

**UNIVERSITY of CALGARY  
DEPARTMENT of GEOSCIENCES**

**GLGY 377\_Petroleum Engineering Geology  
Section 1**

**Thursday, Feb 7<sup>th</sup>, 2013**

**MIDTERM EXAMINATION I**

- There are 40 questions; each of them worth 2 points. There are 100 points awarded for this examination ( $100 = 20 + 40 q * 2 p/q$ ).
- Points are awarded only for the correct answers.
- Select the correct answer for each question.
- Only the answers from the multiple choice examination form will be taken in consideration; the answers written on the pages of this brochure will not be considered.

**01. The thickest continental crust (up to 75 km) is recorded in these regions.**

- a. In the proximity of the continent-ocean junctions.
- b. Below most of the continental areas.
- c. Below oceans.
- d. Below some mountain chains.
- e. Below the magnetic poles.

**02. Which of the following kinds of crust is thicker?**

- a. Continental crust.
- b. Oceanic crust.
- c. Transitional continental-oceanic crust.
- d. None of them; they oceanic and continental crusts are equally thick and the separation between them is only according to the chemical composition.
- e. Oceanic crust can be sometimes thicker than the asthenosphere.

**03. The equivalent of the core/mantle boundary in the Earth's interior subdivision according to the physical properties is the \_\_\_\_\_ boundary.**

- a. Outer core/asthenosphere.
- b. Outer core/mesosphere.
- c. Inner core/outer core.
- d. Inner core/mesosphere.
- e. Outer core/mantle.

**04. What is the physical state of the mesosphere?**

- a. The mesosphere consists of molten matter.
- b. Liquid.
- c. Solid.
- d. Gaseous.
- e. Liquid but behaves as a solid due to the extremely high pressures.

**05. The asthenosphere is situated between \_\_\_\_\_ and \_\_\_\_\_.**

- a. Lithosphere and mesosphere.
- b. Crust and core.
- c. Crust and upper mantle.
- d. Mantle and core.
- e. Lithosphere and mantle.

**06. The regular arrangement of the elements and/or ions characteristic for each mineral is known as \_\_\_\_\_.**

- a. Crystal.
- b. Crystal shape.
- c. Crystal structure.
- d. Mineral.
- e. Mineraloid structure.

**07. The cause of the different physical properties of diamond and graphite is given by \_\_\_\_\_.**

- a. Different chemical composition.
- b. Different chemical formula.
- c. Different melting points.
- d. Different resistance to scratching.
- e. Different crystal structure.

**08. Which of the following minerals or groups of minerals have a planar crystal structure?**

- a. Graphite.
- b. Diamond.
- c. Galena.
- d. Diamond and galena.
- e. Graphite and diamond.

**09. Which of the following native element subgroups have the tendency to develop large-sized minerals?**

- a. Metallic native elements.
- b. Nonmetallic native elements.
- c. None of them.
- d. All of them.
- e. Semimetallic native elements.

**10. A combination between a metallic element and the radical  $\text{SO}_4$  is known as \_\_\_\_\_.**

- a. Hydroxide.
- b. Carbonate.
- c. Sulfide.
- d. Sulfate.
- e. Sulfosalt.

**11. The nature of the bonds between silica tetrahedra and cations in silicate minerals.**

- a. Ionic.
- b. Covalent.
- c. Van der Waals.
- d. Water bonds.
- e. Mixed covalent and water bonds.

**12. The minerals of this silicate group present the structure consisting of two chains of silica tetrahedra.**

- a. Inosilicates.
- b. Sorosilicates.
- c. Tectosilicates.
- d. Nesosilicates.
- e. Cyclosilicates.

**13. The silicates with the crystal structure consisting of a 3D network of silica tetrahedra are known as \_\_\_\_\_.**

- a. Nesosilicates.
- b. Phyllosilicates.
- c. Tectosilicates.
- d. Inosilicates.
- e. Sorosilicates.

- 14. The most frequent silicate is \_\_\_\_\_.**
- Biotite.
  - Muscovite.
  - Phlogopite.
  - Epidot.
  - Quartz.
- 15. Intrusive rock texture characterized by the presence of small sized minerals, which cannot be seen with the unaided eye.**
- Phaneritic.
  - Fragmental.
  - Glassy.
  - Holohyaline.
  - Aphanitic.
- 16. The high mobility of the evaporites, when compared with the other rocks, in the subsurface environments is due to their \_\_\_\_\_.**
- High dissolution potential.
  - Lower specific gravities.
  - Small molecular sizes.
  - Generally light colors.
  - Tendency to form smaller crystals.
- 17. A mud-supported carbonate rock with more than 10% allochems (clasts) is referred to as \_\_\_\_\_.**
- Wackestone.
  - Boundstone.
  - Grainstone.
  - Packstone.
  - Mudstone.
- 18. Kind of metamorphism present at local scale at the boundary between a cooling body of intrusive rocks and adjacent layers.**
- Thermal metamorphism.
  - Regional metamorphism.
  - Shock metamorphism.
  - Burial metamorphism.
  - Shear metamorphism.
- 19. Type of weathering characterized by the formation of new minerals, with different composition than the pre-existent weathered ones.**
- Physical weathering.
  - Erosion.
  - Chemical weathering.
  - Inorganic precipitation.
  - Transport and lithification.
- 20. Which of the following kinds of carbonate sediments are formed in the highest water-energy environments?**
- Supertidal carbonates.
  - Subtidal carbonates.
  - Bioherms.
  - Oolithes.
  - Intertidal carbonates.
- 21. The non-foliated texture in metamorphic rocks is known as \_\_\_\_\_.**
- Poikilitic.
  - Phaneritic.
  - Fragmental.
  - Granoblastic.
  - Porphyritic.

- 22. Which of the following components of a clastic (detrital) sedimentary rock is formed *in situ*?**
- a. Opal.
  - b. Cement.
  - c. Matrix.
  - d. Obsidian.
  - e. Biochemical components.
- 23. A grain-supported carbonate rock with little or no mud at all is referred to as \_\_\_\_\_.**
- a. Boundstone.
  - b. Wackestone.
  - c. Grainstone.
  - d. Mudstone.
  - e. Packstone.
- 24. Very fine material, which is released in the atmosphere during volcanic eruptions and can be used for stratigraphic correlations over long distances.**
- a. Volcanic ash.
  - b. Volcanic tuff.
  - c. Pyroclastic material.
  - d. Lava flow.
  - e. Volcanic bomb.
- 25. Carbonate dominated and wave resistant structures, which are mostly formed through accumulation of skeletal debris, are commonly referred to as \_\_\_\_\_.**
- a. Banks.
  - b. Reefs.
  - c. Shoals
  - d. Bioherms.
  - e. Algal mats.
- 26. Branch of geology that is the study of the successions of layers and bodies of rocks in the Earth crust.**
- a. Stratigraphy.
  - b. Structural geology.
  - c. Sedimentology.
  - d. Seismology.
  - e. Sedimentary petrology.
- 27. What is the physical state of the asthenosphere?**
- a. Plastic.
  - b. Liquid.
  - c. Solid.
  - d. Gaseous.
  - e. A combination of liquid and solid materials.
- 28. Physical property of the minerals that describes the way a mineral reflects the light.**
- a. Crystal form.
  - b. Luster.
  - c. Cleavage.
  - d. Density.
  - e. Streak.
- 29. This mineral is the softest in the Mohs Hardness Scale.**
- a. Corundum.
  - b. Gypsum.
  - c. Talc.
  - d. Calcite.
  - e. Apatite.

- 30. An irregularly developed mineral is known as \_\_\_\_\_.**
- a. Anhedral.
  - b. Euhedral.
  - c. Mineraloid.
  - d. Subhedral.
  - e. All of the above.
- 31. A mineral through which objects cannot be clearly seen is known as \_\_\_\_\_.**
- a. Transparent.
  - b. Anhedral.
  - c. Opaque.
  - d. Translucent.
  - e. Mineraloid.
- 32. The nature of the bonds between silica tetrahedra and cations in silicate minerals.**
- a. Ionic.
  - b. Covalent.
  - c. Van der Waals.
  - d. Water bonds.
  - e. Mixed covalent and water bonds.
- 33. Which of the following grain categories recognized according to particle sphericity characterizes the most mature sediment?**
- a. Very angular.
  - b. Angular.
  - c. Subangular.
  - d. Rounded.
  - e. Very rounded.
- 34. Which of the following characteristics can be used to estimate the degree of maturity of a detrital rock?**
- a. Grain sphericity.
  - b. Presence or absence of matrix.
  - c. Grain roundness.
  - d. Grain sorting.
  - e. All of the above.
- 35. The sand with large amounts of clayey matrix is considered \_\_\_\_\_ sediment.**
- a. Immature.
  - b. Mature.
  - c. Lithified.
  - d. Compacted.
  - e. Cemented.
- 36. \_\_\_\_\_ is the dominant metal in the Earth's crust.**
- a. Iron.
  - b. Aluminium.
  - c. Magnesium.
  - d. Nickel.
  - e. Sodium.
- 37. Mineral physical property that considers the light reflection on the mineral faces.**
- a. Twinning.
  - b. Color.
  - c. Lustre.
  - d. Transparency.
  - e. Translucency.



**38. The habit of the mineral in the illustration above is \_\_\_\_\_.**

- a. Prismatic.
- b. Acicular.
- c. Reniform.
- d. Tabular.
- e. Dendritic.

**39. Mineral that commonly presents the twinning intergrowth phenomenon between two minerals resulting in 'in cross' appearance.**

- a. Cerussite.
- b. Calcite.
- c. Azurite.
- d. Staurolite.
- e. Diamond.

**40. The cleavage directions in a mineral are often defined by this kind of bonds in the mineral structure.**

- a. Covalent.
- b. Water bonds.
- c. Ionic.
- d. Answers a and b.
- e. None of the above.