

# Potions and Poisons B

Rank: \_\_\_\_\_

Points: \_\_\_\_\_

Science Olympiad North Regional  
Tournament at the University of Florida



Name(s): \_\_\_\_\_

Team Name: \_\_\_\_\_

School Name: \_\_\_\_\_

Team Number: \_\_\_\_\_

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 this test; however, you are allowed to write on the answer sheet as much as you please. Lined paper will be provided for written response questions and post-lab questions #31-32. If you need more paper, please ask a supervisor.

## Multiple Choice Section:

1. Why is hydrogen peroxide always found in a brown container? (3pt)
  - a. Brown is used as a warning that hydrogen peroxide cannot be consumed.
  - b. Hydrogen peroxide stains the bottle brown.
  - c. Hydrogen peroxide is photosensitive, so the dark color helps to block out the light.
  - d. The brown container helps to differentiate it between rubbing alcohol which is usually in a clear container.
  
2. Vinegar is the common name for what substance? (3pt)
  - a. Sulfuric acid
  - b. Acetic Acid
  - c. Acetone
  - d. Carbonic Acid
  
3. Smoking Jimson Weed is thought to help cure asthma. (2pt)
  - a. True
  - b. False
  
4. Side effects of Jimson Weed include all of the following EXCEPT: (3pt)
  - a. Difficulty urinating
  - b. Hallucinations
  - c. Increased eye pressure
  - d. Hypothermia
  
5. The telltale marking on a Brown Recluse Spider is shaped like a: (3pt)
  - a. Clover
  - b. Hammer
  - c. Violin
  - d. Hourglass
  
6. What is the decomposition reaction for hydrogen peroxide? (3pt)
  - a.  $2\text{H}_2\text{O}_2(\text{aq}) \rightarrow 2\text{H}_2\text{O}(\text{l}) + \text{O}_2(\text{g})$
  - b.  $\text{H}_2\text{O}_2(\text{aq}) \rightarrow \text{H}_2(\text{g}) + \text{O}_2(\text{g})$
  - c.  $\text{H}_2\text{O}(\text{l}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}_2(\text{aq})$
  - d.  $2\text{OH}^- \rightarrow \text{H}_2\text{O}_2(\text{aq})$
  
7. Poison Ivy and Poison Oak both contain what oil that irritates the skin? (3pt)
  - a. Ascorbic acid
  - b. Benzoyl peroxide
  - c. Urushiol
  - d. Zootoxins
  
8. Clothes are enough of a barrier to prevent a poison ivy rash. (2pt)
  - a. True
  - b. False

9. A person will know that they came in contact with poison ivy or poison oak because the rash will form immediately. (2pt)
- True
  - False
10. Which of the following is NOT an antiseptic? (3pt)
- Sodium hypochlorite
  - Hydrochloric acid
  - Hydrogen peroxide
  - Copper chloride
11. What kind of toxins are found in the Death Cap Mushroom? (3pt)
- Neurotoxins
  - Cytotoxins
  - Amatoxins
  - Cyanotoxins
12. The toxins from the Death Cap Mushroom inhibits the formation of proteins created in the: (3pt)
- i. Liver      ii. Bladder      iii. Kidney      iv. Stomach      v. Intestines
- i and ii
  - i and iii
  - ii and iv
  - iii and iv
13. The toxins from Question 11 have to be metabolized in order to actually be toxic. (2pt)
- True
  - False
14. Which of the following is known for their threat to dogs? (3pt)
- Brown recluse spider
  - Cane toad
  - Mayapple
  - Ongaonga

For Questions 26-27, use the following table.

1 1 H 1.008	2 He 4.0026											13 B 10.81	14 C 12.011	15 N 14.007	16 O 15.999	17 F 18.998	18 Ne 20.180
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 (265)	105 Db (268)	106 Sg (271)	107 Bh (277)	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)	

15. Electronegativity \_\_\_\_\_ from left to right, and \_\_\_\_\_ from top to bottom. (3pt)
- Increases; increases
  - Increases; decreases
  - Decreases; decreases
  - Decreases; increases
16. The atomic radius \_\_\_\_\_ from left to right, and \_\_\_\_\_ from top to bottom. (3pt)
- Increases; increases
  - Increases; decreases
  - Decreases; decreases
  - Decreases; increases
17. Balance the following equation:  $\_\_ \text{NaCl} + \_\_ \text{H}_2\text{SO}_4 \rightarrow \_\_ \text{Na}_2\text{SO}_4 + \_\_ \text{HCl}$  (3pt)
- 1; 2; 2; 1
  - 2; 1; 1; 2
  - 2; 1; 2; 1
  - 1; 2; 1; 2
18. While the main toxin in Mayapple, podophyllotoxin (PPT), is harmful when consumed in high dosages, it does possess an alternative health benefit. One of the main benefits of PPT is that it (3pt)
- Can be used as a moisturizer
  - Is used as an anesthetic
  - Helps to treat warts
  - Relieves pregnancy pains
19. The Pacific Newt is the common name for what genus of newts? (3pt)
- Cynops
  - Taricha
  - Lissotriton
  - Salamandra
20. A common Pacific Newt species, the Rough-Skinned Newt produces which toxin? (3pt)
- Anatoxin-a

- b. Citx
- c. TEA
- d. TTX

## Fill-in-the Blank Section (2pt each):

21. Epsom salt is the common name for \_\_\_\_\_.
22. When a person is deficient in iron, it is called \_\_\_\_\_.
23. The scientific name for Ongaonga is \_\_\_\_\_.

## Open Written Response Questions (5pt each)

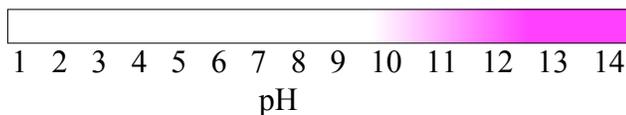
24. Draw 3 water molecules. Include and label all bonds and partial charges.
25. Explain the difference between ionic and covalent bonds, and give an example of each.
26. Taking a calcium supplement and an iron supplement at the same time is harmless, but is it effective? Explain.
27. The city of Flint, Michigan is currently struggling with high levels of lead in their drinking water. Why is this an issue, and what effects does lead have on the human body?

## Penny Lab post-lab portion:

28. What color is the penny to begin with? (1pt)
29. What color does the penny turn after sitting in the solution? (1pt)
30. What color is the penny after letting it rest for a few minutes? (1pt)
31. Which color change is an example of a physical change? Explain why. (5pt)
32. Which color change is an example of a chemical change? Explained why. (5pt)

## Calcium hydroxide post-lab portion:

33. What color is the solution after adding the indicator? (1pt)
34. What color is the solution after breathing into it? (1pt)
35. Based on the following graph, the solution went from \_\_\_\_ to \_\_\_\_\_. (3pt)
- a. Basic; acidic
  - b. Basic; more basic
  - c. Acidic; basic
  - d. Acidic; more acidic



Team Number: \_\_\_\_\_

1. \_\_\_\_\_

11. \_\_\_\_\_

2. \_\_\_\_\_

12. \_\_\_\_\_

3. \_\_\_\_\_

13. \_\_\_\_\_

4. \_\_\_\_\_

14. \_\_\_\_\_

5. \_\_\_\_\_

15. \_\_\_\_\_

6. \_\_\_\_\_

16. \_\_\_\_\_

7. \_\_\_\_\_

17. \_\_\_\_\_

8. \_\_\_\_\_

18. \_\_\_\_\_

9. \_\_\_\_\_

19. \_\_\_\_\_

10. \_\_\_\_\_

20. \_\_\_\_\_

21. \_\_\_\_\_

22. \_\_\_\_\_

23. \_\_\_\_\_

28. \_\_\_\_\_

29. \_\_\_\_\_

30. \_\_\_\_\_

33. \_\_\_\_\_

34. \_\_\_\_\_

35. \_\_\_\_\_

## **Penny Lab Instructions**

1. Pour 25mL of water to the beaker.

2. Add 10g of zinc sulfate and 10g of zinc pellets into beaker.
3. Using forceps, gently place the copper penny into the beaker.
4. Place beaker on a hot plate and bring to a low boil.
5. After the penny changes color (about 15 minutes), use plastic forceps to remove it from the beaker.
6. Rinse the penny in a beaker filled with water.
7. Carefully remove the beaker from the hot plate, and turn the hot plate off.
8. Place the penny on the hot plate and wait 2-3 minutes, or until the color changes again.
9. Clean up station.

## **Calcium hydroxide Instructions**

1. Pour 25mL of calcium hydroxide into an Erlenmeyer flask.
2. Add 5-10 drops of phenolphthalein indicator, and swirl the flask around to mix the solution.
3. Using the straw, breathe into the solution for 1-2 minutes or until the color changes (Caution: do NOT ingest the solution).
4. Safely dispose of solution.