



**University of Technology**  
**Building and Construction Eng. Dept.**  
**Final Exam – First Attempt – 2010/2011**  
**Subject : Engineering Geology**      **Class: 1<sup>st</sup> Year**  
**Branch : All Engineering Branches**      **Time : 3 Hours**  
**Examiner : Eng. Geology Comm.**      **Date : 11/ 6 / 2011**



**Note: Answer FOUR questions only      Marks are equal for each question.**

**Q1- Choose the correct answer for the following items:**

- 1- Boundaries between Earth layers:  
a) are defined by abrupt changes in earthquake wave velocities. b) ~~are defined are defined by abrupt change in earthquake wave velocities~~ c) are places where there's abrupt change in the density of the rocks. d) have been discovered over the last 200 years. e) all of the above.
- 2- Which of the following statements is FALSE? Crystals  
a) have an orderly internal arrangement of atoms attached to a crystal lattice framework. b) grow outward from a seed. c) are formed by the high-temperature, extremely rapid process known as solid-state diffusion. d) display symmetry.
- 3- The rock mass above the fault plane is called: a) Heave b) Foot wall c) Throw d) Hanging wall.
- 4- A rock with a high percentage of open spaces has high:  
a) Porosity b) Base flow c) Capillary d) Permeability.
- 5- Quartzite a metamorphic rock derived from: a) Shale b) Sandstone c) Limestone d) Claystone.
- 6- Which of the following words is associated with the formation of limestone?  
a) Deposition b) Lithification c) Compaction d) Cementation e) Crystallization
- 7- The diagram shown below is a profile of:  
a) ripple marks created by water flowing from A to B  
b) ripple marks created by water flowing from B to A.  
c) sand dunes created by wind blowing from A to B.  
d) sand dunes created by wind blowing from B to A. e) graded bedding in a submarine trench.
- 8- Choose the proper listing of detritus terms, going from smallest to largest of the words  
Offered: a) sand, silt, pebbles b) mud, silt, sand c) silt, mud, sand  
d) sand, cobbles, pebbles e) mud, sand, silt
- 9- Water moves slowly through a clay stratum because:  
a) Capillary is not operating b) The pores not interconnected. c) The total pore space is very small. d) The pore spaces are very small in size.
- 10- Cooling joints are mainly occur in:  
a) Sedimentary rocks b) Igneous rocks c) Metamorphic rocks d) Minerals.



**Q2- State whether each of the following statements is TRUE or FALSE and correct the FALSE one .**

- 1- Geophysics is the study of different geological processes (such as weathering, erosion and deposition).
- 2- Seismic methods measure the transmission of water wave.
- 3- Mica is one of the silicate minerals.
- 4- The single most characteristic feature of sedimentary rocks is bedding.
- 5- Fold is called plunging if its axial plane is horizontal.
- 6- Slickensides phenomena refers to fold.
- 7- Normal faults are formed by compressional forces.
- 8- The ground water exist in the aeration zone and saturation zone
- 9- Orthorhombic system has 3 axis and  $a \neq b \neq c$ .
- 10- A strike line is any inclined line on the plane along which all points are at equal elevation.

**Q3 A-** A fully water saturated rock sample with a mass 0.12 Kg. If the volume of the solids =  $30\text{cm}^3$  and the density of the solids =  $2.6\text{ gm/cm}^3$ ; Find the water content (moisture content) and void ratio.

**B-** Answer the following items with sketches if available:

- 1- List the main characteristics of youth stage of a river.
- 2- List the main geophysical methods showing the main measured physical property for each one.
- 3- Give the differences between confined and unconfined aquifers.

**Q4 A-** A stream with semicircular cross section of a diameter = 10 m, and the velocity of the water = 12 m/min. Calculate

- 1- the discharge of this stream through the cross section in 15 sec.
- 2- the volume of water that flows through the cross section in 6.67 minutes.

**B-** Answer the following items

- 1- About topographic contour maps, show what of the following statements indicate:  
Closely spaced contour lines; widely spaced contour lines; V- shaped contour lines;  
Circular contour lines with increasing (and decreasing) toward the centre of the closure.
- 2- Under what conditions do soils lack horizons?
- 3- Contrast between porosity and permeability. And how can classify rocks according to these properties?

**Q5 A-** Find the porosity of aquifer rock if its retained porosity is 23.3% and the true velocity is 3.4 times its Darcy's velocity.

**B-** Give sketches ONLY for the following items:

- 1- Rock cycle.
- 2- The main components of a fold.
- 3- A geologic layer showing its outcrop, strike and apparent and true dip.

**Best Wishes.....**