

Chem 241-2017 Exam 2 Topics and sample general question topics.

Topic	MindTap Section and Sample Question Topic
Acid-Base Properties of Oxides	Section 22.2a <ul style="list-style-type: none"> <li>- Is MgO acidic or basic in aqueous solution? <math>P_2O_5</math>?</li> <li>- Compare the acid-base behavior of <math>Na_2O</math> and <math>SO_3</math>. Why is one more acidic or basic than the other?</li> </ul>
Global Warming	Section 22.3d <ul style="list-style-type: none"> <li>- Is the greenhouse effect good for life on Earth, or bad?</li> <li>- What gas in the atmosphere plays the largest role in climate change?</li> <li>- Why do more abundant gases like <math>N_2</math> and <math>O_2</math> not play a role in climate change?</li> <li>- Define the following: Solar constant, albedo, blackbody radiation.</li> <li>- As each of the following increases, would that increase or decrease global temperature?</li> <li>- Compare the wavelengths of electromagnetic radiation reaching the Earth from the Sun, and leaving the Earth.</li> <li>- Explain the seasonal variations in atmospheric <math>CO_2</math> levels.</li> <li>- Explain the curves of light leaving Earth's surface and escaping the atmosphere.</li> <li>- Use global energy balance equations to calculate expected planetary temperature in the absence of greenhouse warming or the magnitude of the greenhouse effect in terms of percent of energy reabsorbed by the atmosphere.</li> <li>- Describe how climate modeling is done.</li> </ul>
Silanes	<ul style="list-style-type: none"> <li>- Why are silanes less stable than alkanes?</li> </ul>
Silica and Silicates	Section 22.4b <ul style="list-style-type: none"> <li>- What is the structure of <math>SiO_2</math>? What are the oxidation numbers on Si and O?</li> <li>- Describe the effect of changing O/Si ratio in silicates. How does decreasing this ratio effect the Si-O structures that result?</li> <li>- Describe the charges on Si-O structures and the presence or absence of counter ions.</li> <li>-</li> </ul>
Zeolites	<ul style="list-style-type: none"> <li>- Describe general zeolite structures.</li> <li>- Explain the effect on structure and charge of replacing Si atoms with Al atoms.</li> <li>- Describe effect of introduction of Al on presence of counter ions and adsorption of water.</li> <li>- Describe why and in what manner zeolites function as catalysts.</li> </ul>

Silicones	<p>Section 22.4c</p> <ul style="list-style-type: none"> <li>- Describe the structure of silicones.</li> <li>- Relate the reagents used in forming silicones to the structures that result and their physical properties.</li> </ul>
Band Theory and Molecular Orbital Theory and Metallic Bonding Semiconductors	<p>Simple MO Theory: Section 9.4 a-c Band Theory/Metallic Bonding: Section 12.4 Intro, 12.4a and 22.4 intro</p> <ul style="list-style-type: none"> <li>- Explain what a band diagram is.</li> <li>- Use a band diagram to explain relative bond strength in a metallic solid. That is, predict metallic bonding.</li> <li>- Use band diagrams to compare conductors, insulators, and semiconductors.</li> <li>- Explain the difference between intrinsic and synthetic (doped) semiconductors.</li> </ul>
Computers Chips	<p>Section 22.4a</p> <ul style="list-style-type: none"> <li>- Is pure Si a semiconductor?</li> <li>- Explain how p-type and n-type semiconductors are formed.</li> <li>- Explain how charge is conducted through p-type and n-type semiconductors.</li> <li>- Explain how computer chips are made.</li> </ul>
Boron and Group 3A	<p>Section 22.3a</p> <ul style="list-style-type: none"> <li>- Explain bonding in <math>B_2H_6</math>, <math>Al_2Cl_6</math>, <math>BF_3</math></li> <li>- Compare methods of dealing with electron deficiency in the above compounds.</li> <li>- Compare acid, base and amphoteric behavior in <math>Mg(OH)_2</math>, <math>B(OH)_3</math> and <math>Al(OH)_3</math>.</li> <li>- Compare Boron oxide structures with Silicon oxide structures.</li> <li>- Explain why borosilicate glass does not shatter when heated unevenly.</li> <li>- Explain the use of perborate and chlorine bleaches.</li> <li>- Explain how builders and brighteners work.</li> </ul>
Cave Chemistry	<p>Section 22.3c</p> <ul style="list-style-type: none"> <li>- Use the <math>K_{sp}</math> expression for <math>CaCO_3</math> to calculate the solubility of <math>CaCO_3</math>.</li> <li>- Describe the effect of acids on the equilibrium above and its effect on <math>CaCO_3</math> solubility.</li> <li>- Explain how a cave forms from solid <math>CaCO_3</math> and how formations within the cave (e.g. stalagmites) form.</li> </ul>