In addition to the information at the end of the exam, you will be given a periodic table.

1. Express 3143 in scientific notation.
a. 3.143×10^{-3} b. $3143 \times 10^{+3}$ c. $3.143 \times 10^{+3}$ d. $3.143 \times 10^{+4}$

2. Express 0.000919 in scientific notation.
a. 919×10^{-4} b. 9.19×10^{-4} c. 9.19×10^{4} d. 9.19

3. What is 0.00444 x 0.0358 expressed in scientific notation?
a. 1.59×10^{-5} b. 15.9×10^{-6} c. 1.59×10^{-4} d. $1.6 \times 10^{+4}$

4. Which quantity expresses the sum of the given masses to the correct number of significant figures?
22.1 g + 375.66 g + 5400.132 g
a. 5798 g b. 5797.892 g c. 5800 g d. 5797.9 g

5. Given: (52.6 cm)(1.214 cm)
What is the product expressed to the correct number of significant figures?
a. 62.86 cm^2 b. 63.8564 cm^2 c. 63.9 cm^2 d. 64 cm^2

6. Using the rules of significant figures, calculate the following: $\frac{(1.1 \times 10^{+3})(9.14 \times 10^{-3})}{5.555 \times 10^{-15}}$

a. 1.810×10^{-15} b. 1.81×10^{15} c. 1.8×10^{-15} d. 1.8×10^{15}

7. Using the rules of significant figures, calculate the following (assume that 1 in the numerator is an exact number):

$$\frac{1}{(6.5 \times 10^{+3})(1.111 \times 10^{-7})}$$

a. 1.7×10^{-11} b. 7.2×10^{-10} c. 1.385×10^{3} d. 1.4×10^{3}

8. What is the result of the following multiplication expressed in scientific notation to the correct number of significant figures?

$$\frac{(2.9 \times 10^{+7})(4.1 \times 10^{-4})}{(4.8 \times 10^{-5})(2.12 \times 10^{+5})}$$

a. 1.2×10^{11} b. 1.17×10^{3} c. 5.3×10^{13} d. 1.2×10^{3}

9. Which measurement contains a total of three significant figures?
a. 0.0100 g b. 0.01 g c. 0.010 g d. 0.01000 g

10. The number 1.0805 rounded to three significant figures is_____.
a. 1.0805 b. 1.08 c. 1.080 d. 1.081

11. How many significant figures are in the number 0.00200200?
a. 2 b. 4 c. 5 d. 6

12. Convert 3.00 kg to milligrams.
a. 0.00300 b. 3.00 c. 3.00×10^{6} d. 3.00×10^{-6}

13. How many liters are in 7.4 mL?
a. 0.74 b. 7.4×10^{3} c. 74 d. 0.0074

14. Convert 396 mL into gallons (1 L = 1.060 qt and 4 qt = 1 gal).
a. 0.105 gal b. 105 gal c. 1.68 gal d. 1.05×10^{5} gal

15. Convert 25.0 km to miles (1 mi = 1760 yd and 1 m = 1.094 yd).
a. 1.55×10^{-2} b. 15.5 c. 1.55×10^{-5} d. 13.0

16. Convert 125.4 lb to kilograms (2.205 lb = 1 kg).
a. .001758 b. .003617 c. 276.5 d. 56.87

17. What is the atomic weight of nickel?
a. 28 b. 20.179 c. 14.0067 d. 58.70

18. What is the molecular weight of H_2SO_4?
a. 98.07 b. 49.07 c. 25.00 d. 50.00

19. What is the mass in grams of 1 mole of Cl_2?
a. 35.453 b. 6.02×10^{23} c. 70.906 d. 1.00

20. What is the total number of moles contained in 115 grams of C_2H_5OH?
a. 2.50 b. 3.00 c. 1.50 d. 1.00

21. What is the total number of atoms in 2.00 moles of copper? (Avogadro's number = 6.02×10^{23})
a. 29 b. 6.02×10^{23} c. 1.20×10^{24} d. 63.6

22. What is the total mass of 3.01×10^{23} atoms of helium gas?
a. 4.00 g b. 8.00 g c. 2.00 g d. 3.50 g

23. 300 K equals _____ ($T_K = T_{°C} + 273$).
a. 573°C b. 27°C c. –27°C d. –573°C

24. The volume of a box is actually 5.610 L. A student makes several measurements to determine the volume of the box. Which of the following measurements listed below is most accurate?
a. 6.000 L b. 5.605 L c. 5.600 L d. 5.620 L

25. Which of the following is an example of a compound?
a. NH_3 b. Na c. O_2 d. Ar

26. Given the following species, which is not the formula for an element?
a. CO b. C_{60} c. Ag d. C

27. Which material is a mixture?
a. magnesium b. water c. air d. methane

28. Which of the following statements best describes the electron?
a. It has a smaller mass than a proton and a negative charge
b. It has a greater mass than a proton and a negative charge

c. It has a smaller mass than a proton and a positive charge
d. It has a greater mass than a proton and a positive charge

29. How many electrons are present in a nitrogen atom?
a. 14.0067 b. 7 c. 14 d. 6

30. How many protons are there in a nucleus of an atom of beryllium?
a. 9 b. 2 c. 5 d. 4

31. What is the number of neutrons in the nucleus of the atom below?

$^{32}_{15}P$

a. 47 b. 17 c. 15 d. 32

32. What is the symbol for an atom containing 20 protons and 22 neutrons?

a. $^{40}_{20}Ca$ b. $^{40}_{22}Ti$ c. $^{42}_{20}Ca$ d. $^{42}_{22}Ti$

33. What is the total number of nucleons (protons and neutrons) in the atom below?

$^{79}_{34}Se$

a. 79 b. 34 c. 113 d. 45

34. All atoms of an element have the same
a. atomic mass b. number of neutrons c. atomic number d. number of nucleons

35. How many neutrons are in the nucleus of a chlorine–37 atom?
a. 37 b. 35 c. 20 d. 17

36. Atomic mass is measured in atomic mass units (amu) that are based on an atom of
a. ^{14}N equal to 14.000 amu b. ^{32}S equal to 32.000 amu c. ^{16}O equal to 16.000 amu
d. ^{12}C equal to 12.000 amu

37. What is the average atomic mass of element X if a sample is composed of 85.0 % ^{127}X, 12.0 % ^{130}X, and 3.00 % ^{128}X?
a. 127.4 amu b. 129.0 amu c. 127.0 amu d. 128.3 amu

38. When the following equation is balanced using the smallest whole numbers, what would be the coefficient of H_2?

$$H_2 + Fe_3O_4 \rightarrow Fe + H_2O$$

a. 1 b.2 c. 3 d. 4

39. When the following equation is balanced using the smallest whole numbers, what would be the coefficient of O_2?

$$NH_3 + O_2 \rightarrow HNO_3 + H_2O$$

a. 1 b. 2 c. 3 d. 4

40. When the following equation is balanced using the smallest whole numbers, what would be the coefficient of CO_2?

$$C_2H_6 + O_2 \rightarrow CO_2 + H_2O$$

a. 1 b. 2 c. 3 d. 4

41. When the following equation is balanced using the smallest whole numbers, what would be the coefficient of Al?

$$Al + O_2 \rightarrow Al_2O_3$$

a. 1 b. 2 c. 3 d. 4

42. When the following equation is balanced using the smallest whole numbers, what would be the coefficient of C_5H_{12}?

$$C_5H_{12} + O_2 \rightarrow CO_2 + H_2O$$

a. 1 b. 2 c. 4 d. 6

43. When the following equation is balanced using the smallest whole numbers, what would be the coefficient of NaCl?

$$FeCl_2 + Na_2CO_3 \rightarrow FeCO_3 + NaCl$$

a. 2 b. 3 c. 4 d. 6

44. What is the correct chemical formula for iron (III) oxide?
a. Fe_3O b. FeO_3 c. Fe_3O_2 d. Fe_2O_3

45. What is the formula for magnesium sulfide?
a. $MnSO_3$ b. $MgSO_3$ c. MnS d. MgS

46. What is the correct name for Na_2SO_4 ?
a. disodium sulfite b. sodium sulfur tetraoxide c. soldium sulfite d. sodium sulfate

47. Which formula correctly represents the compound calcium hydroxide?
a. $Ca(OH)_2$ b. Ca_2OH c. $CaOH_2$ d. CaOH

48. The correct formula for ammonium carbonate is_____.
a. NH_4CO_3 b. $(NH_4)_2(CO_3)_2$ c. $(NH_4)_2CO_3$ d. $NH_4(CO_3)_2$

49. The correct name for SO_3 is _____.
a. sulfur oxide b. sulfite c. sulfur trioxide d. sulfate

50. What is the name of the compound whose formula is H_2SO_4?
a. hydrosulfuric acid b. sulfurous acid c. sulfuric acid d. hydrosulfurous acid

END OF EXAM

Useful Information

SI Prefixes	Prefix	Symbol	Multiple	Prefix	Symbol
10^{+12}	tera	T	10^{-1}	deci	d
10^{+9}	giga	G	10^{-2}	centi	c
10^{+6}	mega	M	10^{-3}	milli	m
10^{+3}	kilo	k	10^{-6}	micro	μ
10^{+2}	hecto	h	10^{-9}	nano	n
10	deca	da	10^{-12}	pico	p

Length

1 m = 100 cm	m = meter
1 m = 1000 mm	mm = millimeter
1 m = 10^{+9} nm	nm = nanometer
1 km = 1000 m	km = kilometer
1 m = 39.37 in	in = inch
1 in = 2.54 cm	cm = centimeter
1 mi = 5280 ft	mi = mile
12 in = 1 ft	ft = foot

Volume

1 L = 1000mL	L = liter
1 L = 1.057 qt	qt = quart
1 mL = 1 cm^3	mL = milliliter
1 gal = 4 qt	cm^3 = cubic centimeter
	gal = gallon

Mass

1 kg = 1000 g	kg = kilogram
1 lb = 453.6 g	g = gram
1000 mg= 1 g	lb = pound
10^{+6} μg = 1 g	μg = microgram

Time

1 min = 60 sec	min = minute
1 h = 60 min	s= second
	h = hour

Energy

1 cal = 4.184 J	cal = calorie
1 kcal = 4.184 kJ	J = joule
1 kJ = 1000 J	kJ = kilojoule
1 kcal = 1000 cal	kcal = kilocalorie

Atomic Masses of the Elements

Element	symbol	Atomic number	Atomic mass
Aluminum	Al	13	26.98154
Americium	Am	95	243
Antimony	Sb	51	121.75
Argon	Ar	18	39.948
Arsenic	As	33	74.9216
Astatine	At	85	210
Barium	Ba	56	137.33
Berkelium	Bk	97	247
Beryllium	Be	4	9.01218
Bismuth	Bi	83	208.9804
Boron	B	5	10.81
Bromine	Br	35	79.904
Cadmium	Cd	48	112.41
Calcium	Ca	20	40.08
Carbon	C	6	12.011
Cesium	Cs	55	132.9054
Chlorine	Cl	17	35.453
Chromium	Cr	24	51.996
Cobalt	Co	27	58.9332
Copper	Cu	29	63.546
Fluorine	F	9	18.9984
Gold	Au	79	196.9665
Hafnium	Hf	72	178.49
Helium	He	2	4.0026
Hydrogen	H	1	1.0079
Iodine	I	53	126.9045
Iron	Fe	26	55.847
Krypton	Kr	36	83.8
Lead	Pb	82	207.2
Lithium	Li	3	6.941
Magnesium	Mg	12	24.305
Manganese	Mn	25	54.9380
Mercury	Hg	80	200.59
Neon	Ne	10	20.179
Nickel	Ni	28	58.70
Nitrogen	N	7	14.0067
Oxygen	O	8	15.9994
Phosphorus	P	15	30.97376
Scandium	Sc	21	44.9559
Silicon	Si	14	28.0855
Silver	Ag	47	107.868
Sodium	Na	11	22.98977
Strontium	Sr	38	87.62
Sulfur	S	16	32.06
Tin	Sn	50	118.69
Titanium	Ti	22	47.90
Tungsten	W	74	183.85
Uranium	U	92	238.029
Vanadium	V	23	50.9414
Xenon	Xe	54	131.30
Zinc	Zn	30	65.38

Answers

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