

Potions and Poisons Test

Holt Division B Invitational 2018

Participant Names _____

School / Team Name _____

Team Number _____

Test Score _____

Lab Score _____

Total Score _____

Rank _____

1. _____ Covalent bonds are when:
- A. Electrons are exchanged between atoms
 - B. Electrons are shared between atoms
 - C. Atoms arrange in a regular crystal pattern
 - D. Protons are exchanged between atoms

Match the following compounds with the corresponding chemical bond type. Fill in the blank with either **Ionic** or **Covalent**

2. Salt (sodium chloride) _____

3. Sugar (glucose) _____

4. Ammonia _____

5. Calcium Bromide (CaBr) _____

6. _____ Which of the following is **NOT** a property of ionic bonds
- A. High melting points
 - B. Soluble in water
 - C. Brittle materials
 - D. Does not conduct electricity when dissolved

7. Fill in the following blank with the name of an example of a common household solution

8. _____ Your science olympiad friend dropped all their notes and need help putting their binder back together. Which of the following answers best / correctly describes chemical compounds?
- A. Share electrons between atoms
 - B. Are bonded together
 - C. Contain homogeneous mixtures
 - D. None of the above

For Questions 9 - 11 match the term with the correct definition by placing the corresponding letter in the space provided.

9. _____ Mixture

10. _____ Homogeneous

11. _____ Heterogeneous

- A. Having a uniform composition and appearance
- B. Having an irregular composition and appearance
- C. A combination of different substances that are bonded together
- D. A combination of different substances that are **not** bonded together

12. _____ This is a form of physical separation that uses a phase change (ex: boiling, melting) to separate out chemicals from each other.

- A. Filtering
- B. Chromatography
- C. Distillation
- D. Centrifugation

13. _____ Separating mixtures uses

- A. Only chemical changes
- B. Only physical changes
- C. Both types of changes
- D. Neither types of changes

For questions 14 -17, identify the following examples as either chemical or physical changes.

14. _____ Burning of paper

15. _____ Cutting cheese

16. _____ Melting of wax

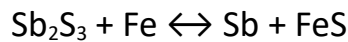
17. _____ Heating honey with water to convert it into a liquid

18. True or False _____ Physical changes can create new chemicals.

19. True or False _____ All chemical changes are irreversible.

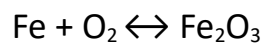
20. True or False _____ A canister full of compressed nitrogen gas cracks under pressure and explodes. It releases a rush of heat and motion as the gas expands outward. This is a physical change.

21. _____ Balance the following chemical equation



- A. $\text{Sb}_2\text{S}_3 + 3\text{Fe} \leftrightarrow 2\text{Sb} + 3\text{FeS}$
- B. $2\text{Sb}_2\text{S}_3 + \text{Fe} \leftrightarrow 2\text{Sb} + 2\text{FeS}$
- C. $2\text{Sb}_2\text{S}_3 + \text{Fe} \leftrightarrow 2\text{Sb} + \text{FeS}$
- D. It is already balanced

22. _____ Balance the following chemical equation



- A. $\text{Fe} + 3\text{O}_2 \leftrightarrow 3\text{Fe}_2\text{O}_3$
- B. $4\text{Fe} + 3\text{O}_2 \leftrightarrow 2\text{Fe}_2\text{O}_3$
- C. $2\text{Fe} + \text{O}_2 \leftrightarrow 4\text{Fe}_2\text{O}_3$
- D. It is already balanced

23. _____ In the space provided, identify the plant in the picture on the projector. (common name is acceptable)

24. _____ Using the images on the projector screen, identify the spider image that corresponds to a **Brown Recluse**

25. _____ What about Poison Oak causes rashes?

- A. Tiny bumps on the leaf itself rubs against and irritates the skin
- B. Releases an oil called urushiol
- C. Amatoxins that coat the surface of the leaf
- D. None of the above

26. _____ Your friend saw a Mayapple plant and decided to eat it. They began to feel a series of symptoms. Choose the best answer for some of the symptoms they would likely experience.

- A. Scratchy throat, severe coughing, dizziness, mood changes
- B. White spots around the mouth, jaundice, diarrhea, bowel pain
- C. Hallucinations, diaphoresis (more sweating), vomiting, dizziness
- D. Salivation, vomiting, diarrhea, excitement, coma

27. ____ Your cousin came into contact with *Rhinella marina*. What are some of the symptoms they would feel as a result?
- A. red and slimy gums, vomiting, disorientation, shivers and tremors
 - B. upper belly pain, nausea, vomiting, belching, indigestion,
 - C. hallucinations , itching and prickling of the skin, dizziness, vomiting
 - D. severe chills, dehydration, malaise, muscle pain
28. ____ Epsom salt is a common household item. What happens if you ingest too much?
- A. muscle paralysis, muscle weakness, severe drowsiness, sweating
 - B. fatigue, fever, rash, swollen glands, red and irritated skin
 - C. chills, dehydration, fever, loss of appetite, headache
 - D. vomiting, diarrhea, severe stomach pain, skin rash
29. ____ Ongaonga is a crazy weird plant that causes rashes, itching, paralysis, and pain. How does the plant hurt people?
- A. Toxins in its seeds
 - B. Poisonous spines
 - C. Oils on their leaves
 - D. None of the above
30. ____ A friend has a few mushrooms and says that he is going to add one to his soup. But you notice that one of is a dangerous Death Cap mushroom. Which of the following should your friend not eat?
- A. A large six inch across cap with a pale green white color
 - B. A thin tall spindly brown mushroom
 - C. A three inch tall red round mushroom with white spots
 - D. A yellow mushroom with cracks and ridges that is four inches across
31. ____ You are on a nature hike and run into another hiker who is picking flowers. Except they are not random wild flowers. They are holding two handfuls of wild poisonous Jimson weeds. What kinds of symptoms should they expect to receive over the next couple hours?
- A. Nasty rashes on their hands
 - B. Stomach cramps and diarrhea
 - C. Delirium and fever
 - D. None of the above
32. The Pacific Newt is found:
- A. On the island of New Zealand
 - B. Eastern swamps of Japan
 - C. Moist forests of California
 - D. Western Deserts of Mexico

For 33 - 42, Write the scientific name for each of the following organisms on the line provided.

33. _____ Poison Ivy

34. _____ Poison Oak

35. _____ Death-Cap Mushroom

36. _____ Jimson Weed

37. _____ Mayapple

38. _____ Ongaonga

39. _____ Cane Toad

40. _____ Pacific Newt

41. _____ Brown Recluse Spider

42. _____ Fat-Tail Scorpion

43. _____ What dangerous chemical is produced when ammonia is mixed with bleach?

- A. Strychnine
- B. Chlorine
- C. Cyanide
- D. Digitoxin

44. _____ What is the chemical symbol for hydrogen peroxide?

- A. H_2O_2
- B. HPO
- C. H_2OP
- D. H_2Po

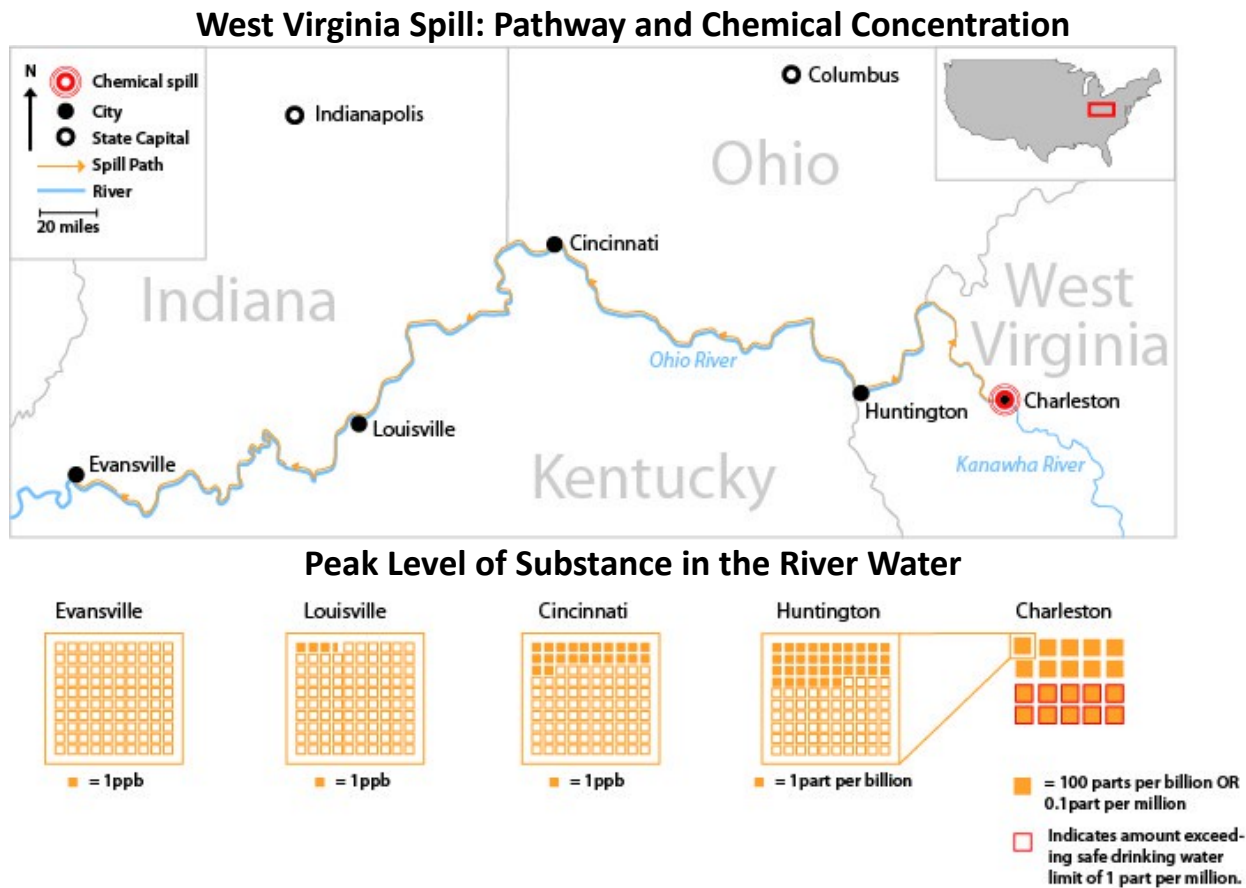
45. _____ Which of the following household chemicals is not only poisonous but also flammable?

- A. Hydrogen Peroxide
- B. Bleach
- C. Vinegar
- D. Rubbing Alcohol

46. _____ Which of the following chemicals is safe to consume?
- A. Rubbing Alcohol
 - B. Ammonia
 - C. Vinegar
 - D. None of the above
47. _____ Which of the following solutions is more concentrated?
- A. One liter solution that is strong enough to hurt 100 people
 - B. One milliliter solution that is strong enough to hurt 10 people
48. _____ The most common source for arsenic poisoning is
- A. Fertilizer on vegetables
 - B. Gases seeping up from the earth
 - C. Naturally contaminated drinking water
 - D. Chemical run-off from power plants
49. _____ Ingesting lead can cause all sorts of bad illnesses. Seriously, don't eat it. Which of the following is true about lead?
- A. It is found in the earth and water
 - B. It is used in pencils
 - C. It is produced by germs
 - D. It is unstable and causes cancer
50. You currently have 100% Rubbing Alcohol, but you want a solution that contains 18% Rubbing alcohol. You need the final volume to be 100 mL of solution. How much water do you need to use in order to meet this criteria? Show your work and include units.

Answer _____

Use the following figure to determine the answers to questions 51 - 53. The paint company Plasma Paints was transporting their ingredients from West Virginia to Indiana. However, an accident occurred, spilling hundreds of millions of gallons along the Kanawha and Ohio Rivers.

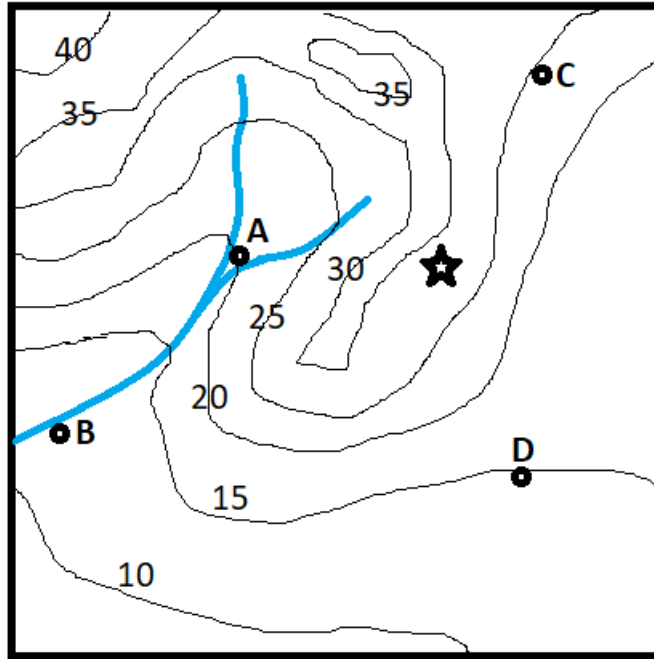


51. _____ Given the information in the above graphic, where was the original spill located?

52. _____ Plasma Paints is hiding something. They mentioned that a substance used in their paints had spilled in the river, but they never mentioned that it was extremely harmful and poisonous. What *heavy metal* is commonly known to be inside paint products? Include the **name** of the metal, and the **chemical symbol**?

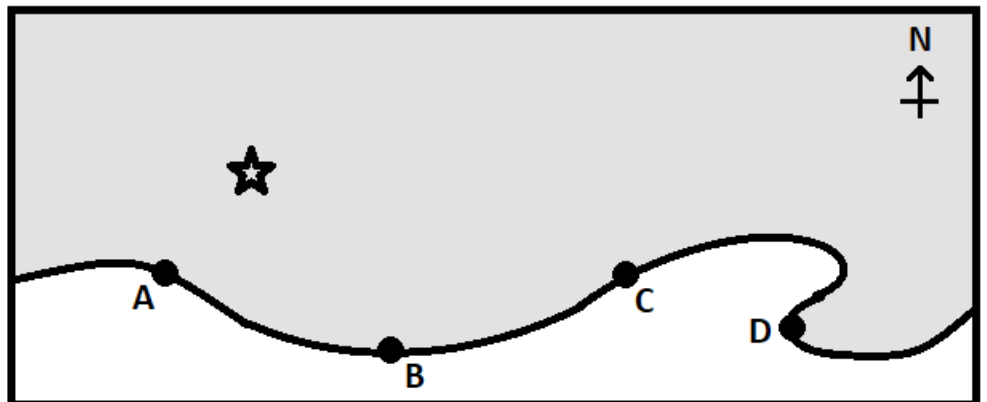
53. _____ The harmful substance traveled around 800 kilometers in 26 hours. Given this information, calculate the speed the substance traveled in **meters per second** (To the nearest tenth). Show your work and include units in your answer.

54. _____ Using the Contour Map below, determine the correct answer. A *water-soluble* hazardous chemical was spilled at the site marked with the star below. There is a Y-shaped river shown, as well as a series of contour lines that mark different elevations above sea level in meters. There are four sites lettered A,B,C,D and are marked on the map below with black circles. The people at those sites are concerned about their drinking water. **Given what you know about the movement of chemical spills, which site should expect to be impacted first and the most severely?**



Use the figure below to answer the last two questions about the movement of chemical spills through the environment. The map shows a coastline, with the sea being depicted with a light gray. There are four cities that dot the coast line, lettered A,B,C,D, and their position is shown with black circles. An oil spill occurred at the position in the sea marked with the star.

55. _____ In this first scenario, there is no wind nor current. If the oil spill originates at the star, which city will first be impacted by the spreading of the oil?



56. _____ In this second scenario, there is a weak wind blowing from the North, but there is a strong coastal surface current that moves toward the East. Which city will the oil spill come into contact with first. (Assume that the spill does not significantly spread in size).