Concordia University
CIVI-231 Geology for Civil Engineers (Fall 2020)

Oct. 5, 2020 **18:00-20:00**

Mid-term exam (Total Marks 66)

PART ONE: MULTIPLE CHOICES (1 mark each, Total Marks 20)

1. _____ includes the study of how rocks and minerals form and change according to physical, chemical, and biologic processes which affect everything from Earth's internal structures and tectonic plates to landscape evolution and crystal forms.
A) Physical geology B) Historical geology C) Manifest destiny D) Catastrophism

2. In the rock cycle, the series of processes that transform unconsolidated sediment into sedimentary rocks is termed _____.
A) cementation B) compaction C) dewatering D) lithification

3. In geologic theory, volcanic eruptions, earthquakes, landslides, floods, and tsunamis are all _____.
A) exceptions to the theory of uniformitarianism B) unique phenomena that can neither be predicted nor understood C) naturally recurring geologic hazards from ongoing physical processes
D) divine punishments sent to discourage us of our evil ways

4. The _____ is the thinnest layer of the Earth.
A) crust B) outer core C) mantle D) inner core

5. The composition of the core of Earth is thought to be _____.
A) basalt B) granite C) peridotite D) iron-nickel alloy

6. The _____, about 100 km thick, is the coldest, most rigid, and most brittle layer in the Earth.
A) lithosphere B) asthenosphere C) mesosphere D) inner core

7. The asthenosphere is actually a part of the _____ of the Earth.
A) outer core B) crust C) inner core D) mantle

8. The process by which magmas cool and solidify to rock is termed _____.
A) volcanism B) plutonism C) crystallization D) thermal metamorphism

9. In sedimentary rocks, lithification includes _____.
A) compaction and cementation B) cementation and weathering C) compaction and transportation
D) crystallization and cooling

10. Minerals consist of an ordered array of atoms or ions that are _____.
A) all the same size and charge B) always packed together in cubes or octahedral C) chemically bonded in a regular crystalline structure D) physically attached to each other by shared protons

11. The property of _____ is controlled by planes of few or weak bonds within the mineral structure.
A) absorbency B) bondage C) cleavage D) well formed crystal faces

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12. Which mineral is easily soluble in water at room temperature conditions?
A) diamond B) talc C) halite D) olivine

13. Which carbonate mineral reacts readily with cool, dilute hydrochloric acid to produce visible bubbles of carbon dioxide gas?
A) calcite B) quartz C) dolomite D) plagioclase

14. Which group of minerals are the most abundant in the Earth's crust?
A) sulphides B) carbonates C) silicates D) chlorides

15. All silicate minerals contain which two elements?
A) iron, silicon B) silicon, sodium C) oxygen, carbon D) silicon, oxygen

16. Three processes contribute to the formation of every igneous rock: _____.
A) assimilation, crystallization, and dyke injection B) extrusion, intrusion, and consolidation
C) partial melting, buoyant rise, and crystallization D) volcanism, plutonism, and magmatic differentiation

17. Which of the following is the major dissolved volatile constituent in both magmas and volcanic gases?
A) carbon monoxide B) methane C) nitrous oxide D) water

18. The process of _____ is driven by _____ and transforms a magma into an igneous rock.
A) crystallization, cooling (heat loss) B) intrusion, overlying rock weight C) partial melting, pressure increase D) volcanism, internal heating

19. As melts cool their viscosity increases (they lose their mobility and get stiffer) even before they start to crystallize because _____.
A) all of the sodium and potassium escape B) their ions become more disordered
C) the silica tetrahedra in the melt start to link up and make larger and stronger units
D) they increase in volume

20. The ion at the centre of a silicon-oxygen tetrahedron is surrounded by _____.
A) 4 oxygen ions B) 6 oxygen ions C) 4 sodium ions D) 6 sodium ions

PART TWO: DESCRIPTIVE QUESTIONS (Total Mark 46)

21. Please list minerals of **two** dark silicates and **three** light silicates (10 marks)

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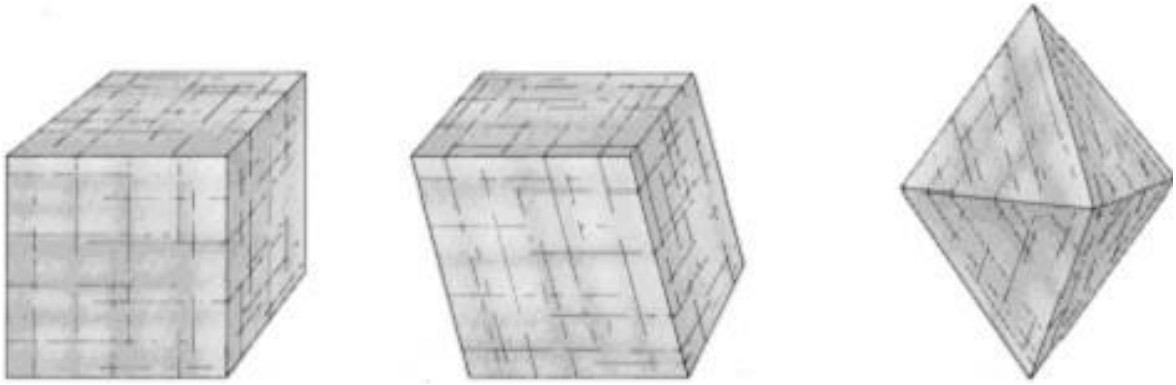
22. Please list the composition **minerals** along with the **chemical formulas** of **Limestone**, **Dolostone**, **Chert**, **Rock Gypsum**, and **Rock salt** (10 marks)

23. Please use your knowledge in physical geology to lay out the similarities and differences between Granite and Rhyolite? (10 marks)

24. For each illustration below, note the number of cleavage directions. (6 marks)



a) b) c)

25. What process is exhibited by the diagram below? When does this process take place? (10 marks)