

# NATIONAL SCIENCE LEAGUE – 2015

JUNIOR HIGH GENERAL SCIENCE CONTEST - Grades 7,8,9

## - ANSWER KEY -

- |                     |                      |
|---------------------|----------------------|
| 1. <u>    B    </u> | 26. <u>    B    </u> |
| 2. <u>    B    </u> | 27. <u>    D    </u> |
| 3. <u>    C    </u> | 28. <u>    A    </u> |
| 4. <u>    D    </u> | 29. <u>    B    </u> |
| 5. <u>    C    </u> | 30. <u>    C    </u> |
| 6. <u>    A    </u> | 31. <u>    A    </u> |
| 7. <u>    B    </u> | 32. <u>    B    </u> |
| 8. <u>    B    </u> | 33. <u>    C    </u> |
| 9. <u>    D    </u> | 34. <u>    B    </u> |
| 10. <u>   A   </u>  | 35. <u>   B   </u>   |
| 11. <u>   B   </u>  | 36. <u>   B   </u>   |
| 12. <u>   C   </u>  | 37. <u>   A   </u>   |
| 13. <u>   A   </u>  | 38. <u>   A   </u>   |
| 14. <u>   C   </u>  | 39. <u>   D   </u>   |
| 15. <u>   D   </u>  | 40. <u>   C   </u>   |
| 16. <u>   A   </u>  | 41. <u>   D   </u>   |
| 17. <u>   A   </u>  | 42. <u>   C   </u>   |
| 18. <u>   B   </u>  | 43. <u>   C   </u>   |
| 19. <u>   D   </u>  | 44. <u>   B   </u>   |
| 20. <u>   D   </u>  | 45. <u>   A   </u>   |
| 21. <u>   C   </u>  | 46. <u>   D   </u>   |
| 22. <u>   D   </u>  | 47. <u>   A   </u>   |
| 23. <u>   A   </u>  | 48. <u>   D   </u>   |
| 24. <u>   C   </u>  | 49. <u>   C   </u>   |
| 25. <u>   C   </u>  | 50. <u>   C   </u>   |

**National Science**  
**General Science**

DIRECTIONS: On the answer sheet, write the letter of the choice that best answers or completes the question.

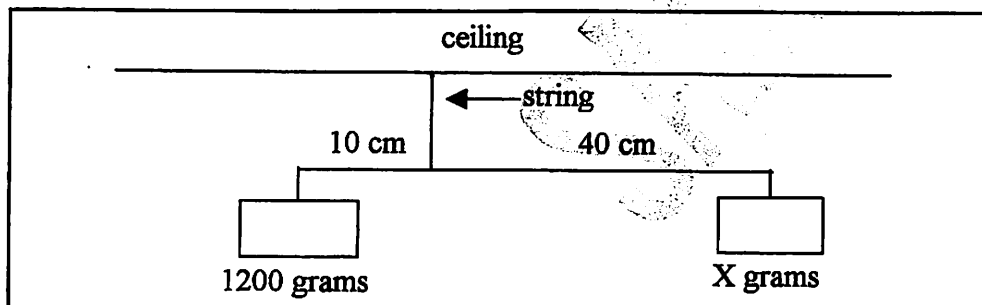
1. The food you eat is broken down into a form that your cells can use by the
  - A. nervous system.
  - B. digestive system.
  - C. circulatory system.
  - D. endocrine system.
2. The formula  $\frac{1}{2} mv^2$  is used to determine the
  - A. velocity of an object.
  - B. kinetic energy of an object.
  - C. acceleration of an object.
  - D. momentum of an object.
3. Which organ filters wastes from your blood?
  - A. the heart
  - B. the cerebellum
  - C. the kidney
  - D. the pancreas
4. Which rock is created by the heating or squeezing of existing rock?
  - A. granite
  - B. sandstone
  - C. pumice
  - D. marble
5. A sodium ion is created when a sodium atom
  - A. gains one proton.
  - B. loses one neutron.
  - C. loses one electron.
  - D. gains one neutron.
6. In which part of a cell does aerobic respiration occur?
  - A. the mitochondria
  - B. the endoplasmic reticulum
  - C. the nucleus
  - D. the ribosomes
7. Glucose and oxygen are made during
  - A. respiration.
  - B. photosynthesis.
  - C. fermentation.
  - D. digestion.
8. A student made a solution by dissolving 50 grams of sucrose in 200 ml of water. The resulting solution does not conduct electricity because the sugar exists as
  - A. ions in the solution.
  - B. molecules in the solution.
  - C. atoms in the solution.
  - D. crystals in the solution.
9. 100 mL of HCl solution with a pH of 4 is added to 100 mL of NaOH solution with a pH of 10. The pH of the resulting solution will be
  - A. 1.
  - B. 4.
  - C. 10.
  - D. 7.
10. Rocks that make up the earth's crust are classified into groups based on
  - A. how they were formed.
  - B. where they were formed.
  - C. the density of the minerals in them.
  - D. their chemical composition.

11. According to Newton's first law,  
 A. the faster an object moves the greater its mass becomes.  
 B. a mass at rest tends to remain at rest unless acted upon by an outside force.  
 C. the acceleration of an object depends upon its mass and the force applied to it.  
 D. for every action there is an equal but opposite reaction.
12. We see different phases of the moon approximately every month because the  
 A. moon revolves on its axis.  
 B. earth rotates on its axis.  
 C. moon revolves around the earth.  
 D. earth revolves around the sun.
13. 500 meters is the same as  
 A. .5 km.  
 B. 50 cm.  
 C. 5 hm.  
 D. 5000 mm.
14. In order to change a hydrogen atom to a helium atom you must  
 A. remove one proton.  
 B. remove one neutron.  
 C. add one proton.  
 D. add one electron.
15. The prefix *deci-* means  
 A. 1/100.  
 B. 1/1000.  
 C. 1/10000.  
 D. 1/10.
16. Chemical digestion of the food you eat is accomplished by  
 A. enzymes.  
 B. auxins.  
 C. hormones.  
 D. vitamins.
17. In which part of a cell are proteins made?  
 A. the ribosomes  
 B. the nucleus  
 C. the mitochondria  
 D. the Golgi bodies
18. Water enters a bean plant through its  
 A. leaves.  
 B. roots.  
 C. stems.  
 D. flowers.
19. Which of the following is part of your circulatory system?  
 A. a neuron  
 B. a villus  
 C. an alveolus  
 D. a capillary
20. Which of these has the lowest mass?  
 A. a proton  
 B. a neutron  
 C. a hydrogen atom  
 D. an electron
21. Which formula is used to determine the mechanical advantage of a machine?  
 A.  $\frac{\text{work done}}{\text{time}}$   
 B.  $\frac{\text{distance effort moves}}{\text{time}}$   
 C.  $\frac{\text{work out}}{\text{work in}}$   
 D.  $\frac{\text{effort force}}{\text{resistance force}}$

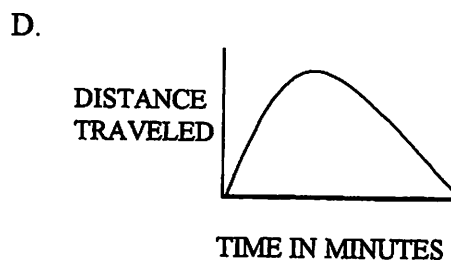
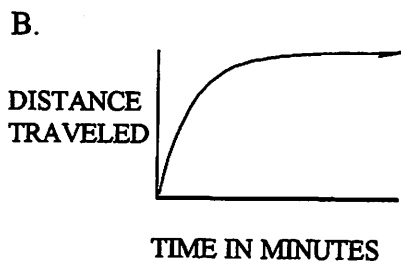
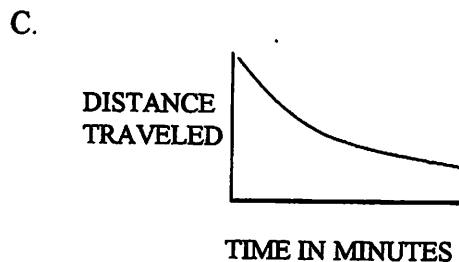
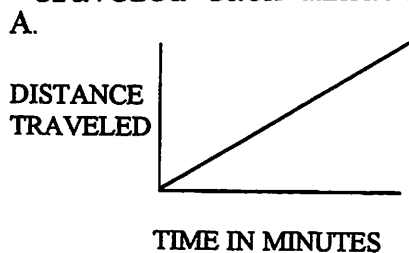
22. By which process does carbon dioxide leave your body cells?  
A. plasmolysis  
B. active transport  
C. osmosis  
D. diffusion
23. Animals that eat both plants and other animals are called  
A. omnivores.  
B. carnivores.  
C. herbivores.  
D. producers.
24. Where on the surface of the earth would you be if it was March 21 and the sun was directly overhead at noon?  
A. the North Pole  
B. the Tropic of Cancer  
C. the Equator  
D. the Arctic Circle
25. Whenever a warm air mass enters an area, the  
A. wind comes from the North.  
B. relative humidity decreases.  
C. barometric pressure falls.  
D. sky becomes filled with clouds.
26. A piece of burning magnesium ribbon was put into a large flask filled with a gas. The magnesium immediately went out. The gas in the flask was  
A. hydrogen.  
B. helium.  
C. oxygen.  
D. fluorine.
27. Contour lines on a topographic map connect places with equal  
A. temperature.  
B. precipitation.  
C. air pressure.  
D. elevation.
28. A battery changes  
A. chemical energy to electrical energy.  
B. mechanical energy to light energy.  
C. electrical energy to light energy.  
D. nuclear energy to mechanical energy.
29. If you wanted to measure out 70 mL of water you would use  
A. a triple beam balance.  
B. a graduated cylinder.  
C. a beaker.  
D. an Erlenmeyer flask.
30. Which type of element does not gain or lose electrons under normal conditions?  
A. a metal  
B. a metalloid  
C. a noble (inert) gas  
D. a non-metal
31. A geologist found a large amount of the sedimentary rock limestone in an area. Which of these conditions existed in the area when the limestone was formed?  
A. a shallow ocean  
B. a rapidly flowing river  
C. a very tall mountain  
D. an earthquake
32. The temperature at which a liquid becomes a gas is called its  
A. melting point.  
B. boiling point.  
C. freezing point.  
D. condensation point.
33. Only green plants can carry on  
A. respiration.  
B. mitosis.  
C. photosynthesis.  
D. digestion.

USE THE FOLLOWING INFORMATION AND YOUR KNOWLEDGE OF GENERAL SCIENCE TO ANSWER QUESTION 34:

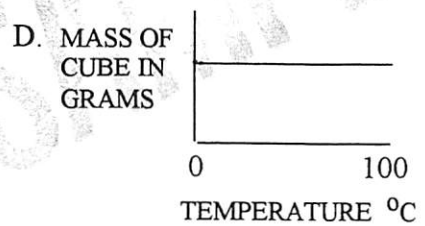
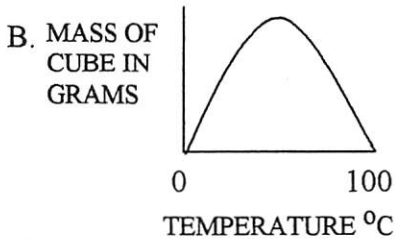
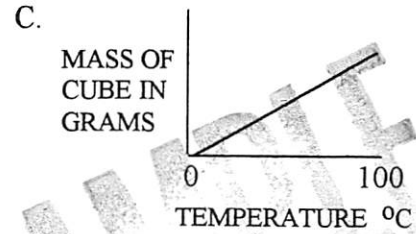
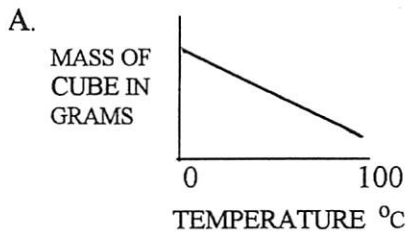
The diagram below shows a lever with masses at each end. Note that the lever is parallel to the ceiling.



34. Mass x is  
 A. 480 grams. C. 4800 grams.  
 B. 300 grams. D. 30 grams.
35. The unit of work in the metric system is the  
 A. meter/second/second. C. gram.  
 B. joule.
36. A chemical change occurs when  
 A. ethyl alcohol is dissolved in water.  
 B. sodium combines with chlorine to make salt.  
 C. ice forms on a car windshield.  
 D. an iron rod melts.
37. Invertebrates are animals that  
 A. lack an internal skeleton.  
 B. are unable to move from place to place.  
 C. do not have circulatory or nervous systems.  
 D. can never be parasites.
38. Which of the following graphs shows that the distance traveled each minute remains the same?



39. Which graph correctly shows the relationship between the mass of an aluminum cube and the temperature of the environment?



40. If the air pressure around a beaker of water that is being heated is reduced, the

- A. water will not boil.
- B. boiling point of the water will increase.
- C. boiling point of the water will decrease.
- D. boiling point will not change.

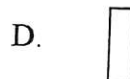
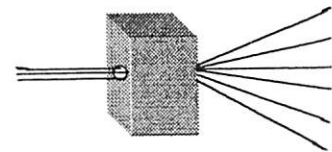
41. A balloon was rubbed on a wool shirt. When the balloon was brought near a wall, it stuck to it. This happened because the wall surface and the balloon surface had

- A. the same electric charge.
- B. the same number of positive and negative electric charges.
- C. no electric charge.
- D. different electric charges.

42. Which of these is a true statement?

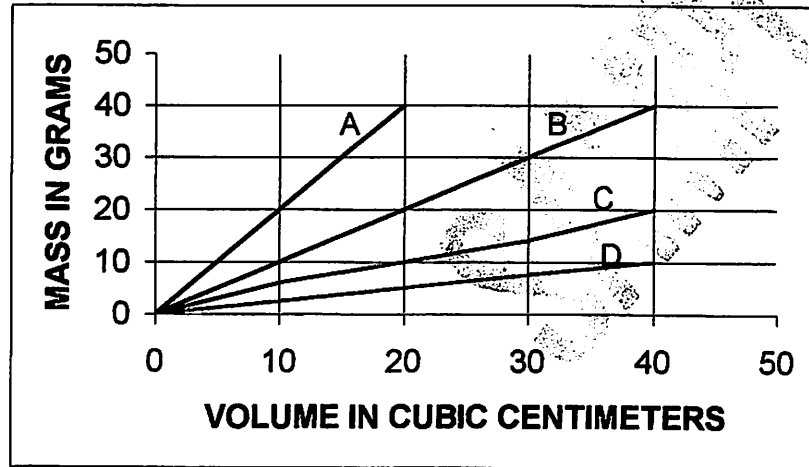
- A. Sedimentary rocks are always formed on dry land.
- B. The crust of the earth is made of one continuous piece.
- C. Most major volcanoes occur in the same locations as major earthquakes.
- D. Metamorphic rock forms when molten lava cools.

43. Light enters this box through the hole on the left. It then passes through a glass object and exits through a hole on the right side of the box. Which of these shapes does this glass object have?

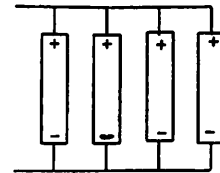
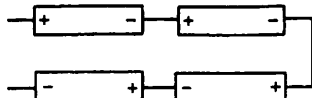


USE THE FOLLOWING INFORMATION AND YOUR KNOWLEDGE OF GENERAL SCIENCE TO ANSWER QUESTIONS 44 TO 46:

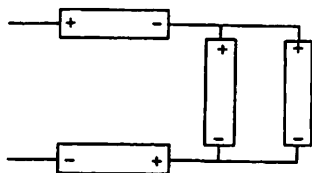
The graph below shows the relationship between the mass and volume of four different substances.



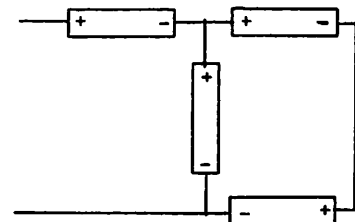
44. According to the graph, which substance has a density that is the same as the density of water?
- A. Substance A  
B. Substance B  
C. Substance C  
D. Substance D
45. According to the graph, which substance has the greatest density?
- A. Substance A  
B. Substance B  
C. Substance C  
D. Substance D
46. According to the graph, which substance has a density of  $.25\text{g}/\text{cm}^3$ ?
- A. Substance A  
B. Substance B  
C. Substance C  
D. Substance D
47. A group of students needed 6 volts to do an experiment. They only had 1.5 volt batteries. How should they hook up these batteries in order to get the 6 volts that they needed?
- A. C.



B.



D.



USE THE FOLLOWING INFORMATION AND YOUR KNOWLEDGE OF GENERAL SCIENCE TO ANSWER QUESTIONS 48 TO 50:

The chart below shows information about the planets that make up our solar system.

PLANET	MEAN DISTANCE FROM THE SUN IN MILLIONS OF KILOMETERS	TIME TO COMPLETE ONE REVOLUTION	ORBITAL VELOCITY IN KILOMETERS PER SECOND	MEAN DIAMETER IN KILOMETERS	MASS COMPARED TO EARTH'S	AVERAGE DENSITY IN GRAMS PER CUBIC CENTIMETER
Mercury	58	88 days	47.5	4,845	0.056	5.1
Venus	108	225 days	35	12,112	0.82	5.3
Earth	150	365.25 days	29.8	12,751	1	5.5
Mars	228	687 days	24.1	6,788	0.018	3.9
Jupiter	778	12 years	13.1	143,000	318	1.3
Saturn	1,427	29.5 years	9.6	121,000	95.2	0.7
Uranus	2,866	84 years	6.8	47,000	14.6	1.6
Neptune	4,492	164 years	5.3	46,529	17.3	2.3

48. According to the chart, which of these statements about Earth, Mars, Venus, and Mercury is true?
- They have the largest mean diameters.
  - They have the lowest orbital velocities.
  - They have almost identical masses.
  - They have the highest average densities.
49. According to the chart, the planet with the greatest mean diameter also has the greatest
- orbital velocity.
  - mean distance from the sun.
  - mass compared to earth's.
  - period of revolution.
50. On which of these planets would your weight be the greatest?
- Venus
  - Uranus
  - Jupiter
  - Earth