

TMSCA ELEMENTARY SCIENCE STATE MEET TEST© 2021

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 5BEST] 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: +, -, %, $^{\wedge}$, $\log x$, 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			Pe	erio	dic	Ta	ble	of	the	e El	em	ent	ts				8A 18
1 H	2A 2											за 13	4A 14	^{5A} 15	6A 16	^{7А} 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 ₂₄₃₁	3B 3	4B 4	5B 5	6B 6	7В 7	8	—8B—	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	53 126.90	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 r 192.22	78 Pt 195.08	79 Au 196.97	80 Hg _{200.59}	81 TI 204.38	82 Pb 207.20	83 Bi _{208.98}	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 FI (289)	115 Mc (289)	116 Lv (293)	117 Ts (293)	118 Og (294)

58	59	60	61	62	63	64	65	66	67	68	69	70	71
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dν	Но	Er	Tm	Yb	Lu
140.1	140.9	144.2	(145)	150.4	152.0	157.3	158.9	162.5	164.9	167.3	168.9	173.0	175.0
90	91	92	93	94	95	96	97	98	99	100	101	102	103
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	l Lr l
232.0	231.0	238.0	(237)	(244)	(243)	(247)	(247)	(251)	(252)	(257)	(258)	(259)	(262)

OTHER USEFUL INFORMATION

Acceleration of gravity at Earth's surface, g = 9.81 m/s²

Avogadro's Number, N = 6.02 x 10²³ molecules/mole

Planck's constant, $h = 6.63 \times 10^{-34} \text{ J} \cdot \text{s}$

Planck's reduced constant, $\hbar = h/2\pi = 1.05 \text{ X } 10^{-34} \text{ J} \cdot \text{s}$

Standard temperature and pressure (STP) is 0°C and I atmosphere

Gram molecular volume al STP = 22.4 liters

Velocity of light, $c = 3.0 \times 10^8 \text{ m/sec}$

Absolute zero= 0 K = -273.15°C

Gas constant, R = 1.986 col/K•mole = 0.082 liter•otm/K•mole

One Faraday= 96,500 coulombs (9 .65 x 10⁴ C)

Dulong and Pelil's constant= 6.0 amu•cal/gram•K

Electron rest mass, $m_e = 9.11 \times 10^{-31} \text{ kg}$

Atomic mass unit, $m_u = 1.66 \times 10^{-21} \text{ kg}$

Boltzmann constant, $k_B = 1.38 \times 10^{-23} \text{ J/K}$

Permittivity of free space ε_0 = 8.85 x 10^{-12} C²/N•m²

Permeability of free space $\mu_0 = 4\pi \times 10^{-7} \text{ T} \cdot \text{m/A}$

1 Atmosphere= $1.02 \times 10^5 \text{ N/m}^2 = 760 \text{ Torr} = 760 \text{ mmHg}$

1 Electron Volt - 1.6 x 10⁻¹⁹ Joules

Charge of on electron" -1.6 x 10⁻¹⁹ coulombs (C)

1 horsepower (hp) = 746 W = 550 ft•lb/s

Neutron Moss= 1.008665 au

Proton Mass= 1.007277 au

1 au= 931.5 MeV

1 calorie= 4.184 Joules (J)

Specific heal of water= 4.18 J/g• °C

2020-2021 TMSCA EL On-Line State Meet Science Test

	not located in the huma	•	D. potalla
A. ulna	B. cochlea	C. xylem	D. patella
2. The study of ants,	bees and roaches is inc	cluded in the field of _	·
A. entomology	B. ornithology	C. ichthyology	D. herpetology
3. Which of these an	imals is not a marsupia	1?	
A. opossum	B. koala	C. kangaroo	D. platypus
4. Which of these bio	ological classifications	does not belong with the	he rest of the terms?
A. class	B. family	C. order	D. genius
5. The tallest mounta	ain in Oklahoma is:		
A. Mt. Davis		C. Mt. Rogers	D. Guadalupe Peak
6. Which of these ter	rms does not describe p	hases of the Earth's m	oon?
A. crescent			D. new
7. What is the name	used for a female bear?)	
A. grizzly	B. sow	C. queen	D. cow
8. Bile is produced b	y the liver. Which orga	nn stores bile?	
A. heart	B. thyroid	C. gall bladder	D. pancreas
9. Which of these ter	rms names a muscle for	and in the human torso	?
A. biceps	B. deltoid	C. abdomen	D. sternum
10. Which disease is	known for uncontrolle	d growth and division	of abnormal cells?
A. cancer	B. polio	C. small pox	D. whooping cough
11. In the NASA spa	ice program, what was	the first Apollo mission	n to enter space?
A. I	B. III	C. VII	D. V
12. How many liters	are in 12 centiliters of	orange juice?	
A. 1200	B. 0.12	C. 120	D. 0.012
13. Which of these N	North American mamm	als is the largest?	
A. moose	B. bison	C. elk	D. bear
14. Which animal is	a reptile?		
A. elephant	B. mandrill	C. alligator	D. kangaroo
15. What is the term	used for a mature male	e deer?	
A buck	B doe	C fawn	D boar

16. What device is u	used to measure the sp	ecific gravity of a liqu	uid?
A. barometer	B. hydrometer	C. hectometer	D. thermometer
17. Which of these	planets has the least m	oons?	
A. Mars	B. Uranus	C. Neptune	D. Venus
18. Which of these A. horse	animals is an equine? B. bear	C. tiger	D. elephant
19. Which of these the stratosphere?	layers of the Earth's at	tmosphere is between	the thermosphere and
A. troposphere	B. mesosphere	C. exosphere	D. lithosphere
20. Who was credit	ed with the invention of	of dynamite?	
A. Davy	B. Edison	C. Nobel	D. Tesla
21. A 3.0 earthquak A. 10,000	times less p	oowerful than a 7.0 ea C. 100,000	rthquake. D. 1,000
22. The America.	_ is a large ground squ	irrel found primarily	in Eurasia and North
A. mandrill	B. mallard	C. marmot	D. mandarin
23. What is the larg	est of Jupiter's 79 mod	ons?	
A. Europa	B. Titan	C. Triton	D. Ganymede
24. What term describes two tectonic plates?	•	nent of rock formed al	ong the boundaries of
A. meiosis	B. graph	C. crustacean	D. fault
25	_ kilometers equals 21	4 hectometers.	
A. 21.4	B. 0.0214	C. 0.00214	D. 2140
26. What kind of ro of bodies of water?	ck forms from pressur	e acting on the accum	ulation of small particles at the bottom
A. igneous	B. metamorphic	C. sedimentary	D. elementary
27. What term descri	ribes a flat, dark plain	of lower elevation on	the Moon?
A. cliff	B. mare	C. crater	D. stalagmite

28. What kind of rocl A. igneous	s is granite? B. metamorphic	C. diabetic	D. sedimentary
29. What electrical te	rm describes an unbro	ken path along which e	electrons from a voltage flow?
A. insulation	B. ground	C. charge	D. circuit
30. What is the comn	non unit of measureme	nt used by barometers?	?
A. pound	B. joule	C. millibar	D. kilogram
31. A substance used	I to create immunity ag	gainst a disease is calle	d a(an)
A. vaccine	B. coagulant	C. balm	D. salve
32. The study of gnat	s, hornets and flies is i	ncluded in the field of_	·
A. epistemology	B. entomology	C. etymology	D. endocrinology
33. A simple machin	e that redirects force w	vith a grooved wheel ar	nd cable is called a/an
A. screw	B. pulley	C. wedge	D. lever
34. Which of these ar	nimals does not belong	to the same group?	
A. elk	B. deer	C. elephant	D. moose
35. Who worked with	n Charles Babbage in th	ne field of early compu	iting devices?
A. Hopper	B. Curie	C. Lovelace	D. Edison
36. A group of alligat	tors can be called a cor	gregation. A group of	apes can be called a/an
A. company	B. culture	C. shrewdness	D. coalition
37. The IBM 650 Ma	gnetic Drum Data-Pro	cessing Machine was p	orimarily used in what decades?
A. 1930's to 1940's	B. 1950's to 1960's	C. 1970's to 1980's	D. 1980's to 1990's
38. The highest geolo	ogic point in Louisiana	is:	
A Wheeler Peak	R Driskill Mountain	C Mount Rogers	D Pike's Peak

39. What type of tree	is a medium to large ev	vergreen tree that prod	uces large white flower
A. sequoia	B. elm	C. oak	D. magnolia
40. Which of these mo	etals is usually the leas B. copper	t valuable in the mode C. platinum	rn era? D. silver
41. Which human org A. liver	an secretes insulin? B. gall bladder	C. stomach	D. pancreas
42. Which of these is A. radius	not a bone in the huma B. ulna	n body? C. pistil	D. patella
43. Which of these pa A. lung	rts of the body would a B. heart	a neurologist most like C. kidney	ly treat? D. spinal cord
44. How many astrona A. 1	auts constituted a comp B. 2	olete crew in the NASA C. 3	A Mercury series? D. 4
45. Who acquired the A. Elias Howe	first US patent for a se B. Thomas Edison		lockstitch design? D. Robert Fulton
46. Which of these an A. elephant	imals is a predator? B. lion	C. horse	D. giraffe
47. Which of these an	imals is a vulpine?		
A. horse	B. tiger	C. fox	D. ostrich
48. Which celestial of	oject was reclassified a	s a dwarf planet in 200	06?
A. Pluto	B. Venus	C. Mars	D. Sirius
49. What river forms	the boundary between	Mexico and the United	l States?
A. Yukon	B. Missouri	C. Mississippi	D. Rio Grande
50. What is the only n	novable bone in the hu B. meniscus	man skull? C. mandible	D. femur

2020-2021 EL On-Line State Meet Science Answer Key

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

34. C

17. D