



TMSCA MIDDLE SCHOOL SCIENCE TEST #8 © JANUARY 25, 2020

GENERAL DIRECTIONS

1. About this test:
 - A. You will be given 40 minutes to take this test.
 - B. There are 50 problems on this test.
2. All answers must be written on the answer sheet/Scantron form/Chatsworth card provided. If you are using an answer sheet be sure to use **BLOCK CAPITAL LETTERS**. Clean erasures are necessary for accurate grading.
3. If using a Scantron answer form, be sure to correctly denote the number of problems not attempted.
4. You may write anywhere on the test itself. You must write only answers on the answer sheet.
5. You may use additional scratch paper provided by the contest director.
6. All problems have **ONE** and **ONLY ONE** correct [BEST] answer. There is a penalty for all incorrect answers.
7. On the back of this page is a copy of the periodic table of the elements as well as a list of some potentially useful information in answering the questions.
8. A simple scientific calculator with the following formulas is sufficient for the science contest: +, -, %, ^, log x, e^x, ln x, y^x, sin x, sin^{-x}, cos x, cos^{-x}, tan x, tan^{-x}, with scientific notation and degree/radian capability.
The calculator must be silent, hand-held and battery operated. The calculator cannot be a computer or cannot have built-in or stored functionality that provides scientific information and cannot have communication capability. If the calculator has memory, it must be cleared. Each student may bring one spare calculator. **NO GRAPHING CALCULATORS ARE PERMITTED.**
9. All answers within $\pm 5\%$ will be considered correct.
10. All problems answered correctly are worth **FIVE** points. **TWO** points will be deducted for all problems answered incorrectly. No points will be added or subtracted for problems not answered.
11. In case of ties, percent accuracy will be used as a tie breaker.

1A 1																	8A 18
1 H 1.01	2A 2											3A 13	4A 14	5A 15	6A 16	7A 17	2 He 4.00
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31	3B 3	4B 4	5B 5	6B 6	7B 7	8B 8 9 10			1B 11	2B 12	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.64	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.60	53 I 126.90	54 Xe 131.29
55 Cs 132.91	56 Ba 137.33	57 La 138.9	72 Hf 178.49	73 Ta 180.95	74 W 183.84	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.20	83 Bi 208.98	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (264)	108 Hs (277)	109 Mt (268)	110 Ds (281)	111 Rg (281)	112 Cn (285)	113 Nh (286)	114 Fl (289)	115 Mc (289)	116 Lv (293)	117 Ts (293)	118 Og (294)

Specific heat of water = $4.18 \text{ J/g} \cdot ^\circ\text{C}$

2019-2020 TMSCA Middle School Science Test #8

1. These clouds are formed from sinking air instead of rising air. What type of cloud is this?

A. Lenticular
B. Kelvin-Helmholtz
C. Mammatus
D. Cirrus



2. Students were conducting an investigation to find out if a person's hand length is associated with that person's height. Which of the following would be a reasonable step in their process?

A. Measure the heights of their family members and friends, make a bar graph of the heights
B. Measure hand lengths of 10 people in the mall, then measure heights of the next 10 people
C. Make a circle graph of heights vs. hand lengths of 25 people in their class
D. Measure 100 random people's heights and hand lengths, create a scatterplot graph of the data

3. What does the prefix "dia" mean?

A. middle B. against C. across D. down

4. Read the list of terms below.

unstable isotope, accelerated neutrons, large amount of energy released, Uranium 235

What is the commonality of this list of terms?

A. chemical reactions B. nuclear fusion C. deuterium D. nuclear fission

5. Bhavin was helping with water testing at a local river. He used a probe that measures the flow of electricity through the water. What was he measuring?

A. turbidity B. pH C. conductivity D. alkalinity

6. Which statement about bronchitis is not correct?

A. it involves irritated and inflamed airways
B. can be caused by the germs that also cause colds or flu
C. it affects the kidneys and liver
D. can be caused by breathing polluted air, smoke, or chemical fumes

7. Which of the objects below would be considered "technology"?

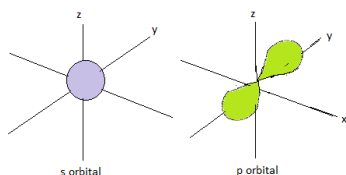
A. toothbrush B. nail clippers C. computer D. all of these

8. When atoms bond to form molecules, they tend to prefer 8 valence electrons in their outer energy level just like the noble gases. This is called the what?

A. heptane law B. noble law C. VSEPR theory D. Octet rule

9. Which statement below describes a difference between mitosis and meiosis?
- only one division takes place in meiosis, two in mitosis
 - meiosis produces 4 different from parent haploids, mitosis produces 2 identical diploid daughter cells
 - mitosis produces haploid gametes, meiosis produces diploid
 - mitosis occurs in plants only, meiosis occurs in animals only
10. The Mediterranean Gecko was introduced to the United States most likely by accident around 1915. Over time, this gecko made its way across the US into Texas. Which statement below about this species is true?
- They are non-native to Texas.
 - They are insectivores.
 - They can usually be found in and around houses with porchlights.
 - All of these
11. Mrs. Mott's class was discussing the conductivity of several water samples. Conductivity is indirectly related to the number of dissolved solids that are in the water, such as minerals or salts. Out of the water samples listed below, which would most likely have the lowest conductivity?
- water from a river after a torrential rain
 - water in a lake fed by several tributaries
 - water in the stream as it empties into the ocean
 - water from snowmelt on top of a 14,000 ft mountain
12. What percentage of the offspring will have heterozygous genotypes?
- 25%
 - 50%
 - 75%
 - 100%
- | | | Maternal | |
|----------|---|----------|----|
| | | B | b |
| Paternal | B | BB | Bb |
| | b | Bb | bb |
13. This Ecoregion of Texas contains post oak-blackjack oak wooded areas along with shin oak, live oak, and other tree species. This region also has sandstone and limestone escarpments with some steep slopes. What Ecoregion of Texas is this?
- Cross Timbers
 - High Plains
 - Trans Pecos
 - Pineywoods
14. Which statement below about galaxies is not true?
- Elliptical galaxies do not rotate at all or rotate much more slowly than spiral
 - Our Sun is in the Milky Way Galaxy
 - Irregular Galaxies are the most common type of galaxies observed
 - The Milky Way Galaxy is a spiral galaxy.
15. The red maple tree produces an interested looking "winged fruit". What are these called?
- a samara
 - a nut
 - a caryopsis
 - an aggregate

16.



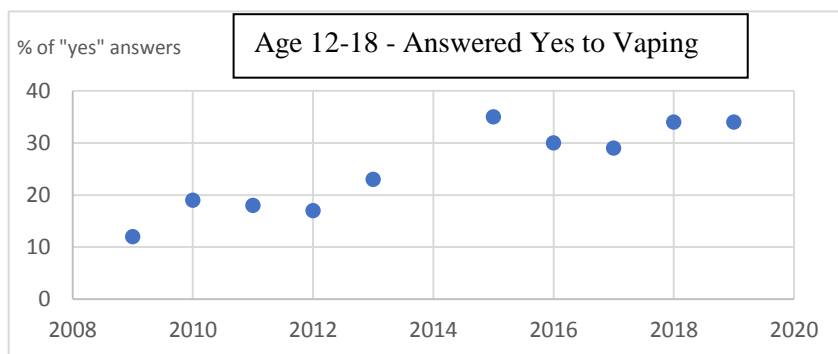
Mohammed saw this diagram in his science book. What is the diagram showing?

- A. a model of chemical bonding in two elements
- B. a model of electronegativity
- C. the model shows how molecules can be formed
- D. a diagram shows a model of electron pathways surrounding the nucleus of an atom

17. 100 students between the age of 12 and 18 were surveyed in a particular city for a period of 10 years. Each student was asked the question, "Have you ever vaped?"

The results are shown below. In 2014, the results were lost. If someone wanted to estimate the percentage for that year to be 30%, this would be considered to be what?

- A. extrapolation of data
- B. using outliers to predict
- C. concept mapping
- D. interpolation of data

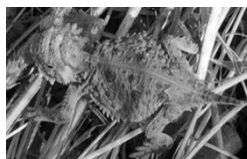


18. Which of the following statements about bats is true?

- A. Bats commonly get tangled in the hair of mammals.
- B. Bats are mammals.
- C. Bats have extremely poor eyesight and they navigate solely on sound.
- D. Research has shown that approximately 25% of bats carry rabies.

19. The Dallas and Ft. Worth Zoos are raising baby Texas horned lizards in an effort to try to repopulate the species in certain areas of Texas where the numbers have decreased. This process is known as what?

- A. wildlife rehabilitation
- B. selective breeding
- C. captive breeding
- D. Both A and B



20. After the eruption of Mt. St. Helens, a fluid mudflow caused quite a trail of destruction. What is another name for this mudflow from volcanoes?

- A. pyroclastic flow
- B. Lahar
- C. ash fall
- D. Pahoehoe

21. When alkali metals react with water, what is given off?

- A. hydrogen gas
- B. carbon dioxide gas
- C. oxygen gas
- D. all of the above

22. What day of the year is the longest day of sunlight for the Northern Hemisphere?

- A. December 21
- B. June 21
- C. March 21
- D. September 22



23. In this diagram of a human foot, the arrow pointing up represents the muscle movement or effort, the triangle shows the “fulcrum”, and the box is the resistance. What type of lever does this represent?

- A. 1st class
- B. 2nd class
- C. 3rd class
- D. no lever is formed



24. Earth is approximately 93 million miles from the sun and is the only known planet to support life. What do scientists sometimes refer to this special zone Earth is located in?

- A. Circumstellar Habitable Zone (CHZ)
- B. Goldilocks' Zone
- C. Convection Zone
- D. Both A and B

25. What structure on the underside of leaf allows for the exchange of gases?

- A. phloem
- B. xylem
- C. cambium
- D. stomata

26. What does the prefix “prim” mean?

- A. first
- B. around
- C. hang
- D. fear

27. Several animals use the process of echolocation to find prey. Which list below are these animals?

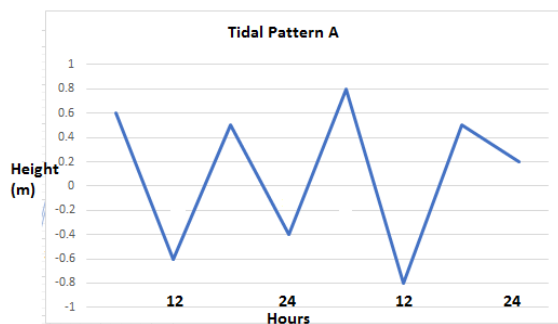
- A. shrews, bats, jackrabbits, dolphins
- B. bats, dolphins, whales, shrews
- C. bats, sharks, dolphins, whales
- D. dolphins, bats, hyenas, cats

28. Students were given 3 different types of magnets and a box of paperclips. The question is to find out which type of magnet has the strongest magnetic attraction. Which process below would be the best approach with these materials provided?

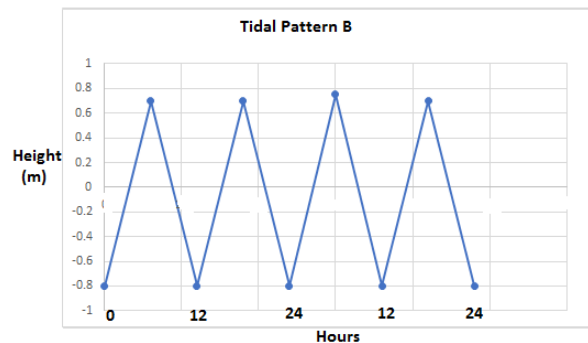
- A. Place the magnets in a circle. Sprinkle paper clips around them and count which magnet attracted the most.
- B. Place the magnets side by side in a box. Toss the paperclips, one at a time to see which magnet catches the most.
- C. Take each magnet separately, touch one paperclip at a time to the magnet in a straight line to see how many paper clips the magnet can hold. Record the data and repeat with next two magnets.
- D. Take two magnets. Put a paperclip between them to see which magnet will attract the paper clip.

29. Along the East coast of the United States, there are two high tides and two low tides of approximately equal heights during each tidal day. This is considered to be a Semidiurnal Tidal Pattern. Which graph below would most likely belong to the East U.S. Coast?

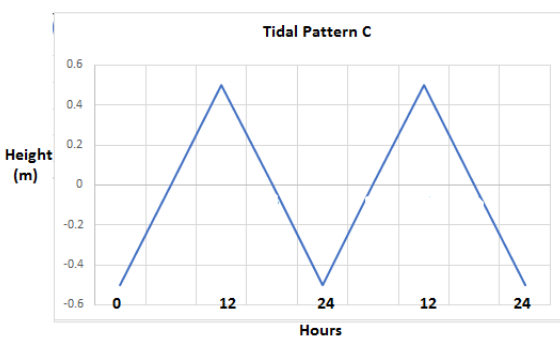
A.



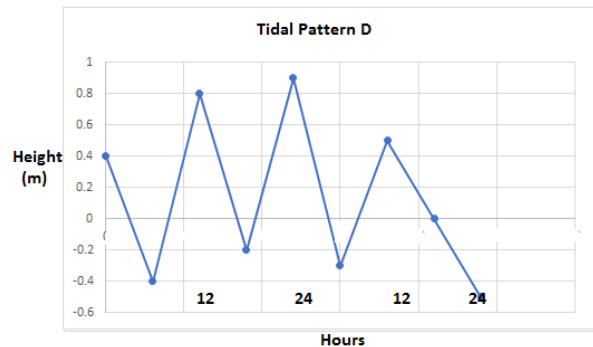
B.



C.



D.



30. According to the 8 main moon phases, what phase comes right after a waxing crescent?

- A. waning crescent
- B. first quarter
- C. new moon
- D. last quarter

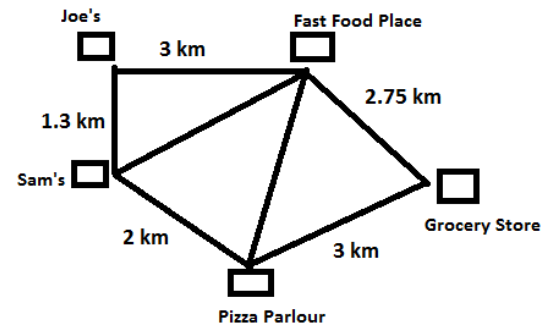
31. What does the prefix “rad” mean?

- A. cool
- B. ray
- C. carry
- D. after

32. A pharyngeal jaw is an adaptation that helps a Moray Eel do what?
- A. frighten unsuspecting victims
 - B. capture prey and aid in swallowing
 - C. chew food to miniscule portions
 - D. protect its young
33. A yucca plant and a yucca moth have a symbiotic relationship. The moth pollinates the yucca plant and the plant provides a place for eggs and food for the moth larvae. What type of relationship is this?
- A. parasitism
 - B. mutualism
 - C. commensalism
 - D. interactivism
34. What element is very abundant in the Earth's crust, but not so abundant in a human body?
- A. Nickel
 - B. Oxygen
 - C. Phosphorus
 - D. Silicon
35. When you are hand washing pots and pans that have a greasy layer, you use a type of soap to help remove the grease. The soap acts as a(n) what in order for this to happen?
- A. electrolyte
 - B. concentrator
 - C. oxidator
 - D. emulsifier
36. Which of these do NOT belong in the Eukarya Domain?
- A. Amoebas
 - B. Yeasts
 - C. Ferns
 - D. Viruses
37. What description about halogens is incorrect?
- A. nonmetals
 - B. react with metals to form salts
 - C. in group 7A
 - D. all radioactive
38. What type of bridge involves using cables hanging between two towers that support the bridge?
- A. arch
 - B. suspension
 - C. beam
 - D. abutment
39. Which statement about the star, Betelgeuse, is incorrect?
- A. Betelgeuse will most likely become a white dwarf
 - B. Betelgeuse is found in the Orion constellation
 - C. Betelgeuse may explode into a supernova someday
 - D. Betelgeuse is much larger than our Sun
40. Which of these would not belong in the category "High Clouds – 16,500 to 45,000 ft"?
- A. cirrus
 - B. altostratus
 - C. cirrocumulus
 - D. cirrostratus
41. What does the prefix "photo" mean?
- A. love
 - B. star
 - C. light
 - D. heat
42. How many electrons does a neutral atom of Calcium have?
- A. 40
 - B. 27
 - C. 20
 - D. 17

43. Joe was at his house and needed to get some milk at the grocery store. He went east 3km and southeast 2.75 km. He bought the milk and went back home the same way he went. What was his displacement?

A. 11.5 km
B. 5.75 km
C. 5 km
D. 0 km



44. Around the Northwest Pacific, what we call a “hurricane” would be called what instead?
A. typhoon B. depression C. monsoon D. also, a hurricane
45. Which hormone produced in the pancreas raises blood glucose levels?
A. glucagon B. epinephrine C. liver complex D. insulin
46. What is the specific function of adipose tissue?
A. store fat B. contract and expand C. conduct signals D. transport nutrients
47. Students were measuring the volume of several irregular shaped objects. While measuring the volume, they used a graduated cylinder and found the displacement of the water to be 5 mL. The teacher wanted the volume written in cubic centimeters. What should they write down for the volume?
A. 5,000 cm³ B. 10 cm³ C. 500 cm³ D. 5 cm³
48. What causes an eclipse?
A. when an object in space casts a shadow on another
B. when a space object reflects the light off another object in space
C. when an object in space crosses the orbital path of another
D. when an object in space reflects back sunlight
49. The police officer sat on his motorcycle holding a radar speed gun that calculates the speed of a passing car. The radar speed gun works by using the change in pitch of the sound waves of the car as it changes when it passes the officer. This involves the what?
A. Acoustical Refraction
B. sound bombing
C. echolocation
D. Doppler Effect
50. Sandy said that the sunflower she was looking at in the garden was actually made up of a lot of little flowers clustered together to look like one big flower. Her mother said, “Yes, that is true! Do you know what type of flower the sunflower is?” Sandy should answer her mother with what word below?
A. legume flower B. composite flower C. conglomerate flower D. none of the above

2019 - 2020 TMSCA Middle School Science Test #8 - Key

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