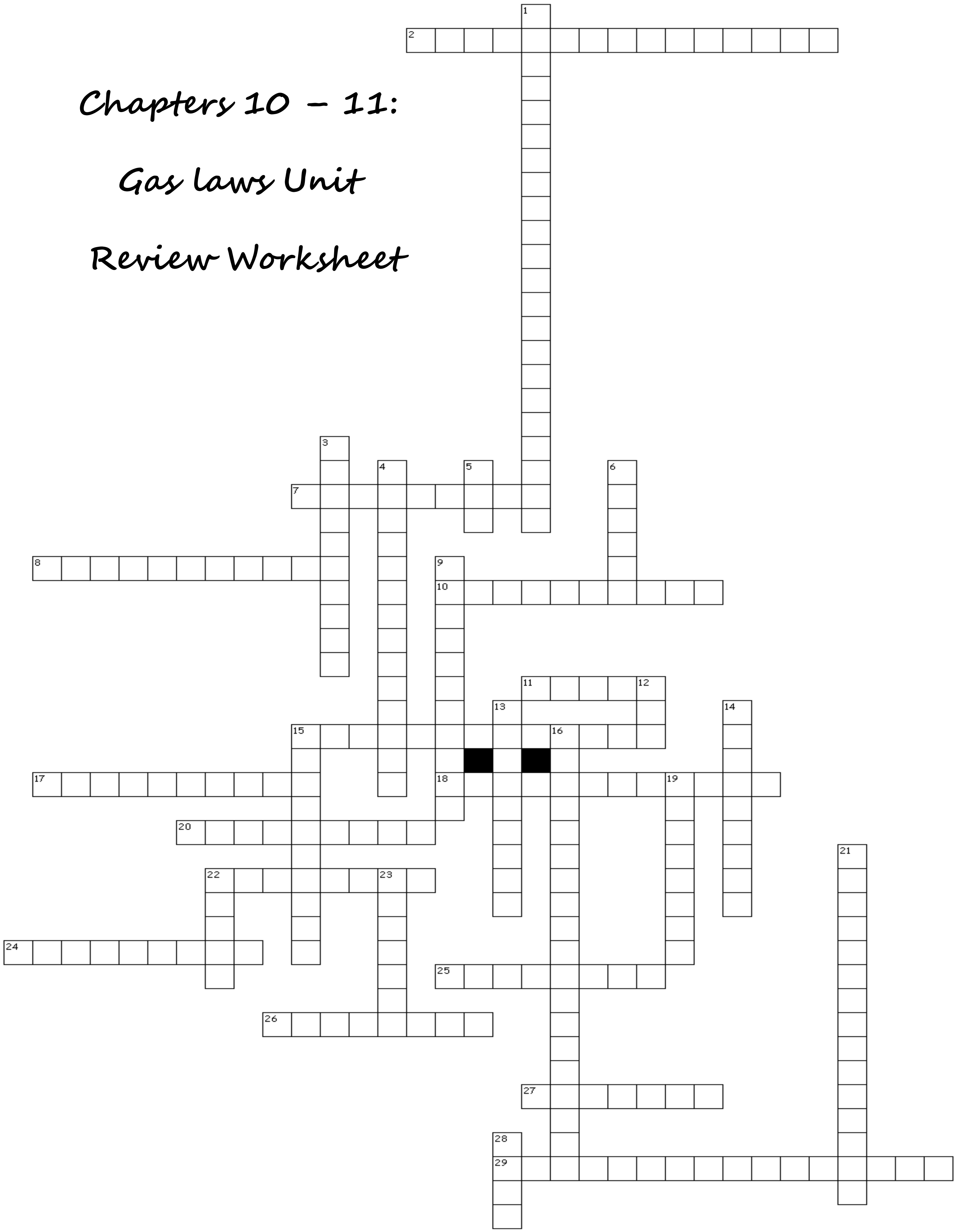
Name ________________________ Date ____________ Mod ______ Exam Date ___________

Chapters 10 – 11: Gas laws Unit Review Worksheet



A. Complete the crossword puzzle using the following clues.

Across

2. the pressure of each gas in a mixture
7. a device used to measure atmospheric pressure
8. a measure of the average kinetic energy of all the particles in an object
10. the law that states that the total pressure of a mixture of gases is equal to the sum of the partial pressures of the component gases
11. the value of the standard molar volume
15. the law that states that the pressure of a fixed mass of gas at constant volume varies directly with the Kelvin temperature
17. due to the fact that the particles of a gas are very spread out in comparison to their size and therefore create a lot of empty space between the particles, gases have a ______
18. the law that states that equal volumes of gases at the same temperature and pressure contain equal numbers of molecules
20. spontaneous mixing from high to low concentration of the particles of two substances caused by their random motion
22. the force per unit area on a surface
24. the law that states that the volume of a fixed mass of gas varies inversely with pressure at constant temperature
25. an imaginary gas that perfectly fits all the assumptions of the kinetic-molecular theory but is not how gases actually exist
26. a process by which gas particles pass through a tiny opening
27. a collision between gas particles and between gas particles and container walls in which there is no net loss of kinetic energy; real gases do not have these kinds of collisions
29. the constant, R, used in the ideal gas law

Down

1. a theory based on the idea that particles of matter are always in motion, having both kinetic and potential energy
3. the law that states that the volume of a fixed mass of gas at constant pressure varies directly with the Kelvin temperature
4. the law that expresses the relationship between pressure, volume, and temperature of a fixed amount of gas
5. 0°C (273 K) and 1 atm (101.3 kPa)
6. substances whose particles can easily slide past one another and therefore can flow; a liquid or a gas
9. the mathematical relationship of pressure, volume, temperature, and the number of moles of a gas
12. real gases deviate most from ideal behavior at _____ temperature
13. a device used to measure the pressure of an enclosed gas sample
14. the physical property of gases explained by the fact that they do not have a definite shape and can completely fill any container in which they are enclosed
15. his law of combining volumes of gases states that at constant temperature and pressure, the volumes of gaseous reactants and products can be expressed as ratios of small whole numbers
16. the volume occupied by one mole of a gas at STP
19. gases have enough kinetic energy to completely _____ from one another
21. the physical property of gases explained by the fact that they do not have a definite shape and their volume can be greatly decreased as a result
22. real gases deviate most from ideal behavior when they are ____ covalent molecules
23. a gas that does not behave completely according to the assumptions of the kinetic-molecular theory and is how a gas actually exists
28. real gases deviate most from ideal behavior at _____ pressure

B. List the equivalent values of pressure.

____________________ ____________________ ____________________

____________________ ____________________

C. List the 5 assumptions of the kinetic-molecular theory.

1. ____
2. ____
3. ____
4. ____
5. ____

D. List the 6 physical properties of gases.

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________
5. ______________________________
6. ______________________________

E. Practice problems. Be sure to show all of your work! Check units, labels, and sigfigs!

1. If 4.51 L of gas are collected at a pressure of 92.4 kPa, what volume will the same gas occupy at standard pressure, assuming the temperature remains the same?

2. A gas is collected over water and occupies a volume of 966 mL at 55.0°C. The total pressure is 110.0 kPa. What is the pressure of the gas itself?

3. A helium filled balloon has a volume of 4.30 mL at 26.0°C and 900.5 torr, what is its volume at STP?

4. A gas occupies a volume of 70.0 mL at 43.0°C. What volume will the same gas occupy at standard temperature if the pressure remains constant?

5. If a sample of gas occupies 5.40 L at 21.0°C and 99.0 kPa, what volume will the same gas occupy at STP?

6. A tank for compressed gas has a maximum safe pressure limit of 875 kPa. The pressure gauge reads 288 kPa when the temperature is 67.0°C. What is the highest temperature the tank can withstand safely?

7. Maintaining constant pressure, the volume of a gas is increased from 25.0 L to 50.0 L by heating it. If the original temperature was 45.0°C, what is the new temperature?

8. If the gas pressure in an aerosol can is 161.5 kPa at 25.0°C, what is the pressure inside the can if it is heated to 350.°C?

9. A chemist collected 65.1 mL of a gas in an open manometer. The next day, the chemist noted that the volume had changed to 62.9 mL and the barometer reading was 104.4 kPa. The temperature had not changed. What had been the barometer reading on the previous day when the gas was collected?

10. Find the number of moles of an ideal gas contained in a 7.50 L tank at 7.0°C and 89.5 kPa.

11. What volume is occupied by 0.685 mol of gas at 0.789 atm and 95.0°C?

12. A chemist collects 432 mL of gas over water at 80.0°C and 565.0 kPa. What is the pressure exerted by the gas itself?

F. Identify the gas law used to solve each of the problems in Section E.

References

Temperature (°C)	Pressure (mm Hg/torr)	Pressure (kPa)
23.0	21.7	2.81
23.5	21.7	2.90
24.0	22.4	2.98
24.5	23.1	3.10
25.0	23.8	3.17
26.0	25.2	3.36
27.0	26.7	3.57
28.0	28.3	3.78
29.0	30.0	4.01
30.0	31.8	4.25
35.0	42.2	5.63
40.0	55.3	7.38
50.0	92.5	12.34
60.0	149.4	19.93
70.0	233.7	31.18
80.0	355.1	47.37
90.0	525.8	70.12
95.0	633.9	84.53
100.0	760.0	101.32

$$R = 8.314\ \frac{L \cdot kPa}{mol \cdot K} \qquad R = 0.0821\ \frac{L \cdot atm}{mol \cdot K}$$