

- 1) What is the expression for force?
- 2) What is the expression for pressure?
- 3) Complete the following pressure conversions:
 - a) 76 mmHg to atmospheres
 - b) 3.00 atm to kilopascals
 - c) 825 torr to millimeters of mercury
 - d) 380 mmHg to kilopascals
- 4) According to KMT, do intermolecular forces exist between gases?
- 5) Describe the motion of gas particles.
- 6) What term indicates that no energy is lost in a collision?
- 7) Molecules of $N_2(g)$ and $CO_2(g)$ are trapped in a flask at $25^\circ C$. What do you know about the kinetic energies of these two gases?
- 8) Gas particles spread out in random directions until they achieve an _____.
- 9) Kinetic energy is equal to _____.
- 10) What are the two defining points on the Celsius temperature scale?
- 11) Convert the following temperatures:
 - a) $150^\circ C$ is how many Kelvins?
 - b) 573K is what Celsius temperature?
 - c) -200 degrees Celsius are how many Kelvins?
 - d) Express the number of degrees Celsius in 173K.
- 12) If a gas is cooled by $75.5^\circ C$, how many Kelvins have been lost?
- 13) Temperature calculations must be done using the _____ scale because it begins where there is _____ kinetic energy.
- 14) Increasing temperature results in a(n) _____ in volume.
- 15) Decreasing volume results in a(n) _____ in pressure.
- 16) Decreasing temperature results in a(n) _____ in pressure.
- 17) A gas sample is filling a 4.00 L container at 2.00 atm pressure would have what pressure when transferred to a 1.00 L container at constant temperature?
- 18) Under what set of conditions might the pressure of a gas be decreased when heated?
- 19) Determine the pressure of a gas sample that is heated from $0^\circ C$ at 55 kPa to $50^\circ C$ in a rigid gas tank.
- 20) A certain gas at STP occupies a 500 mL balloon. If the balloon is placed in a pressurized chamber at 5.00 atm at 373K, what will the new volume of the balloon be?
- 21) The substance that is being dissolved is called the _____.
- 22) The substance that surrounds the solute is called the _____.
- 23) Oil and water make a solution. True or False?
- 24) In terms of molecular motion, what do solvents dissolve solutes?
- 25) Would a solution form at zero Kelvin?
- 26) Dissolving happens because of the _____ of the solvent molecules.
- 27) High pressure above a liquid solvent causes more/less of the solute to dissolve.
- 28) How does temperature affect the dissolving process for solid and gaseous solutes?
- 29) What could you do to speed up the dissolving process for an antacid tablet?
- 30) Concentration of a solution tells you how much _____ the solution contains.
- 31) The most common concentration scale used in chemistry is _____.
- 32) 10 grams of table salt (NaCl) is dissolved in 500 mL of water. Find the:
 - a) # of grams per liter
 - b) molarity
 - c) percent by mass
 - d) parts per million

33) Complete the table below:

Solution substances	solute mass	solute moles	solvent mass	solution mass	solution volume	percent by mass	molarity
50g NaCl in 250 g H ₂ O				300 g			
44g CO ₂ in 500 mL H ₂ O			500 g				
NO in H ₂ O	90 g				810 mL		
KF in H ₂ O					2.0L		2.50 M
3% H ₂ O ₂ (aq)				100 g			
HCl (aq)						10% HCl	

34) A piece of metal at 250°C is placed in 20°C water. In which direction will the heat flow?

35) Gas in a flask is held at a constant temperature of 25°C. Would you describe this system as having heat?

36) A rock that has been heated to 100°C is placed in a container of ethanol at 0°C to cool. The ethanol heats up to 20°C in this process. What is the final temperature of the rock?

37) In a cold pack, chemicals combine and absorb energy which feels cold to the touch. This process would be described as _____.

38) Complete the table below:

Process	Energy Flow	Thermal Description	It Feels...
melting (s → l)	surroundings to substance	endothermic	cold
freezing (l → s)			
sublimation (s → g)			
deposition (g → s)			
vaporization (l → g)			
condensation (g → l)			

39) Determine the specific heat of a metal if 100g of metal cooling 50°C gives off 500 J of heat.

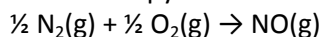
40) How much energy is gained when 200 g of a liquid sample is heated from 15°C to 40°C if the liquid has a specific heat of 2.00 J/g°C?

41) What is the final temperature of a 10 g sample of water that begins at a temperature of 60°C if it absorbs 418 J of heat?

42) Calculate the energy required to heat a 100 g water sample from 70°C to 120°C.

$$(\Delta H_{\text{fus}} = 334\text{J/g}, \Delta H_{\text{vap}} = 2260\text{ J/g}, s_{\text{ice}} = 2.06\text{ J/g}^\circ\text{C}, s_{\text{water}} = 4.18\text{ J/g}^\circ\text{C}, s_{\text{steam}} = 2.02\text{ J/g}^\circ\text{C})$$

43) The standard enthalpy of formation of nitrogen monoxide gas (NO) is +90 kJ/mol according to this reaction:



If 270 kJ are absorbed as NO is formed, how many moles of NO are produced?