



GEL4050 Igneous and Metamorphic Petrology Study Guide - METAMORPHIC ROCKS ONLINE EXAM

Disclaimer: This review is a courtesy of the instructor. While care has been taken to include everything that might be tested, omissions or oversights may have occurred. The instructor shall NOT be liable for any missed answer on your part just because the topic is not explicitly mentioned. It is still the STUDENT'S RESPONSIBILITY to know and be able to use concepts addressed during lectures, labs, or required texts.

1. Fundamentals of Metamorphic Geology

- Definition of metamorphism
- Factors controlling metamorphism (temperature, pressure, fluids, and time)
- Types of metamorphism (regional, contact, hydrothermal, burial, dynamic, shock)
- Metamorphic facies and their significance
- Parent rock (protolith) influence on metamorphic processes

2. Metamorphic Textures and Structures

- Foliation (slaty cleavage, schistosity, gneissic banding)
- Non-foliated textures (granoblastic, porphyroblastic, hornfelsic)
- Lineation and other structural features
- Deformational structures in metamorphic rocks (folds, boudinage, shear zones)

3. Metamorphic Mineralogy and Reactions

- Index minerals and metamorphic grade
- Common metamorphic minerals (garnet, kyanite, staurolite, sillimanite, etc.)
- Metamorphic reaction types (dehydration, decarbonation, phase transitions)
- P-T (pressure-temperature) paths and their geological implications
- Mineral assemblages and stability fields

4. Metamorphic Facies and Classification

- Barrovian vs. Buchan metamorphism
- Zeolite, Greenschist, Amphibolite, Granulite facies
- Blueschist and Eclogite facies (high-pressure metamorphism)
- Contact metamorphic aureoles and hornfels
- Skarns and metasomatism

5. Thermodynamics and Metamorphic Equilibria

- Phase diagrams and P-T diagrams
- Gibbs free energy and reaction stability
- Geothermobarometry and its applications

6. Metamorphism and Plate Tectonics

- Subduction zone metamorphism
- Continental collision and regional metamorphism
- Metamorphism at mid-ocean ridges
- Metamorphic core complexes

7. Field and Laboratory Methods in Metamorphic Geology

- Identifying metamorphic rocks in hand sample and thin section from pictures
- Common field structures and mapping techniques
- Geochemical and isotopic analysis methods

8. Sample Exam Questions

- Explain the differences between contact and regional metamorphism.
- How do pressure-temperature paths differ between subduction zones and continental collisions?
- Describe the role of fluids in metamorphic reactions.
- What are the index minerals used to determine metamorphic grade?
- Discuss the importance of metamorphic facies in understanding tectonic environments.

Study Tips

- Review lecture notes and textbook chapters on each topic.
- Practice identifying metamorphic minerals and textures in hand samples (This Exam uses pictures)
- Understand P-T diagrams and metamorphic phase equilibria.
- Work through past exam questions to test understanding.

Good luck with your exam preparation!

A PRINTER may be advantageous