Review Packet Answer Key

Physical Behavior of Matter (Topic 4 in your review book)

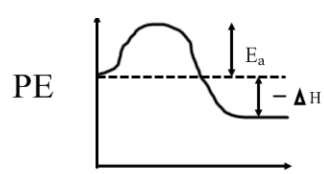
Matter

1. 3
2. 2
3. 3
4. 1
5. 4
6. 3
7. 1
8. 3
9. 2
10. 3
11. 1
12. 4
13. 3
14. 4

15. density of neon gas = 0.827 grams/Liter
16. one physical property is the melting of the wax
17. one indication of chemical change is the statement "the candle burns"… burning (combustion) is always a chemical change
18. for the solid diagram, show all the particles touching and with a regular pattern to their arrangement, for the liquid, still show all the particles touching, but do not show them having a regular arrangement
19. Sample 3
20. Two molecules can be made, leaving one particle of "y" and 4 particles of "z" left over.
21. This symbol does not represent a compound because only one type of element is shown.

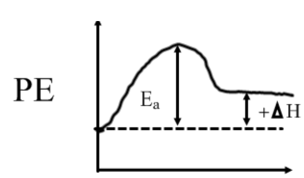
Heat and Temperature

1. 2
2. 1
3. 3
4. 4
5. 2
6. The diagram should look like



7. According to the chemical equation, reacting 1 mole of propane (C_3H_8) releases 2219.2 kJ , so 2.5 moles x 2219.2 kJ = **5548.0 kJ**

8. The diagram should look like



9. Use the $q = mc\Delta T$ equation (Table T)

   $q = (5.00\ g)\ (4.71\ J/g\ ^oC)\ (30\ ^oC)$

   q = 707 J

10. average **KE = remains the same** since Temperature is not changing along BC.
    PE = increasing as the sample vaporizes

11. Use the $q = mH_v$ equation from Table T q = 5.00 g

    (1370 J/g)

    q = 6850 J

12. The entire sample of NaCl is in the liquid phase along segment CD, where the temperature changes from 801 to 1465^0C, so the range over which the entire sample is in the liquid phase is (1465-801) = **664^oC**

13. The average KE is changing anywhere where the temperature is changing, so correct answers are **segments AB or CD**

14. The segment where NaCl is in one phase and able to conduct electricity would be where it is all and only in the liquid phase (it then has mobile ions capable of conducting electricity). So the **segment CD** applies.

15. Use the $q = mc\Box\Delta T$ equation from Table T

    Obtain the specific heat of water value from Table B, and the change in temperature value from the paragraph above the picture (22^oC to 57^oC)

    $q = (100.0\ g)\ (4.18\ J/g\ ^oC)\ (35^oC)$
    q = 14630 J

16. Percent error = (30.2 – 25.9/30.2) x 100% = **14.2%**

17. The boiling point is **120^oC.**

18. During the first minute of heating the sample is in the solid phase, so draw the particles touching each other and arranged in a definite pattern.

19. The substance is in the liquid phase only from 4 minutes to 7, so the answer is **3 minutes**.

20. Heat is being added at a constant rate of 15kJ per minute according to the paragraph above the graph, and the substance takes from 2 minutes to 4 minutes to melt, so the heat needed to melt is 15 x 2 = **30 kJ**

Phases & Gases

1. 3
2. 3
3. 2
4. 2
5. 1
6. 4
7. 4
8. 3
9. 2

10. Neon has an atomic mass of 20.1 so one mole is equal to 20.1 grams.

    Density = m/V = 20.1 g/ 24.4 L = **0.824 g/L**

11. The boiling point is **120^{o}C.**

12. The particles should all be shown touching each other, and should be arranged geometrically, or
    with a specific pattern shown.

13. The sample becomes completely melted at 4 minutes,and then warms up and starts to vaporize at 7
    minutes. So it is in the liquid ONLY phase from 4 to 7 minutes, a total of **3 minutes**.

14. The paragraph above the graph states that heat is added at "a constant rate of 15 kJ per minute." The sample takes from 2 minutes to 4 minutes to melt at its melting point (70^{o}C). SO multiply 15 x
    2 = **30 kJ**

15. The initial volume of the cylinder is 125 mL, which is equivalent to **0.125 Liters**

    $$125 \text{ mL} \times \frac{1.0 \text{ Liter}}{1000 \text{ mL}} = 0.125 \text{ Liters}$$

16. Use the combined gas law:

    $$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

** Since Temp remains the same, you may drop "T_1" and "T_2" out of the

equation: (1.0 atm) (125 mL) = (1.5 atm) V_2

V_2 = 83 mL

17. This is a way of asking Avogadro's hypothesis. For gases, there is a predictable relationship between the V, T, P and number of molecules for the sample. If two gas samples have the same P, T, and V values, they must **contain the same number of molecules.**