



SCIENCE OLYMPIAD
— AT THE —
UNIVERSITY OF FLORIDA

Northern Regional: January 19th, 2019

Potions and Poisons B Test

Name(s): _____

Team Name: _____

School Name: _____

Team Number: _____

Rank: _____

Score: _____

This exam consists of 4 sections, (1) multiple choice, (2) fill in the blank, (3) open written response, and (4) post-[lab questions. Take your time answering the questions, and please answer the written response questions as thoroughly and clearly as possible. You may NOT write on the test; however, you are allowed to write on the answer sheets as much as you please. If you need more paper, please ask a supervisor.

Multiple Choice Section:

1. Which of the following substances is vinegar? (2 points)
 - a. Acetic Acid
 - b. Hydrochloric Acid
 - c. Sulfuric Acid
 - d. Carboxylic Acid
2. What is the chemical name of rubbing alcohol (2 points)
 - a. Isomethanol
 - b. Isoethanol
 - c. Isopropanol
 - d. Isobutanol
3. Magnesium sulfate is also known as (2 points)
 - a. Acid
 - b. Epsom salt
 - c. Bleach
 - d. Rubbing alcohol
4. Vinegar is considered (2 points)
 - a. A solute
 - b. A solvent
 - c. A solution
 - d. A mixture
5. Lemonade is considered as (2 points)
 - a. A solute
 - b. A solvent
 - c. A solution
 - d. A mixture
6. CH_4 has which bond type? (2 points)
 - a. Ionic
 - b. Metallic
 - c. None of the above
 - d. Covalent
7. Rank the following intermolecular bonds from strongest to weakest (2 points)
 - a. Hydrogen bonding < Dipole-Dipole < Van der Waals
 - b. Van der Waals < Dipole-Dipole < Hydrogen bonding
 - c. Dipole-Dipole < Van der Waals < Hydrogen bonding
 - d. They all have the same strength

8. What type of gas must be used in gas chromatography? (2 points)
- Inert Gas
 - Oxygen gas
 - Hydrogen gas
 - Air
9. Which of the following poisons cause farm animal intoxication when coming into contact (2 points)
- Oak
 - Brown Recluse Spider
 - Wild Carrot
 - Poison Ivy
10. Which common household toxins causes nausea, thirst, lethargy, muscle weakness, cardiac arrhythmias, and heart palpitations? (2 points)
- Vinegar
 - Bleach
 - Hydrogen peroxide
 - Calcium and Iron supplements

Written Response Section:

11. Identify the following organism (2 points)



12. Identify the following organism (2 points)



13. Identify the following organism (2 points)



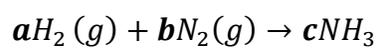
14. Identify the following organism (2 points)



15. Identify the following organism (2 points)



16. Balance the following equations by fill in the coefficients (3 points)

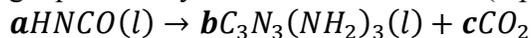


$a =$

$b =$

$c =$

17. Balance the following equations by fill in the coefficients (3 points)

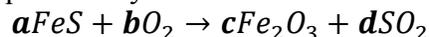


$a =$

$b =$

$c =$

18. Balance the following equations by fill in the coefficients (4 points)



$a =$

$b =$

$c =$

$d =$

For Question 19-22, choose from the following words bank to fill in the blank:

i. Physical

ii. Chemical

19. Rotting wood would be consider as _____ change (2 points)

20. Deforming a piece of plastic is consider as _____ change (2 points)

21. Nuclear fission reaction is consider as _____ change (2 points)

22. Magnetizing a non-ferrous metal is consider as _____ change (2 points)

Open Written Response Section:

23. When the Fukushima Daiichi plant was hit by an earthquake and tsunami combination, its defenses failed and resulted in nuclear fallout accident. Name one process that nuclear radiation can spread and contaminate the surrounding environment? (2 points)

24. Name three effects of arsenic poisoning on human health (2 points)

25. Name a symptom and a possible treatment for copper toxicity (2 points *)

26. Draw the electronegative trend of atoms onto the following periodic table (2 points)

1 H 1.008																	18 He 4.0026
3 Li 6.94	4 Be 9.0122											5 B 10.81	6 C 12.011	7 N 14.007	8 O 15.999	9 F 18.998	10 Ne 20.180
11 Na 22.990	12 Mg 24.305	3	4	5	6	7	8	9	10	11	12	13 Al 26.982	14 Si 28.085	15 P 30.974	16 S 32.06	17 Cl 35.45	18 Ar 39.948
19 K 39.098	20 Ca 40.078	21 Sc 44.956	22 Ti 47.867	23 V 50.942	24 Cr 51.996	25 Mn 54.938	26 Fe 55.845	27 Co 58.933	28 Ni 58.693	29 Cu 63.546	30 Zn 65.38	31 Ga 69.723	32 Ge 72.630	33 As 74.922	34 Se 78.97	35 Br 79.904	36 Kr 83.798
37 Rb 85.468	38 Sr 87.62	39 Y 88.906	40 Zr 91.224	41 Nb 92.906	42 Mo 95.95	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	57-71 *	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 207.2	83 Bi 208.98	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	89-103 #	104 Rf (261)	105 Db (268)	106 Sg (271)	107 Bh (270)	108 Hs (277)	109 Mt (276)	110 Ds (281)	111 Rg (280)	112 Cn (285)	113 Nh (286)	114 Fl (289)	115 Mc (289)	116 Lv (293)	117 Ts (294)	118 Og (294)
* Lanthanide series			57 La 138.91	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.05	71 Lu 174.97
# Actinide series			89 Ac (227)	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

27. A 20 mL solution in a beaker has in 15.5% concentration of salt. If one would desire a solution of 3% concentration of salt, how much water must be added? Show all your calculation (2 points)

28. Explain the difference between mixture and solution (2 points)

29. Explain the difference between an ionic and a covalent bond (2 points)

30. What is LD50? (2 points *)

Post-lab Section:

Pennies Experiment:

31. Describe the initial conditions of the given pennies (1 point)

32. Describe the condition of the penny after the finishing the reaction (1 point)

33. Is the reaction an example of chemical change or physical change? Explain. (2 points)

Salt Water Conductivity Experiment:

34. What happens to the light bulb when the 2 copper electrodes are in distilled water? (1 point)

35. What happens to the light bulb when the 2 copper electrodes are in salt water? (1 point)

36. Explain why pure water is not a good conductor? (1 point)

37. What is the role of salt in this experiment? (1 point)

* Tie-breaker

Pennies Experiment Instructions

1. Into a bowl, pour some vinegar and add some salt into it. Keep on stirring continuously until you see that the salt has completely dissolved.
2. Take a handful of copper pennies or coins and put them inside the bowl containing the salt and vinegar. Keep the pennies inside the bowl for about 5 minutes.
3. Now with the help of a spoon, carefully take half of the coins out of the bowl and place them over the piece of cloth.
4. After that get the other coins out of the bowl and try to rinse them thoroughly. Put them on a separate piece of cloth and not with the coins you brought out of the bowl earlier.
5. Leaving the two sets of coins for about 10 minutes. Record observation
6. Clean up station

Salt Water Experiment Instructions

1. With the help of a crocodile wire, connect the red terminal of the voltmeter with one of the two copper electrodes. In the same way, connect the black terminal (COM) of the voltmeter to the negative terminal of the battery with the second crocodile ended wire.
2. Now using the third wire with crocodile extremity, connect the positive terminal of the battery with the other copper plate. This completes the wire connection for the experiment.
3. After that, fill the glass with distilled water and then immerse the two copper electrodes in it without letting them come in contact with each other. Record observation
4. Remove the copper electrodes from the glass and add some salt in to the water. Stir thoroughly with the help of tea spoon to let the salt dissolved properly.
5. Now again immerse the copper electrodes in the salt solution. Record observation
6. Clean up station