

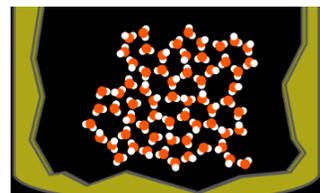
**Exam 1**  
**Science 265**

Name: \_\_\_\_\_ Group: \_\_\_\_\_

1. If an object carries a net electrical charge, it will
  - A. repel all other objects
  - B. repel objects with a like charge**
  - C. repel objects with the opposite charge
  - D. repel all plastic objects
  
2. If an object carries a net electrical charge, it will attract bits of paper
  - A. if it has either type of charge**
  - B. only if it has a positive charge
  - C. only if it has a negative charge
  
3. An item with a negative charge
  - A. gained protons
  - B. lost electrons
  - C. lost protons
  - D. gained electrons**
  
4. All magnets
  - A. have a net electrical charge
  - B. are attracted to all metals
  - C. both A and B
  - D. neither A or B**
  
5. A person has a magnet and they cut the North end off and throw it away. Now they are left with a
  - A. South pole
  - B. North pole
  - C. North and a South pole**
  - D. It is no longer a magnet
  
6. In lab, magnets *strongly* attracted
  - A. A nail and paperclip**
  - B. A nail, paperclip and aluminum rod
  - C. plastic pipe, clear plastic and glass test tube
  - D. A and C
  - E. B and C
  
7. What is in the bubbles of boiling water?
  - A. Air
  - B. Hydrogen Gas and Oxygen Gas
  - C. Empty Space
  - D. Water vapor**

8. When substances go from liquid to solid,
- A. all substances take up less space for the same amount of material
  - B. all substances expand
  - C. all contract except water which expands**
  - D. some expand and some contract

9. The diagram to the right is showing a substance in
- A. gas state
  - B. liquid form
  - C. solid form**
  - D. Not enough information



10. What are the conditions that allow molecules to stop moving completely?
- A. When the substance is in solid form.
  - B. When the substance is at absolute zero, 0K.**
  - C. When the substance is at 0°C
  - D. When something is completely frozen

11. See your copy of the exam for questions 11 – 30.

**Version A Key**

11. C	12. C	13. C	14. A	15. B	16. B
17. B	18. C	19. D	20. A	21. C	22. C
23. B	24. C	25. B	26. C	27. E	28. D
29. B	30. C				

**Version B Key**

11. B	12. B	13. B	14. A	15. D	16. D
17. B	18. A	19. E	20. C	21. B	22. B
23. C	24. A	25. C	26. B	27. D	28. A
29. D	30. D				

31. (6 pts) Name three chemical features that affect the properties of polymers.

- Material used to make the polymer 2 pts
- Shape of polymer chain 2 pts
- Proportions of ingredients used to make the polymer 2 pts

32. (6 pts) Here is a recycling symbol that is different from the standard ones used on plastic containers. If printed in color, this symbol is green. What can you take away from this symbol?

- It is made of a polymer call "PLA" 2 pts
- It is made using corn as one of the starting material 2 pts
- It is "green" – environmental friendly 2 pts
- It can be recycled



Three out of four, 2 pts each.

33. (6 pts) A. Describe the properties of plastics that **both** make them desirable and present a challenge for their disposal at the same time.

**Plastics are durable and they won't easily decay, dissolve, or break apart.** (2 pts)

**They are inert and don't react with too many things.** (2 pts)

- B. Offer two potential ways to address these challenges.

Recycle and use them to make other useful products

Make plastics using compostable and biodegradable materials

Use less

Work to create polymers made out of materials with more end of life options

34. (7 pts) Susan sucks air out of a bottle during lab.

- A. Her bottle has a mass of 80.14 g before she removes some air and then a mass of 79.94 g after. She then allows water to fill the empty space in the bottle. She finds that she has 230 ml of water. Determine the density of air from this data.

Mass of air removed =  $80.14 \text{ g} - 79.94 \text{ g} = 0.20 \text{ g}$  1 pt

Volume of air removed = volume of water = 230 mL 1 pt

$$\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{0.20 \text{ g}}{230 \text{ mL}} = 0.00087 \text{ g/mL} \quad \text{or } 8.7 \times 10^{-4} \text{ g/mL}$$

density formula 1 pt                      Calculation 1 pt                      Unit 1 pt

- B. Why does the volume of water get used for volume of air in the above calculation?

When air is sucked out of the bottle, the pressure of the air inside the bottle becomes lower compared to the outside pressure. When the clamp is open, water will be pushed into the bottle by the pressure difference until the pressure inside the bottle is the same as the outside pressure. **The volume of water it takes will be equal to the volume of air sucked out of the bottle because it is filling the "empty space" that was left behind.** 2 pts

35. (5 pts *Extra Credit*) Describe the behavior of a substance that has a temperature of  $-20\text{K}$ ? Explain why?

The lowest temperature possible is 0 K.  $-20 \text{ K}$  is impossible. 1 pts

When the temperature is at 0 K, the motion of the molecule/atom of the substance stop completely. 3 pts

No more energy can be removed from the substance to cool it down further. Or having molecules move less than not moving, makes no sense. 1 pts

36. (extra credit) When a few drops of iodine is added to a piece of potato, the potato turned dark blue. A few drops of orange juice made the dark blue color disappear. Since the color change is reversible, the change must be a physical change. **True or False?** Justify your answer.

False 1 pt

When starch in the potato combined with  $\text{I}_2$  (iodine), it forms a starch –  $\text{I}_2$  complex which has a dark blue/black color. It is a new substance, therefore a chemical change. 2 pts

When a few drops of orange juice is added to the dark spot on the potato, the color disappeared after a few seconds. This is due to the chemical reaction between vitamin C and  $I_2$ , breaking apart the starch –  $I_2$  complex. So it is also a chemical change. 2 pts

“Since the color of the potato after adding iodine is a new color (dark blue) that neither the potato or the iodine showed before they were combined, then it has to be a chemical change, not a physical change.”