

The test will mainly focus on material in Chapters 4-6, including the last sections of chapter 3 (determining polarity of bonds and of molecules after successfully drawing the Lewis structures. Study your lecture notes, and homework assignments. Expect to solve problems. Test yourselves by doing problems similar to the homework under time constraints. MAKE SURE YOU BRING SCANTRONS. You will be responsible for pages 97-171 of the text.

The following sample questions are meant to get you started in review and to touch on topics covered in these chapters. The actual exam will most likely be multiple choice.

TRUE OR FALSE: (IF THE STATEMENT IS FALSE, WRITE DOWN THE TRUE STATEMENT)

Chapter 3:

- 1) The H-C-H angle in methane, CH₄ is 90°.
- 2) The molecule NO₂ has 17 valence electrons and does not follow the octet rule.
- 3) The molecule hydrogen sulfide, H₂S, is a linear molecule.
- 4) The molecule CH₂O is a polar molecule.
- 5) CO₂ is a nonpolar molecule even if it contains polar bonds.

Chapter 4:

- 1) Chapter 4: After balancing the equation A: Fe + O₂ → Fe₂O₃, the coefficient of O₂ is 2.
- 2) The number of oxygen atoms in the formula: Al(C₂H₃O₂)₃ is 5.
- 3) Less than 30 grams of acetylene, C₂H₂ (26.0g/mol)+ H₂ can be produced from 64 grams of methane (16.0g/mol).
- 4) In the reaction: CO + O₂ → CO₂, 10 moles of CO₂ are formed from 5 moles of CO.
- 5) The burning of paper is exothermic because a flame is needed to start the reaction.
- 6) In the reaction of H₂ + O₂ → H₂O, an increase in activation energy will not lead to an increased rate of reaction.
- 7) According to Le Chatelier's Principle, adding heat to the system represented by the reactants and products in the following equilibrium, H₂ + Cl₂ <=> 2HCl + heat, produces more HCl.
- 8) The formula weight of Al(NO₃)₃ is 213 amu.
- 9) The number of moles of CaCO₃ in 250 g CaCO₃ is 5.0 moles.
- 10) The minimum energy required to get a chemical reaction going is called a catalyst.
- 11) The heat absorbed or released during a chemical reaction is called enthalpy.
- 12) If 2.5 moles of H₂ are added to 2.1 moles of CO to form CH₃CH₂OH, the limiting reagent is H₂.
- 13) A catalyst is formed during the transition from reactant to product.
- 14) A catalyst can alter the enthalpy ΔH of a reaction.
- 15) An example of an endothermic process is the boiling of H₂O at 100°C.
- 16) A factor for increasing the rate of a reaction is an increase in concentration of the reactants.

Chapter 5

- 1) In the reaction 2 SO₂ + O₂ → 2 SO₃, the SO₂ is oxidized.
- 2) In the reaction: CH₄ + 2 O₂ → CO₂ + 2 H₂O, methane is an oxidizing agent.
- 3) In the reaction: Hg₂Cl₂ → Hg + HgCl₂, mercury is both oxidized and reduced.
- 4) KMnO₄ is a common oxidizing agent while H₂ is a common reducing agent.
- 5) In photosynthesis: 6 CO₂ + 6 H₂O → C₆H₁₂O₆ + 6 O₂, CO₂ is oxidized.
- 6) Living cells obtain energy by reducing carbohydrates.
- 7) Oxidation and reduction always occur together.
- 8) An example of oxidation is: iron rusting.
- 9) The oxidation number of sulfur in Al₂(SO₄)₃ is -2.

Chapter 6

- 1) Temperature is the same as heat,
- 2) Newtons is used to measure pressure.
- 3) STP means 0°C and 1 atm.
- 4) If a bubble released by a deep sea diver at a depth of 21 m triples in volume by the time it reaches the surface where the pressure is at 760 Torr, then the pressure at the level of the diver is 2000 Torr.
- 5) If the pressure on 10.0 L of gas is changed from 0.75 atm to 2.5 atm, with the temperature constant, its new volume will be 2.5L.
- 6) A gas occupies 400 cm^3 at 0°C , what volume will it occupy at 273°C if the pressure remains constant? 400 cm^3 .
- 7) If you raise the temperature of a gas in a container of fixed volume, the molecules will strike the walls harder but less frequently.
- 8) As an automobile tire becomes hotter, it shrinks because the rubber contracts.
- 9) A 1.00 L tank can explode if the pressure exceeds 12.5 atm. At 25°C the gas inside is at a pressure of 2.07 atm. At 1527°C , the tank is expected to explode.
- 10) At STP, the approximate density of nitrogen gas (N_2) is 1.25 g/cm^3 .