers	Number of Pollinators
6,500 m	2	1
3,250 m	6	7
1,150 m	20	11
750 m	18	37
150 m	31	39
25 m	30	35

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B. Prototype of a robot  
C. Dinosaur fossil replica  
D. Data table

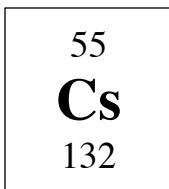
4. The graph represents a person walking their dog. What would be the independent variable in this situation?
- A. Time  
B. Distance  
C. Dog  
D. Person



5. A scientist needs to measure the volume of water at  $-12^{\circ}\text{C}$ . Which of following equipment would be best to obtain the volume?
- A. Ruler  
B. Graduated cylinder  
C. Beaker  
D. Electronic balance

6. How many electrons, protons, and neutrons are contained in the following atom?

- A. 55 e<sup>-</sup>; 55 p<sup>+</sup>; 77 n<sup>0</sup>
- B. 132 e<sup>-</sup>; 132 p<sup>+</sup>; 55 n<sup>0</sup>
- C. 187 e<sup>-</sup>; 187 p<sup>+</sup>; 55 n<sup>0</sup>
- D. 77 e<sup>-</sup>; 55 p<sup>+</sup>; 55 n<sup>0</sup>



7. Which best describes an atom of Neptunium?

- A. It can be divided into smaller particles that retain all of its properties
- B. It can not be divided into smaller particles that retain all of its properties
- C. It doesn't possess properties of larger quantities of neptunium
- D. Its atomic number is zero

8. Which of the following is not one of the four blocks of the periodic table?

- A. s
- B. p
- C. d
- D. h

9. Which of the following is the correct formula for ethanol?

- A. H<sub>3</sub>O
- B. NH<sub>3</sub>
- C. C<sub>2</sub>H<sub>6</sub>O
- D. NaCl

10. As a rocket launches into outer space, which law best explains how it is able to provide enough thrust to reach orbit?

- A. Law of inertia
- B. Law of force and acceleration
- C. Law of gravitation
- D. Law of action-reaction

11. If someone was traveling at 45 mph north, which quantity does this best refer to?

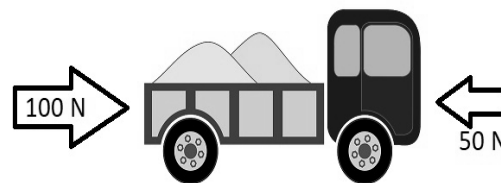
- A. Speed
- B. Direction
- C. Velocity
- D. Acceleration

12. If 50 grams of sodium reacts with chlorine to form 175 grams of salt, how many grams of chlorine is needed to complete this reaction?

- A. 50 g
- B. 125 g
- C. 175 g
- D. 225 g

13. What will occur to the truck shown?

- A. Balanced forces make the truck slow down
- B. Balanced forces make the truck speed up
- C. Unbalanced forces make the truck speed up
- D. Unbalanced forces make the truck slow down



14. Earth's oceans respond to the moon's gravitational pull by bulging and dipping as the moon rotates around the Earth. As the ocean bulges toward the moon a \_\_\_ tide is created.

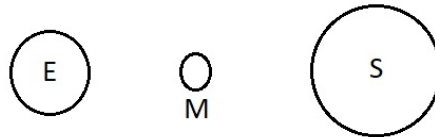
- A. Low
- B. High
- C. Spring
- D. Constant

15. Complete the phrase:

*At the new moon phase, \_\_\_\_\_.*

- A. The moon is so close to the sun in the sky that none of the side facing the Earth is illuminated.
- B. The moon is behind the earth in space with respect to the sun.
- C. The half-lit moon is highest in the sky at sunset, and then sets about six hours later.

16. If the following orientation of the Sun, Moon, and Earth occurs, what events in most likely observed?



- A. Blue Moon
- B. Pink Moon
- C. Solar Eclipse
- D. Lunar Eclipse

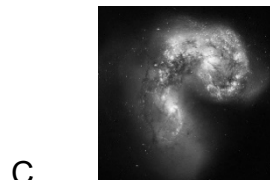
17. Which individuals discovered cosmic microwave radiation?

- A. Lemaitre
- B. Hubble & Einstein
- C. Watson & Crick
- D. Penzias & Wilson

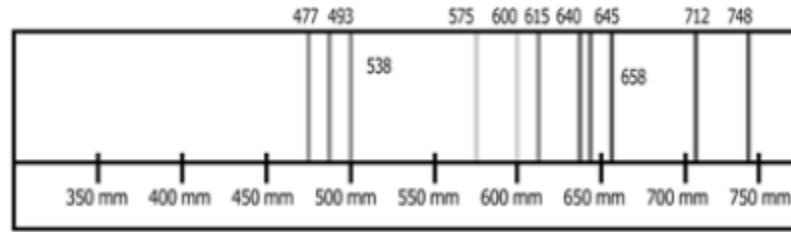
18. Geologists obtain indirect evidence about the interior of the Earth by:

- A. Measuring pressure differences at the surface
- B. Guesstimating the temperature of the core
- C. Looking at the layers of the Earth
- D. Recording and analyzing seismic waves

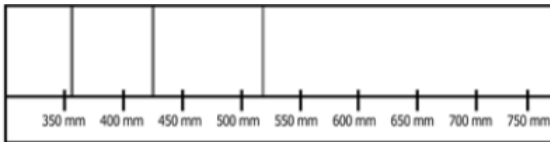
19. Which graphic best illustrates our Milky Way galaxy?



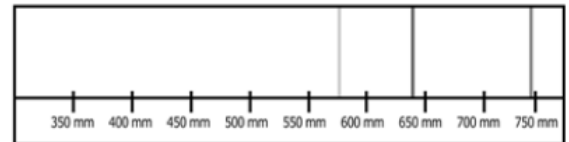
20. Given the following emission spectra from a distant star. Determine which element is mostly present.



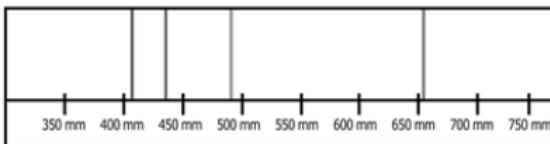
A.



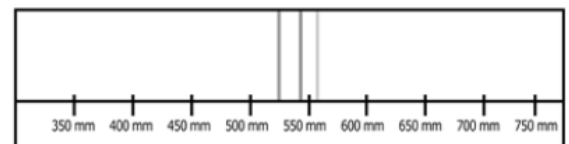
C.



B.



D.

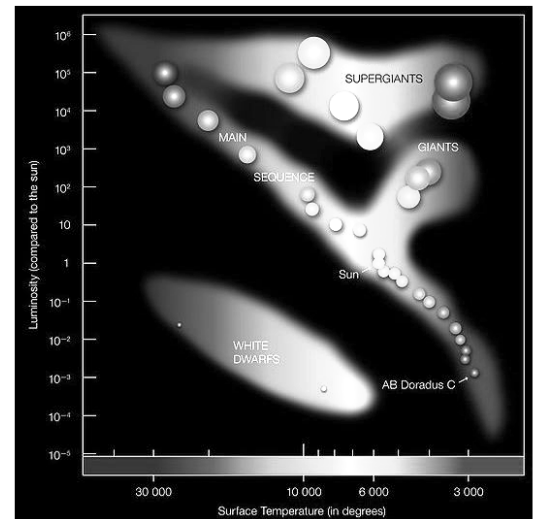


21. Using the diagram provided, which region contains superhot, small, and not very luminous stars?

- A. Red giants
- B. Blue giants
- C. Main sequence
- D. White dwarfs

22. Hurricanes will continue to grow and strengthen, providing which of the following?

- A. It remains over a source of cold, moist air
- B. It remains over a source of cold, dry air
- C. It remains over a source of hot, moist air
- D. It remains over a source of hot, dry air



The Hertzsprung-Russell Diagram

ESO Press Photo 28e/07 (19 June 2007)

23. A collision between two pieces of continental crust at a converging boundary produces a:

- A. Mid ocean ridge
- B. Deep ocean trench
- C. Rift valley
- D. Mountain range

24. Local winds are influenced by which of the following?
- A. Coriolis effect
  - B. Latitude
  - C. Geography of area
  - D. Temperature difference
25. This is a two-dimensional model of the Earth's three-dimensional surface.
- A. Contour map
  - B. Physical map
  - C. Thematic map
  - D. Political map
26. Which of the following is not classified as a biotic factor in an environment?
- A. Bacteria
  - B. Water
  - C. Mushroom
  - D. Shrub
27. Most thermal energy in the atmosphere moves due to:
- A. Conduction
  - B. Convection
  - C. Radiation
28. Emily is heating a liquid in a test tube. According to proper lab safety procedures, what direction should the test tube correctly be positioned?
- A. In a direction pointing toward herself
  - B. In a direction pointing towards herself
  - C. In a direction pointing way from herself and others
  - D. In a direction pointing towards others
29. A bird's food supply is a species of beetle that lives in the grass. A severe drought occurs and causes much of the vegetation to die. Which trait of the beetle will allow them to survive the best?
- A. Size of the body
  - B. Size of the legs
  - C. Brown coloring
  - D. Green coloring
30. Which of the following is not a positive human impact made on the oceans?
- A. Some laws and policies
  - B. Coastal cleanups
  - C. Artificial reefs
  - D. Overfishing
31. How are the isotopes of Oxygen – 16 and Oxygen – 18 different?
- A. Number of protons
  - B. Number electrons
  - C. Number of neutrons
  - D. Atomic number
32. A group of students measures the displacement of a moving toy car. Which of the following tools is needed to collect this data?
- A. Balance
  - B. Graduated Cylinder
  - C. Meter Stick
  - D. Spring Scale

33. The diagram below shows three horizontal forces acting on an object. Neglecting all sources of friction, what is the magnitude of the force,  $F$ , if the object begin to slow?



- A. 20 N                      B. 7 N                      C. 12 N                      D. 17 N
34. A student conducts an experiment to measure the acceleration of falling bodies, which is  $9.8 \text{ m/s}^2$ . The student collects an experimental value of  $11.3 \text{ m/s}^2$ . The most likely reason for the discrepancy is due to:
- A. Air friction
  - B. Human error
  - C. Mass of the object
  - D. Potential energy of the object
35. Which of the following is not a way for humans to reduce their dependence on natural resources?
- A. Turn off flowing water while brushing your teeth
  - B. Recycle plastic products
  - C. Turn off lights when not in use
  - D. Set air conditioner a few degrees lower during the summer



**UNIVERSITY INTERSCHOLASTIC LEAGUE  
2018-2019 SCIENCE II  
INVITATIONAL TEST**

Answer Key

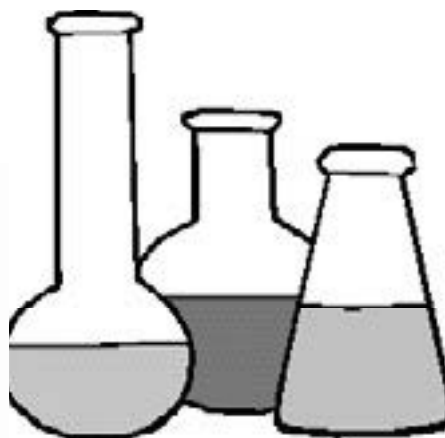
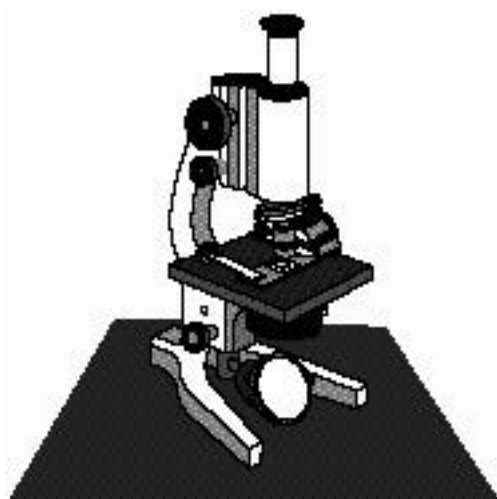
- |       |       |
|-------|-------|
| 1. C  | 19. B |
| 2. D  | 20. C |
| 3. D  | 21. D |
| 4. A  | 22. C |
| 5. A  | 23. D |
| 6. A  | 24. C |
| 7. B  | 25. A |
| 8. D  | 26. B |
| 9. C  | 27. B |
| 10. D | 28. C |
| 11. C | 29. C |
| 12. B | 30. D |
| 13. C | 31. C |
| 14. B | 32. C |
| 15. A | 33. A |
| 16. C | 34. B |
| 17. D | 35. D |
| 18. D |       |

**FALL/WINTER DISTRICT 2018-2019**

**A+ ACADEMICS**



University Interscholastic League



# Science I

**DO NOT OPEN TEST  
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**UNIVERSITY INTERSCHOLASTIC LEAGUE  
2018-2019 A+ SCIENCE I  
FALL/WINTER DISTRICT TEST**

1. Carbon dioxide needed for photosynthesis enters the leaf via the \_\_\_\_  
A. Xylem  
B. Stomata  
C. Phloem  
D. Chloroplast
2. This action doesn't involve a change in the chemical makeup of a substance. Which of the following does not belong with this description?  
A. Painting  
B. Cutting  
C. Dissolving  
D. Cooking
3. A hot air balloon rising has which of the following energy transfers?  
A. Thermal to mechanical  
B. Mechanical to thermal  
C. Radiant to mechanical  
D. Mechanical to radiant

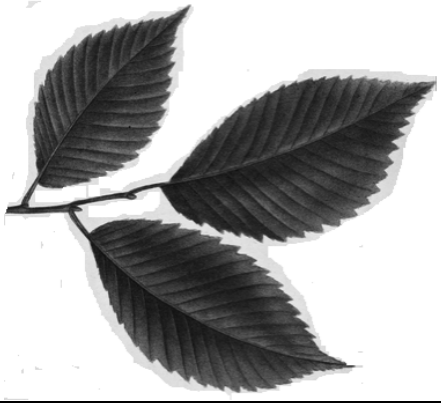
4. What is the correct order of the following organisms in a food chain?



- A. Algae, lobster, mussel, seal
  - B. Lobster, algae, mussel, seal
  - C. Algae, mussel, lobster, seal
  - D. Mussel, algae, lobster, seal
5. If a plant has low turgor pressure, the plant appears to:  
A. Wilt  
B. Change colors  
C. Stand upright  
D. Remain unchanged
  6. When it rains, the liquid water flows into the watershed. Along the way, runoff picks up loose liquids and other materials such as:  
A. Lawn chemicals  
B. Cleaning products  
C. Gasoline  
D. All of these
  7. Today's atmosphere of Earth is primarily composed of:  
A. Oxygen  
B. Nitrogen  
C. Carbon dioxide  
D. Argon

8. Which is not an impact to an ecosystem following tornadic activity?
- A. Destruction of structures and plants
  - B. Storm surge
  - C. Water contamination
  - D. Disruption of food chain
9. Soil is formed over time by which of the following processes?
- A. Erosion & weathering of rocks
  - B. Erosion & decomposition of plants
  - C. Weathering of rocks & decomposition of biotic material
  - D. Weathering & erosion biotic material
10. Which biomes of Texas once contained large herds of grazing herbivores?
- A. Temperate forest
  - B. Tundra
  - C. Grassland
  - D. Savanna
11. The human exploration of space began in the:
- A. 1950's
  - B. 1960's
  - C. 1970's
  - D. 1980's
12. In which geographic location would you expect to find the greatest species diversity?
- A. Russia
  - B. Egypt
  - C. Panama
  - D. United States
13. Ants communicate with one another using pheromones. Ants lay down pheromones to help others find a food source. This is an example of:
- A. Structural adaptation
  - B. Behavioral adaptation
  - C. Physical adaptation
  - D. Physiological adaptation
14. This type of succession involves changing an area from one lacking life form to one that contains numerous organisms. This best describes which of the following?
- A. Primary succession
  - B. Secondary succession
  - C. Tertiary succession
  - D. Zeroth succession

15. Using the dichotomous key, correctly identify the branch of leaves shown.

	
1a. Leaves are spiny.....	<i>Pinus taeda</i>
1b. Leaves are broad.....	Go to 2
2a. Single leaf.....	Go to 3
2b. Many leaflets.....	Go to 4
3a. Leaf edge is smooth.....	<i>Cornus florida</i>
3b. Leaf edge is serrated.....	<i>Ulmus americana</i>
4a. Leaflet edges are smooth.....	<i>Albizia julibrissin</i>
4b. Leaflet edges are serrated.....	<i>Juglans nigra</i>

- A. *Pinus taeda*
- B. *Cornus florida*

- C. *Ulmus americana*
- D. *Juglans nigra*

16. What is described below?

Over time, traits are passed on to more offspring. As favorable traits become more common in the population, species adapt to environment.

- A. Selection
- B. Adaptations

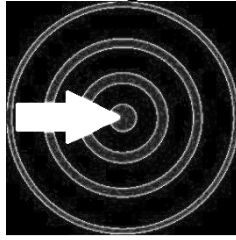
- C. Variation
- D. Inheritance

17. Xylem and phloem are structures that transport materials within a plant. The structures that enable the cells to function are:

- A. Short and hollow
- B. Short and compact

- C. Long and hollow
- D. Long and compact

18. Given the graphic below, what level of organization is best represented?



- A. Nucleus
- B. Cell
- C. Tissue
- D. Organ

19. This body system's main function is to provide protection. It is comprised of skin, hair, and nails. Which best describes this system?

- A. Immune
- B. Endocrine
- C. Nervous
- D. Integumentary

20. Organisms respond to external stimuli to maintain homeostasis. Shown is a lizard basking in the sun. The lizard responds to the stimuli by

- A. Dehydration
- B. Hibernating
- C. Aestivating
- D. Camouflage



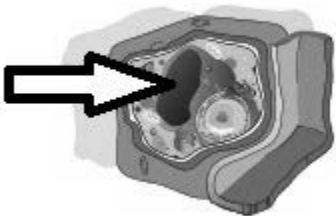
21. As technology has developed and scientists learn more about the structure and functions of the cell, the cell theory has been modified. Which of the following is not a part of the modern cell theory?

- A. Cells contain heredity information
- B. Most organisms are made of cells
- C. All cells are the same chemical composition
- D. Cells arise from other cells via cell reproduction

22. The mitochondria is most similar to which organ system?

- A. Circulatory
- B. Nervous
- C. Excretory
- D. Digestive

23. In animal cells, there are several small structures as shown. They store nutrients, water, and waste from the cell. This best describes which of the following organelles?



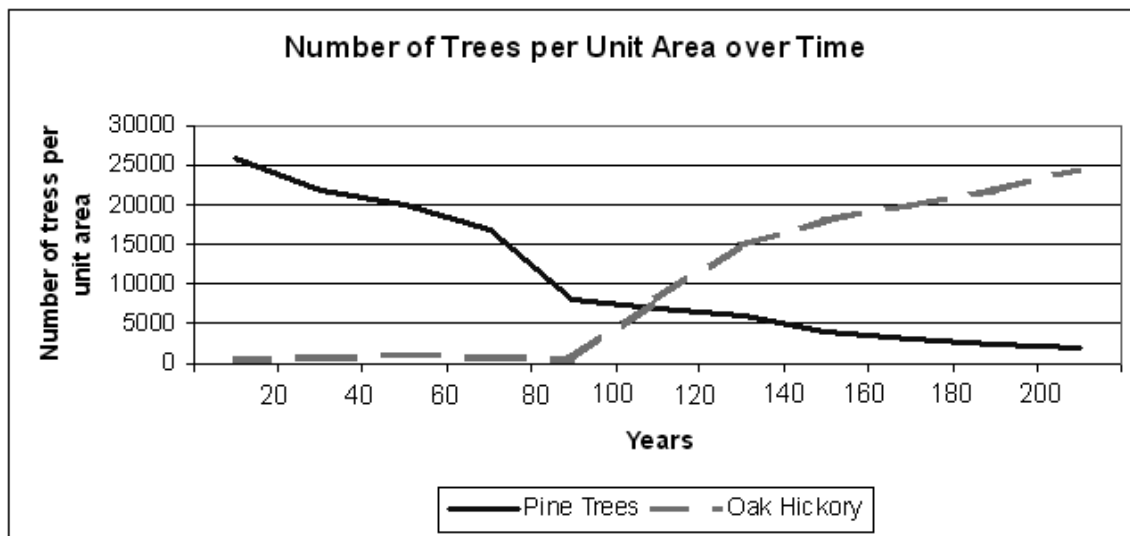
- A. Vacuole
- B. Mitochondria
- C. Endoplasmic reticulum
- D. Nucleons

24. What determines the biological sex of a human?
- A. Presence of a X or Y chromosome
  - B. Presence of the 21<sup>st</sup> chromosome
  - C. Codominance
  - D. Presence of the 47<sup>th</sup> chromosome
25. Elephants migrate during the dry season as a herd. This response is due to:
- A. Organism
  - B. Species
  - C. Community
  - D. Population
26. Mutations occur in organisms. Which of the following is a harmful mutation?
- A. Sickle cell anemia
  - B. Increase bone density in humans
  - C. Nylonase in bacteria
  - D. Murray Gray cattle in Australia
27. If data from repeated experiments is shown to support a hypothesis, which most likely will occur next?
- A. Data would become a law
  - B. A conclusion would be defined
  - C. A hypothesis is rejected
  - D. A hypothesis will be revised
28. What part of meiosis is most similar to mitosis?
- A. Reduction division
  - B. Interkinesis
  - C. Meiosis I
  - D. Meiosis II
29. Which of the following shows a system for identifying hazards associated with various materials?
- A. Biohazard symbols
  - B. Hazard to environment symbols
  - C. NFPA label
  - D. SDS label
30. This is commonly used to put out small fires. It comes in four different categories. This description best refers to which of the following safety equipment?
- A. Fire blanket
  - B. Fire extinguisher
  - C. Eye wash
  - D. Safety shower

31. In a student led experiment, 4 insects were placed at each end of a divided container based on specific temperature ranges. After 10 minutes, all of the insects were congregated in the center compartment. The students concluded that the organisms had moved as far as they could during the time period. Which other explanation is best supported?
- A. Insects need to be with other insects for warmth
  - B. Insects moved to the preferred temperature range
  - C. Insects randomly move until they locate other insects
  - D. Insects moved until they ran out of energy and remained stationary
32. A student hypothesized that an aquatic plant will grow the most if they are exposed to light that has a wavelength of 475 nm. To test this hypothesis, the student should design an experiment with which independent variable?
- A. Color of the aquatic plant
  - B. Rate of growth of the aquatic plant
  - C. Wavelength of light that the aquatic plant is exposed to
  - D. Time of exposure to light
33. What does this safety symbol indicate?
- A. This symbol indicates that a material is radioactive
  - B. This symbol indicates an oxidizing substance
  - C. This symbol indicates that this material is toxic
  - D. This symbol indicates a biohazard







34. According to the data presented above, a 150-year-old community would contain pine trees with a density of approximately:
- A. 2,750 trees per unit area
  - B. 4,250 trees per unit area
  - C. 5,000 trees per unit area
  - D. 17,500 trees per unit area
35. Of the following, which scientific instrument is commonly used to observe the external features of a fly's abdomen?
- A. Dissecting Microscope
  - B. Electron Microscope
  - C. Centrifuge
  - D. Scanning tunneling microscope

**UNIVERSITY INTERSCHOLASTIC LEAGUE  
2018-2019 SCIENCE I  
FALL/WINTER DISTRICT TEST**

Answer Key

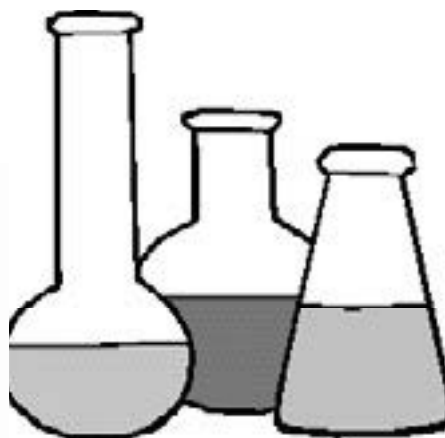
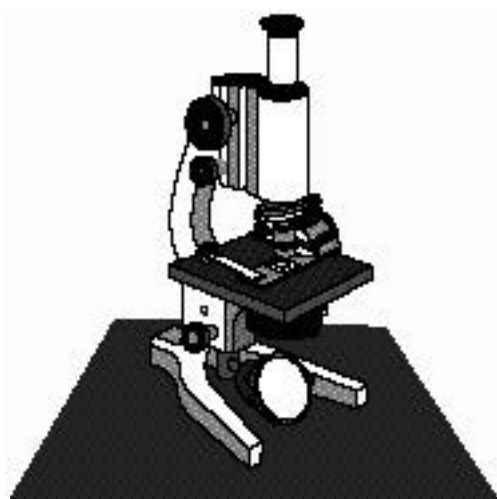
- |      |      |
|------|------|
| 1. B | 19.D |
| 2. D | 20.C |
| 3. A | 21.B |
| 4. C | 22.D |
| 5. A | 23.A |
| 6. D | 24.A |
| 7. B | 25.D |
| 8. B | 26.A |
| 9. C | 27.B |
| 10.C | 28.D |
| 11.B | 29.C |
| 12.C | 30.B |
| 13.B | 31.B |
| 14.A | 32.C |
| 15.C | 33.A |
| 16.B | 34.B |
| 17.C | 35.A |
| 18.B |      |

**FALL/WINTER DISTRICT 2018-2019**

**A+ ACADEMICS**



University Interscholastic League



# Science II

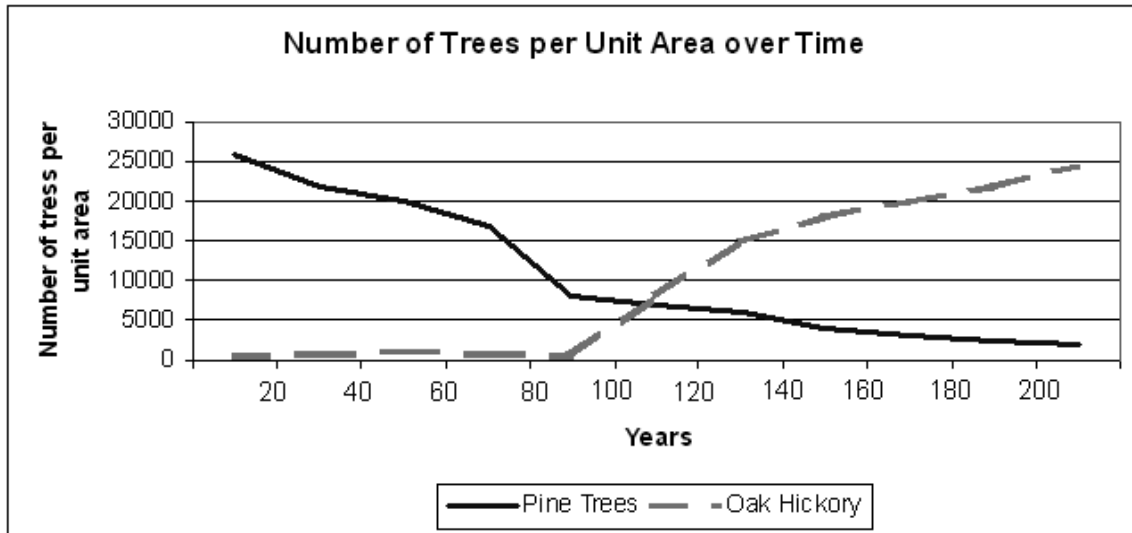
**DO NOT OPEN TEST  
UNTIL TOLD TO DO SO**

**UNIVERSITY INTERSCHOLASTIC LEAGUE  
2018-2019 A+ SCIENCE II  
FALL/WINTER DISTRICT TEST**

1. Which of the following shows a system for identifying hazards associated with various materials?
  - A. Biohazard symbols
  - B. Hazard to environment symbols
  - C. NFPA label
  - D. SDS label
  
2. This is commonly used to put out small fires. It comes in four different categories. This description best refers to which of the following safety equipment?
  - A. Fire blanket
  - B. Fire extinguisher
  - C. Eye wash
  - D. Safety shower
  
3. In a student led experiment, 4 insects were placed at each end of a divided container based on specific temperature ranges. After 10 minutes, all of the insects were congregated in the center compartment. The students concluded that the organisms had moved as far as they could during the time period. Which other explanation is best supported?
  - A. Insects need to be with other insects for warmth
  - B. Insects moved to the preferred temperature range
  - C. Insects randomly move until they locate other insects
  - D. Insects moved until they ran out of energy and remained stationary
  
4. A student hypothesized that an aquatic plant will grow the most if it is exposed to light that has a wavelength of 475 nm. To test this hypothesis, the student should design an experiment with which independent variable?
  - A. Color of the aquatic plant
  - B. Rate of growth of the aquatic plant
  - C. Wavelength of light that the aquatic plant is exposed to
  - D. Time of exposure to light
  
5. What does this safety symbol indicate?
  - A. This symbol indicates that a material is radioactive
  - B. This symbol indicates an oxidizing substance
  - C. This symbol indicates that this material is toxic
  - D. This symbol indicates a biohazard



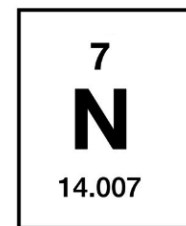
6. Elements in the same group of the periodic table have the same number of \_\_\_\_.
- Protons
  - Nucleons
  - Valence electrons
  - Neutrons



7. According to the data presented above, a 150-year-old community would contain pine trees with a density of approximately:
- 2,750 trees per unit area
  - 4,250 trees per unit area
  - 5,000 trees per unit area
  - 17,500 trees per unit area

8. How many protons does the following element contain?

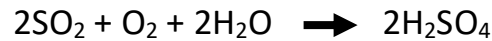
- 7
- 14
- 21
- 0



9. Which particle in an atom determines the identity of each particular atom?

- |              |             |
|--------------|-------------|
| A. Electrons | C. Neutrons |
| B. Protons   | D. Nucleons |

10. Given the following reaction, determine if it is balanced or unbalanced.



A. Balanced

B. Unbalanced

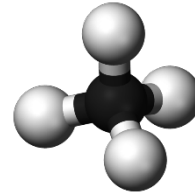
11. Given the molecule shown, which of the following could represent its chemical formula?

A. C&H

B. CH

C. C<sub>2</sub>H<sub>4</sub>

D. CH<sub>4</sub>



12. When forces act upon an object it is dependent upon which of the following factors?

A. Magnitude of the force

B. Distance of the force

C. Magnitude & direction of the force

D. Distance & application of the force

13. Because of Earth's tilt on its axis, the amount of daylight varies throughout the year. The least amount of variation occurs at which of the following?

A. Tropic of Cancer

C. Arctic Circle

B. Tropic of Capricorn

D. Equator

14. Jackson walked 320 meters in 92.5 seconds. Using this information, which best describes which of the following quantities could be determined?

A. Acceleration

C. Speed

B. Friction

D. Velocity

15. Which of these is not an example of Newton's Third Law of Motion?

A. Person in an automobile that is braking

B. Rowing a boat

C. Rocket propulsion

D. Swimming forward in a pool

16. The moon appears to be more than half illuminated from Earth as seen by an observer. This is best described by which phase of the lunar cycle?

A. Last quarter moon

C. Waxing crescent

B. Waning crescent

D. Waxing gibbous

17. Which two scientists created a graph showing the relationship between a star's surface temperature and brightness.

A. Russell & Hertzsprung

C. Watson & Crick

B. Hubble & Dingle

D. Aller & Alcock

18. In addition to the moon, tides on Earth are caused by which of the following?
- A. Revolution of Earth
  - B. Tilt of Earth
  - C. Rotation of Earth
19. Galaxies come in a variety of shapes and sizes. Our Milky Way galaxy is referred to as this type of galaxy.
- A. Irregular
  - B. Elliptical
  - C. Planetary
  - D. Spiral
20. What is Laurasia?
- A. A Polish scientist
  - B. Another term for continental drift
  - C. Name of the northern continent that existed millions of year ago
  - D. Another name for an ancient dinosaur that existed millions of years ago
21. Telescopes are used to gain information about our solar system and the universe. Which wave cannot be captured and reflected using mirrors?
- A. Visible
  - B. Gamma
  - C. Reflecting telescope
  - D. Refracting telescope
22. When continental plates pull apart at a divergent boundary on land, a(n) \_\_\_\_\_ forms.
- A. Mountain range
  - B. Rift valley
  - C. Ocean
  - D. Continent
23. This theory about the origin of the universe postulates that matter is created throughout the universe. This violates the law of conservation of matter and also energy. Which theory does this describe?
- A. Big Bang Theory
  - B. Open Universe Theory
  - C. Creationism
  - D. Steady State Theory
24. After the energy from the sun has reached the Earth, thermal energy always moves from \_\_\_\_\_ to \_\_\_\_\_ areas naturally.
- A. Cold; hot
  - B. Warm; hot
  - C. Cold; cool
  - D. Hot; cold
25. Complete the following rule for topographic maps. Contour lines never cross. All points along a contour line represent a \_\_\_\_\_.
- A. Single elevation
  - B. Closed circles
  - C. Depression
  - D. Sloping characteristic

26. This is the union of two fronts, shown below, as the cold front overtakes the warm front.



- A. Mix
- B. Squall
- C. Occluded
- D. Cold/warm

27. What resources are the penguins in the image competing for?



- A. Biotic
- B. Abiotic
- C. Biotic & abiotic
- D. They are not competing for any resources

28. Most hurricanes form at which of the following latitudes:

- A. Polar
- B. Equator
- C. Mid

29. Environmental changes can affect organisms and traits in the subsequent populations. Which of the following statements is true?

- A. Organisms can't change on their own to survive
- B. Organisms can change on their own to survive
- C. Organisms that have advantageous adaptations will die off
- D. Organisms with disadvantageous adaptations will survive

30. Which of the following has a positive impact on the ocean systems?

- A. Oil spill
- B. Artificial reefs
- C. Sewage and runoff
- D. Overfishing

31. If the mass number of an element is 14 and the atomic number is 7, how many nucleons does the following element contain?

- A. 7
- B. 14
- C. 21
- D. 0

32. Susan ran south 400 meters in 92.5 seconds. Using this information, which of the following quantities could be determined?

- A. Acceleration
- B. Friction
- C. Speed
- D. Velocity

33. You are doing a lab with another student when her hair gets caught on the balance scale. She should have -

- A. Gotten a haircut before class today
- B. Skipped the lab
- C. Pulled her hair up in a ponytail or bun
- D. Worn a hat today



34. Where should a student properly discard liquid chemical waste, such as an acid or base?
- A. The sink
  - B. Trash can
  - C. Cardboard box
  - D. Container identified by teacher
35. Flammable materials should never be dispensed or used near:
- A. Water
  - B. An operating Bunsen burner
  - C. A flashlight
  - D. A broken glass container

**UNIVERSITY INTERSCHOLASTIC LEAGUE  
2018-2019 SCIENCE II  
FALL/WINTER DISTRICT TEST**

Answer Key

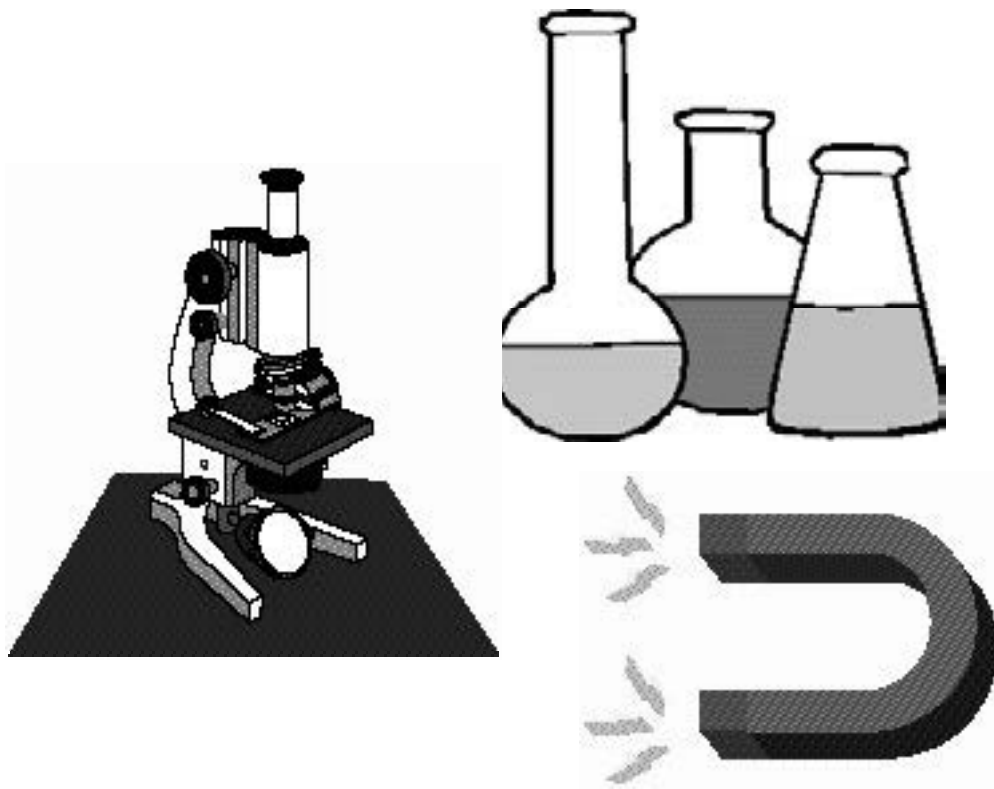
- |      |      |
|------|------|
| 1. C | 19.D |
| 2. B | 20.C |
| 3. B | 21.B |
| 4. C | 22.B |
| 5. A | 23.D |
| 6. C | 24.D |
| 7. B | 25.A |
| 8. A | 26.C |
| 9. B | 27.C |
| 10.A | 28.B |
| 11.D | 29.A |
| 12.C | 30.B |
| 13.D | 31.B |
| 14.C | 32.D |
| 15.A | 33.C |
| 16.D | 34.D |
| 17.A | 35.B |
| 18.C |      |

**SPRING DISTRICT 2018-2019**

**A+ ACADEMICS**



University Interscholastic League




# Science I

**DO NOT OPEN TEST  
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**UNIVERSITY INTERSCHOLASTIC LEAGUE  
2018-2019 A+ SCIENCE I  
SPRING DISTRICT TEST**

1. Using the dichotomous key correctly identify the branch of leaves shown.

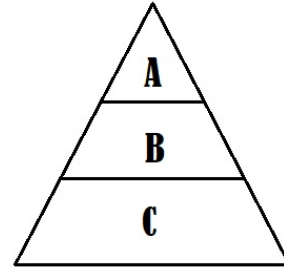

1a. Leaves are spiny..... <i>Pinus taeda</i> 1b. Leaves are broad.....Go to 2
2a. Single leaf.....Go to 3 2b. Many leaflets.....Go to 4
3a. Leaf edge is smooth..... <i>Cornus florida</i> 3b. Leaf edge is serrated..... <i>Ulmus americana</i>
4a. Leaflet edges are smooth..... <i>Albizia julibrissin</i> 4b. Leaflet edges are serrated..... <i>Juglans nigra</i>

- |                               |                           |
|-------------------------------|---------------------------|
| A. <i>Albizia julibrissin</i> | C. <i>Ulmus americana</i> |
| B. <i>Cornus florida</i>      | D. <i>Juglans nigra</i>   |

2. Photosynthesis uses the energy from the sun to covert water and \_\_\_ into high energy \_\_\_ and oxygen. Correctly complete the missing words.
- |                           |                          |
|---------------------------|--------------------------|
| A. Carbon dioxide; starch | C. Carbon dioxide; sugar |
| B. Starch; carbon dioxide | D. Sugar; carbon dioxide |
3. When you eat a bag of chips you are consuming which of the following types of energy?
- |                       |               |
|-----------------------|---------------|
| A. Chemical potential | C. Thermal    |
| B. Radiant            | D. Mechanical |
4. Which of the following is a physical change?
- |                     |                           |
|---------------------|---------------------------|
| A. Toasting bread   | C. Roasting a marshmallow |
| B. Lighting a match | D. Burning a candle       |
5. Organisms with tropisms will naturally turn in response to a given stimulus. In a negative tropism, the organism will move:
- |                           |  |
|---------------------------|--|
| A. Toward the stimulus    | C. Does not move in relation to the stimulus |
| B. Away from the stimulus |  |

6. Sequence the trophic levels to show the flow of energy in this following energy pyramid.

- A. Sun, A, B, C
- B. A, B, C, Sun
- C. Sun, C, B, A
- D. C, B, A, Sun



7. In some regions, extreme flooding is expected to increase. This could have serious effects on important natural habitats such as:

- A. Icebergs
- B. Rivers
- C. Deserts
- D. Mountains

8. Which of the following planets is not considered to lie in the habitable zone?

- A. Earth
- B. Venus
- C. Mars
- D. Uranus

9. What supplies sixty percent of all water used in the state of Texas, according to the Texas Water Development board?

- A. Reservoirs
- B. Aquifers
- C. Rivers
- D. Oceans

10. Which of the following is a natural agent of weathering and erosion?

- A. Constant temperature
- B. Fire
- C. Air pollution
- D. Water

11. The amount of oxygen in a fish tank is a \_\_\_ that can affect the number of organisms living in the tank.

- A. Tolerance zone
- B. Biotic factor
- C. Limiting factor
- D. Environmental factor

12. What was the first manned satellite to orbit Earth?

- A. Sputnik
- B. Vostok
- C. Explorer I
- D. Mercury

13. An area of a forest that experiences very little change in its composition of species would most likely show which of the following:

- A. Climax community
- B. Primary succession
- C. Secondary succession
- D. Primary community

14. Many diversity indices have been developed to measure biodiversity. This model combines species richness and species evenness.

- A. Shannon index
- B. Renyi index
- C. Einstein's index
- D. Simpson's index

15. When cold weather drives insects away, bats can do which of the following to help them survive?

- A. Hibernate
- B. Migrate
- C. Both of these

16. Another adaptation that allows fishes to live in an aquatic environment is their gills. Gills are made up of very thin tissues because...

- A. It enables  $O_2/CO_2$  exchange
- B. It enables  $O_2/CO$  exchange
- C. It enables  $N_2/O_2$  exchange
- D. It enables  $H_2/O_2$  exchange

17. In order to acquire different food sources, a finch's beak is varied in shape. A large billed beak bird would feed more efficiently on which of the following food sources?

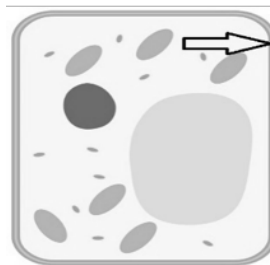
- A. Small, hard seeds
- B. Large, hard seeds
- C. Small, soft seeds
- D. Large, soft seeds

18. Which of these is not considered an organ in a plant?

- A. Leaf
- B. Root
- C. Xylem
- D. Flower

19. This cell structure controls the movement of substances in and out of the cell.

- A. Cell wall
- B. Cell membrane
- C. Endoplasmic reticulum
- D. Nucleus



20. The discovery of cells and the development of the cell theory would not have been possible without the invention of a:

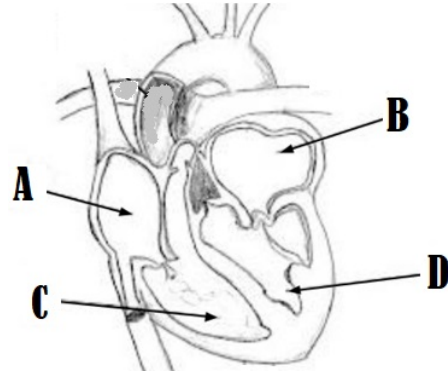
- A. Magnifying glass
- B. Telescope
- C. Microscope
- D. Spectroscope

21. The endoplasmic reticulum transports materials from one part of the cell to another. This is most similar to which body system?

- A. Nervous
- B. Skeletal
- C. Digestive
- D. Circulatory

22. What part of the heart does the oxygen rich blood enter?

- A. A
- B. B
- C. C
- D. D



23. An organism that carries two dominant or two recessive alleles for any given trait is said to be:

- A. Heterozygous
- B. Hybrid
- C. Pure
- D. Hidden

24. Fight or flight is an automatic response. Most of the time this response is triggered which of the following occurs?

- A. A false alarm
- B. An adaptive response
- C. A freeze response
- D. A survival alarm

25. If a black dog (Bb) were crossed with a white dog (bb). What is the resulting phenotypic ratio?

- A. 0:1 black to white
- B. 1:0 black to white
- C. 1:1 black to white
- D. 3:1 back to white

26. This helps the body protect itself against pathogens.

- A. Vomiting
- B. Fever
- C. Dehydration
- D. Hunger

27. For an organisms with six pairs of chromosomes, how many possible combinations of gametes can be produced by random lining up?

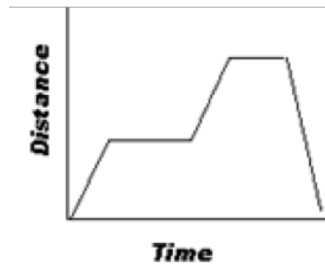
- A. 32
- B. 48
- C. 64
- D. 120

28. Which of the following shows an SI unit of measurement?

- A. 10 ft.
- B. 10 oz.
- C. 10 L
- D. 10 in.



29. What type of property is best represented in the picture above?
- A. Chemical  
B. Physical  
C. Conversation  
D. Elemental
30. One one-hundredth is expressed using the prefix:
- A. Centi-  
B. Milli-  
C. Deci-  
D. Micro-
31. In the scientific method after a conclusion is drawn, which of the following would not be done?
- A. Determine if the hypothesis is supported  
B. Determine if the hypothesis is not supported  
C. Test the hypothesis  
D. Modify the hypothesis as needed
32. How many liters are comprised of 2500 mL?
- A. .25 L  
B. 2.5 L  
C. 25 L  
D. 250 L
33. A scientist needs to measure the volume of water at 22°C. Which of the following equipment would be best to obtain the volume?
- A. Ruler  
B. Graduated cylinder  
C. Beaker  
D. Electronic balance
34. A graph is a pictorial representation of information recorded in a data table. Which type of graph shows a statistical graphic which is divided into slices to illustrate numerical proportions?
- A. Line graph  
B. Bar graph  
C. Scatter plot  
D. Pie graph
35. The graph shows a person walking their dog. What would be the dependent variable in this situation?



- A. Time  
B. Distance  
C. Dog  
D. Person



**UNIVERSITY INTERSCHOLASTIC LEAGUE  
2018-2019 SCIENCE I  
SPRING DISTRICT TEST**

Answer Key

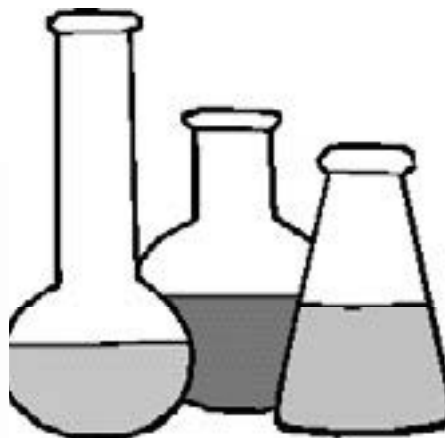
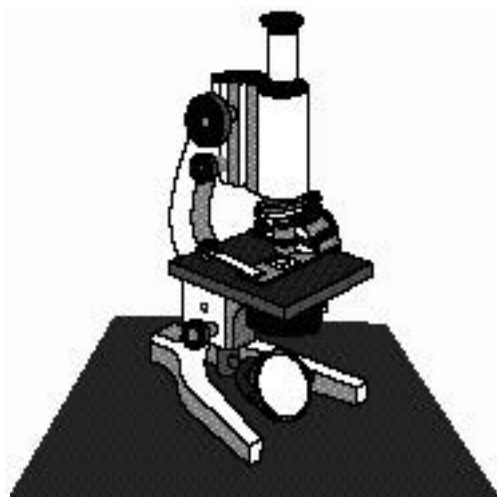
- |       |       |
|-------|-------|
| 1. A  | 19. B |
| 2. C  | 20. C |
| 3. A  | 21. D |
| 4. D  | 22. B |
| 5. B  | 23. C |
| 6. C  | 24. A |
| 7. B  | 25. C |
| 8. D  | 26. B |
| 9. B  | 27. C |
| 10. D | 28. C |
| 11. C | 29. B |
| 12. B | 30. A |
| 13. A | 31. C |
| 14. D | 32. B |
| 15. C | 33. B |
| 16. A | 34. D |
| 17. B | 35. B |
| 18. C |       |

**SPRING DISTRICT 2018-2019**

**A+ ACADEMICS**



University Interscholastic League



# Science II

**DO NOT OPEN TEST  
UNTIL TOLD TO DO SO**



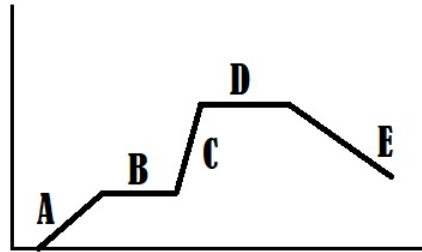
9. Two elements with the same number of protons but different number of neutrons is referred to as a(n)
- A. Molecule
  - B. Isotope
  - C. Atom
  - D. Ion

10. In a chemical formula, a subscript is used when
- A. More than one mole is reacting
  - B. Less than one mole is reacting
  - C. More than one atom is represented
  - D. Less than one atom is represented

11. Select the following correct reaction based on your knowledge of the law of conservation of mass.
- A.  $N_2 + H_2 \rightarrow NH_3$
  - B.  $Fe + Cl_2 \rightarrow FeCl_3$
  - C.  $2Fe_2O_3 + 3C \rightarrow 4Fe + 3CO_2$
  - D.  $CH_4 + 2O_2 \rightarrow CO_2 + 3H_2O$

12. Using a graph of a train moving in a straight line, which of the segments show a balanced force?

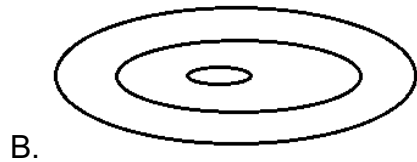
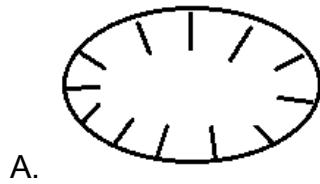
- A. A & C
- B. B & D
- C. C & E
- D. A, C, & E



13. Which of the following is a common misconception many people have about Earth's seasons?
- A. Seasons are caused by the tilt of the Earth's axis
  - B. Seasons are caused by the sun's gravitational force
  - C. Seasons are caused by the distance from the Earth to the Sun
  - D. Seasons are caused by the rotation of Earth on its axis
14. Which of the following is not used in calculating acceleration of an object?
- A. Initial velocity
  - B. Average speed
  - C. Time
  - D. Final velocity
15. Even in a low speed head on test crash, \_\_\_\_ causes an unrestrained crash dummy to slam into the front windshield or seat directly in front of it. Correctly complete the missing word.
- A. Inertia
  - B. Air resistance
  - C. Gravity
  - D. Friction

16. This is a cloud of gas and dust in outer space. It is a region where new stars are formed, while some are remnants of a dead or dying stars. This description best refers to which of the following terms?
- A. Nebula
  - B. Galaxy
  - C. Black hole
  - D. Black dwarf
17. We see the moon in the night sky because ...
- A. The moon is luminous
  - B. The moon reflects light
  - C. The moon absorbs light
18. Our sun is located in the Orion Arm of the Milky Way galaxy. The approximate distance from the center of the galaxy to our Sun is:
- A. 1,000 light years
  - B. 2,600 light years
  - C. 100,000 light years
  - D. 260,000 light years
19. The relationship between the phases of the moon and the tides on Earth were discovered by which of the following individuals?
- A. Zheng He, a Chinese explorer
  - B. Zhu Xi, a Chinese philosopher
  - C. Aristotle, a Greek philosopher
  - D. Pytheas, a Greek explorer
20. When using this type of telescope, astronomers do not have to worry about the amount of sunlight, clouds, or rain that might affect their observations.
- A. Reflecting
  - B. Refracting
  - C. Radio
  - D. Optical
21. Which of the following tectonic plate collision will form a mountain, providing it is a convergent?
- A. Continental to oceanic
  - B. Continental to continental
  - C. Oceanic to oceanic
22. The big bang theory originated in 1927 with several scientists having contributed to it over the years. Which scientist discovered cosmic microwave radiation?
- A. Lemaitre
  - B. Einstein & Hubble
  - C. Aristotle
  - D. Penzias & Wilson
23. The plate tectonic theory as we know it today, was formed from components of all of the following scientist research except:
- A. Wegner
  - B. Hess
  - C. Lacks
  - D. Holmes

24. Which of the following best shows a depression as illustrated on a topographic map?



25. The movement of wind is affected by the rotation of earth. What causes the winds to change directions?

- A. Conduction
- B. Pressure differences
- C. Uneven heating
- D. Coriolis effect

26. Competition of organisms for biotic and abiotic factors in an environment can do which of the following?

- A. Increase the population
- B. Increase the resources
- C. Prevent population growth

27. The beginning of a hurricane starts with an area of \_\_\_ in a(n) \_\_\_ ocean. Correctly complete the blanks.

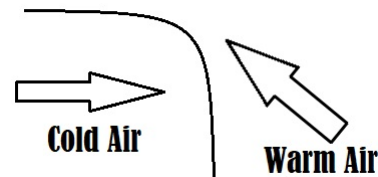
- A. High pressure; tropical
- B. Low pressure; tropical
- C. High pressure; arctic
- D. Low pressure; arctic

28. Which of these is not a physical adaptation of an organism to its environment?

- A. Migration
- B. Beak shape
- C. Teeth
- D. Camouflage

29. Looking at the diagram, which front is shown?

- A. Cold
- B. Warm
- C. Stationary
- D. Occluded



30. About seven billion tons of litter is dumped into the oceans each year. Of that litter, sixty percent of it is made of which of the materials listed?

- A. Metal
- B. Sewage
- C. Oil
- D. Plastic

31. Dmitri Mendeleev is given credit for developing the modern periodic table due to which of the following?
- A. He arranged known elements by their atomic number
  - B. He arranged elements into distinctive groups and periods
  - C. He arranged elements based on repeating properties
  - D. He arranged known elements and also left blank spaces for elements yet to be discovered based on their properties
32. Which will experience more weathering?
- A. A rock in the Sonora Desert
  - B. A rock in a decorative pond in someone's yard
  - C. A rock on the beach in South Carolina
  - D. A rock preserved in a museum
33. Each of these is an example of how research has changed scientific understanding except:
- A. Classification of living things now includes six kingdoms instead of five.
  - B. The metric system is now used around the world instead of other less precise systems.
  - C. Protons and electrons are now known to be made of smaller particles of matter.
  - D. Heat, which was once thought to be fluid, now is known as a form of energy.
34. When did Newton first propose his Laws of Motion?
- A. During World War II
  - B. After the American Civil War
  - C. Approximately 300 years ago
  - D. After humans orbited the Earth
35. Which of the following does not contain 4 atoms?
- A.  $\text{H}_2\text{O}_2$
  - B.  $\text{AlCl}_3$
  - C.  $\text{H}_2\text{O}$
  - D.  $2\text{O}_2$

**UNIVERSITY INTERSCHOLASTIC LEAGUE  
2018-2019 SCIENCE II  
SPRING DISTRICT TEST**

Answer Key

- |      |      |
|------|------|
| 1. A | 19.D |
| 2. C | 20.C |
| 3. B | 21.B |
| 4. B | 22.D |
| 5. D | 23.C |
| 6. A | 24.A |
| 7. B | 25.D |
| 8. A | 26.C |
| 9. B | 27.B |
| 10.C | 28.A |
| 11.B | 29.A |
| 12.B | 30.D |
| 13.C | 31.D |
| 14.B | 32.C |
| 15.A | 33.B |
| 16.A | 34.C |
| 17.B | 35.C |
| 18.B |      |