Potions and Poisons B
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)
   a. True
   b. False

10. Which of the following is NOT an antiseptic? (3pt)
    a. Sodium hypochlorite
    b. Hydrochloric acid
    c. Hydrogen peroxide
    d. Copper chloride

11. What kind of toxins are found in the Death Cap Mushroom? (3pt)
    a. Neurotoxins
    b. Cytotoxins
    c. Amatoxins
    d. Cyanotoxins

12. The toxins from the Death Cap Mushroom inhibits the formation of proteins created in the: (3pt)
    a. i and ii
    b. i and iii
    c. ii and iv
    d. iii and iv

13. The toxins from Question 11 have to be metabolized in order to actually be toxic. (2pt)
    a. True
    b. False

14. Which of the following is known for their threat to dogs? (3pt)
    a. Brown recluse spider
    b. Cane toad
    c. Mayapple
    d. Ongaonga

For Questions 26-27, use the following table.
15. Electronegativity ____ from left to right, and ____ from top to bottom. (3pt)
a. Increases; increases  
b. Increases; decreases  
c. Decreases; decreases  
d. Decreases; increases

16. The atomic radius ____ from left to right, and ____ from top to bottom. (3pt)
a. Increases; increases  
b. Increases; decreases  
c. Decreases; decreases  
d. Decreases; increases

17. Balance the following equation: __NaCl + __H₂SO₄ ---> __Na₂SO₄ + __HCl (3pt)
a. 1; 2; 2; 1  
b. 2; 1; 1; 2  
c. 2; 1; 2; 1  
d. 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)
a. Can be used as a moisturizer  
b. Is used as an anesthetic  
c. Helps to treat warts  
d. Relieves pregnancy pains

19. The Pacific Newt is the common name for what genus of newts? (3pt)
a. Cynops  
b. Taricha  
c. Lissotriton  
d. Salamandra

20. A common Pacific Newt species, the Rough-Skinned Newt produces which toxin? (3pt)
a. Anatoxin-α
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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

Answer Sheet
1. __________
2. __________
3. __________
4. __________
5. __________
6. __________
7. __________
8. __________
9. __________
10. __________

11. __________
12. __________
13. __________
14. __________
15. __________
16. __________
17. __________
18. __________
19. __________
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.