

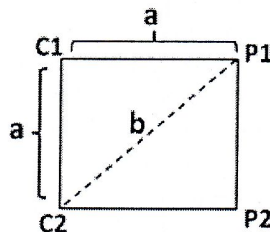
Final Exam in Principals of Geophysics (G250)
(Two Pages – 50 marks total)

January: 2019

Time: 2 hours

A) Answer the following questions: (five marks each)

1) Derive the general expression for ρ_a for the square array sketched below.



2) With the help of drawing explain the absolute measurements of gravity data.

B) Define only five of the following: (two marks each)

Apparent resistivity	Critical angle of refraction	The geoid
Magnetic susceptibility	Bouguer anomaly	Inclination
Shear modulus	Declination	

C) Mark only ten of the following statements with True or false: (two marks each)

1. Electrical resistivity increases with increasing water content
2. Self-Potential is classified as an active electrical method whereas the resistivity method is passive
3. The higher the value of the modulus, the stronger the material, and the smaller the strain produced by a given stress
4. The gravity acceleration varies from the equator to the pole by almost 0.5%
5. 99% of the earth's magnetic field originate from the outer core of the Earth
6. By increasing the electrode spacing, more of the injected current will flow to shallower depths

7. Electrokinetic potentials result from the flowing of fluid through a capillary or porous medium
8. Bouguer correction is applied to gravity data to correct for tidal effect
9. Sedimentary rocks have in general higher magnetic susceptibilities than basic igneous rocks
10. The sign of the self-potential is an important diagnostic factor in the interpretation of SP anomalies
11. Secondary (shear) seismic waves cannot travel through liquids
12. Vertical electrical sounding in resistivity best suited to map lateral electrical resistivity contrasts, such as lithologic contacts
13. The variation in gravity acceleration depends mainly on the density variations of rocks and minerals

D) Write brief notes on only five of the followings: (*two marks each*)

1. The different modes for resistivity field survey
2. The main sources of Earth's magnetic field
3. Two problems associated with the interpretation of seismic refraction data
4. Type of electrical current conductions in subsurface earth materials
5. Three different source mechanisms of self-potential
6. The different corrections applied to gravity data
7. Three applications of magnetic method
8. Advantages and limitations of resistivity method
9. Archi's law and define all of its components

End of questions

Prof. Dr.: Gamal Zidan AbdelAal

Good luck.....



جامعة أسيوط
كلية العلوم - قسم الجيولوجيا

امتحان التحريري لطلاب المستوى الثاني بكلية العلوم شعب الجيولوجيا - الجيوفيزياء - الجيولوجيا - كيمياء

المقرر: علم الطبقات (٢١٠ ج)

دور يناير - العام الجامعي ٢٠١٨/٢٠١٩ م

الزمن: ساعتان

الدرجة الكلية للامتحان: ٥٠ درجة

ملحوظة الامتحان يتكون من ورقة واحدة على الوجهين

ANSWER THE FOLLOWING QUESTION (Obligatory):

Question No. 1: Choose if the following are (right) or (wrong): (5 marks; 0.5 mark each)

- a- Principle of strata continuity implies that rock layers are deposited inclined and then deformed to various attitudes.
- b- The basic principle of biostratigraphy is that evolutionary changes in faunas and floras are reversible.
- c- A rock unit of a Jurassic-Cretaceous age means that this rock unit has only a Cretaceous age.
- d- Magnetostratigraphic polarity zones may consist of bodies of strata unified by a single polarity of magnetization.
- e- The fundamental taxonomic unit used in any refined biostratigraphy is the species.
- f- Subsurface geology cannot give a reasonable picture of buried strata and their possible environments of deposition.
- g- Drilling shallow or deep boreholes offers answers to many stratigraphic problems such as attitudes of buried strata.
- h- Numerical dating has traditionally formed the most important basis for chronostratigraphic classification.
- i- Stratigraphy deals with rocks of stratified nature even if they are not of sedimentary origin.
- j- Relative time dating can be established by fossils.

ANSWER THREE ONLY FROM THE FOLLOWING QUESTIONS:

Question No. 2: Complete the missing word(s) in the following: (15 marks; 3 marks each)

- a- In a certain lineage, when the taxa involved are unrelated or when the bounding horizons are of last occurrences of either related or unrelated taxa, the term is used.
- b- Stratigraphy from surface outcrops can only give partial picture of the subsurface geological environment, especially in areas where there is no exposures such as
- c- Shocked quartz, craters, iridium anomalies and tektites, all of which are indicators of
- d- Subsurface data required for rock correlations include
- e- Shape of spontaneous potential curves can give ideas about

Question No. 3: Answer the following questions:

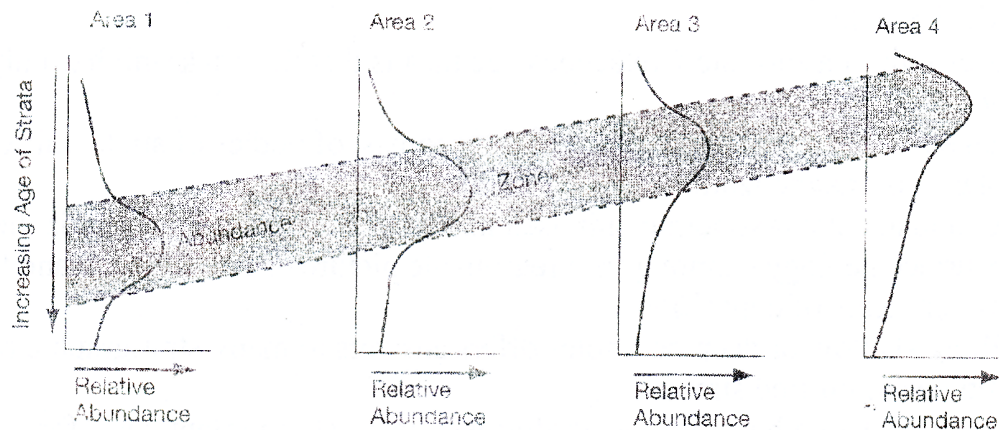
(15 marks; 5 marks each)

- a- What is the significance of unconformities in stratigraphy.
- b- What are the characters for distinguishing formations from each other.
- c- Within one faunal assemblage sharing common environmental stresses speciation rate differs from species to species; discuss this statement.

Question No. 4: Answer the following questions:

(15 marks; 5 marks each)

- a- Write briefly on types of remnant magnetism.
- b- The relative abundances of a given species are shown on the given schematic diagram below. Could you state why correlation of various successions in different areas based on abundances may not be true, as reflected by the diagram?



- c- What are the limitations and advantages of core and ditch (cuttings) samples.

Question No. 5: Write on:

(15 marks; 5 marks each)

- a- Contacts between lithostratigraphic units.
- b- Development of a disconformity.
- c- Differentiate between lithostratigraphic and biostratigraphic correlation.

تمت الأسئلة مع أطيب الأمنيات بالتوفيق

Examiners:

Prof. Dr. Magdy S. Mahmoud (Geology Department)

Assoc. Prof. Dr. Amr S. Deaf (Geology Department)

Optical Mineralogy (235 G)

I-Indicate by the sign (✓) or (×) and correct the mistaken one (12 marks):

- 1-Biotite has one cleavage ()
- 2-Pyroxene has two cleavages ()
- 3-Amphiboles have two cleavages ()
- 4-Olivine has a parting ()
- 5-Polysynthetic twinning (albite twinning) is present in plagioclase crystal ()
- 6-Cross-hatching twinning is occur n microcline ()
- 7-When 2V is acute about Z: (+) ()
- 8-When 2V is acute about X: (-) ()
- 9-Is an albite, simple, and pericline twinning occur in **biotite (Plagioclase)** ()
- 10-Minerals whose optical orientations are **uniaxial (biaxial)** ()
- 11-**Biaxial** not has optical orientations (**uniaxial**) ()
- 12-The variation in interference colour which the grains of a certain mineral present depends on the shape of the grain (**orientation**) ()

Choose the correct answer of the following

(8 Marks)

- 13-A simple twin occur in
- 14-Polysynthetic or albite twins occur in
- 15-parting occur in
- 16-Biaxial minerals have
- 17-Uniaxial minerals have
- 18-Isotropic minerals have
- 19-The most characteristic mineral twins are
- 20-Cross-hatching occur in

Write shorts notes on:

- 21-What the meaning of extinction (5Marks)
- 22-What the meaning of extinction (5Marks)
- 23-Ray velocity surfaces of isotropic minerals is (5Marks)
- 24-Write on double refraction (5Marks)
- 25-What the interference figure of uniaxial mineral (10 Marks)

Good luck

Prof. Dr. Mohamed Abd El-Raouf Hassan

Answer the following quations

1-Indicate by the sign (✓) or (×): (10 marks)

- | | |
|--|--------|
| 1-All system contains pinacoid | () |
| 2-Rhombohedron present in hexagonal | () |
| 3-Tetragonal system contain 6 planes and one four axis | () |
| 4-Monoclinic system contains two planes | () |
| 5 Pyramid is closed form | () |
| 6-Prism is open form | () |
| 7-Scalenohedron is closed form | () |
| 8-Cube is closed form | () |
| 9-A dome is parallel to a axis | () |
| 10-Pidon has one face | () |

2-Sterographic projection of rhombohedron, scalenohedron, first order prism and second order prism in trigonal system with example mineral crystalline in this system (5 marks)

3-Sterographic projection of first order prism, second order prism, first order bipyrimadal and second order bipyrimadal in tetragonal system with example mineral crystalline in this system (5 marks)

3-Sterographic projection of prism, a-dome and B-dome in orthorhombic system with example mineral crystalline in this system (5 marks)

Good luck

Prof. Dr. Mohamed Abd El-Raouf Hassan



Geology Department – Students of Level Two – January 2019
Course No. (G233) – Total marks (50) – Time allowed: 2 Hours

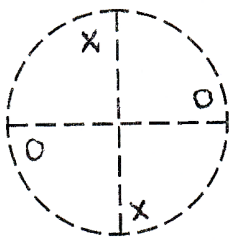
Answer the following questions:

1) Define **ONLY 5** of the following terms:-

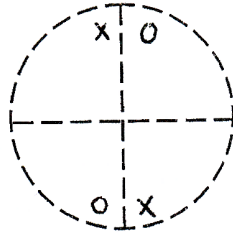
(10 Marks)

Crystal form – Special form - First order – Pediton -
Inversion axis - Ditrigonal prism – Piezoelectricity.

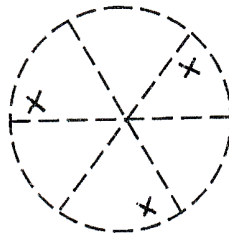
2) Write the Hermann-Mauguin symbols for the following stereograms and write the name of the form: (10 Marks)



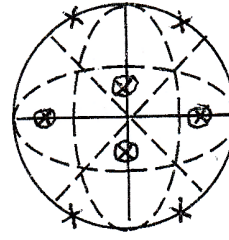
A



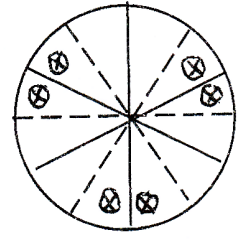
B



C



D



E

3) Draw stereograms for **ONLY 6** of the following forms, write their names (24 Marks)

$\{2\ 2\ 1\}$ in class $\bar{4}3m$

$\{3\ 2\ 0\}$ in class 43

$\{2\ 2\ 1\}$ in class $\bar{4}2m$

$\{0\ 2\ 1\}$ in class 222

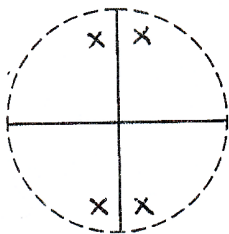
$\{1\ 0\ \bar{1}\ 1\}$ in class $3m$

$\{2\ 0\ 1\}$ in class $4mm$

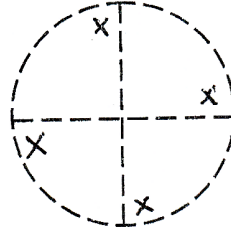
$\{1\ 0\ \bar{1}\ 0\}$ in class 62

$\{1\ 1\ \bar{2}\ 0\}$ in class $6mm$

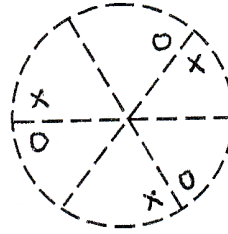
4) Write the elements of symmetry shown by the following stereograms: (6 Marks)



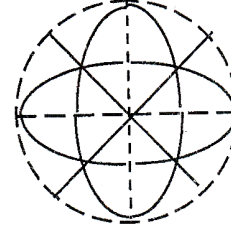
A



B



C



D

Good luck

Prof. Dr/ Wagih Bishara

سوف يُعقد الامتحان الشفوي عقب التحرير مباشرة بمكتب ا.د/ وجيه بشاره

Assiut University Faculty of Science Geology Department		جامعة أسيوط كلية العلوم قسم الجيولوجيا
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First Semester Final Examination
Geology students 2nd Level
(Invertebrate Paleontology)

December 2018	G215	50 Marks	Time: 2 hours
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Please answer four questions only (give illustration if possible):

The First Question (12.5 Marks)

Discuss the followings:

1- **Write about:**

- a. Phytoplankton, Zooplankton and give examples.
- b. The pelagic organisms.
- c. Benthonic organisms (give examples for all of the three organisms and their ecological distributions).

The Second Question (12.5 Marks)

- 1- Write about the development of Septa in Tetracoralla and give the exact age of this group.
- 2- What are the different types of sponge spicules?
- 3- Tabulata as a Paleozoic index fossil, describe this group.

The Third Question (12.5 Marks)

The following groups are Paleozoic index fossils: Archaeocyathata, Trilobites and Graptolites, please describe them and give the exact age for each one.

The Fourth Question (12.5 Marks)

Illustrate the following:

- 1- The internal skeleton structure of articulate Brachiopoda.
- 2- The geologic history of Cephalopoda.

The Fifth Question (12.5 Marks)

Give short notes on:

- 1- Shell parts of Gastropoda.
- 2- Regular of Echinoidea.

The Sixth Question (12.5 Marks)

Describe the following:

- 1- Skeleton of Crinoidea.
- 2- Morphology of Pelecypoda.

Good Luck,,

Prof. Dr. Hassan A. Soliman

Prof. Dr. Adel H. Hegab

Geology Department
Faculty of Sciences
Assiut University
Second level



First Term Examination
Rock forming minerals (230 G)
January, 2018
Two Hours

Rock forming minerals

(230 G)

Answer the following questions: (5 Points for each question)

1. Define polymorphism, and Give TWO examples of minerals that show polymorphism, being sure to name all of the polymorphs.
2. What is a solid solution? Give examples of at least three minerals that show solid solution, giving the end-members for each?
3. What is exsolution? Why plagioclase feldspars CAN NOT have exsolution?
4. Define the following (a) closed system, (b) open system, (c) isolated system, (d) phase, and (e) component.
5. Give an alternative name for each of the following groups of silicates (a) nesosilicates, (b) sorosilicates, (c) cyclo-silicates, (d) inosilicates, (e) sheet silicates.
6. a) What is the easiest way to distinguish between the pyroxene group of minerals and the amphibole group of minerals?
b) What are the main chemical and structural differences between the orthopyroxenes and the clinopyroxenes? In this section how would you distinguish these two pyroxene groups?
7. What is the difference between the dioctahedral and trioctahedral sheet silicates?
8. Connect with a line, the element pairs that are likely to substitute for each other in solid solution sites.

Na	Fe ³⁺
Al	Mn
Ca	K
Fe	Sr

9. If Na substitutes for Ca in plagioclase, what other substitution must occur? AND WHY?
10. In the discontinuous mineral series of Bowen's Reaction Series, decreasing temperature promotes the successive formation of olivine, pyroxene, amphibole, and biotite. What general changes occur in the structural types of silicates represented by these minerals?

With my best wishes
Mohamed Abdel Moneim



First Semester Final Examination
Zoology Students
(Paleontology)

December 2018	G211	50 Marks	Time: 2 hours
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Answer the following questions:

First question (5 marks).

Write the geologic ages for the following index fossils:

- | | | |
|---------------------|-----------------|--------------------------|
| 1- Archaeocyatha | 2- Tetracoralla | 3- Ceratitic cephalopods |
| 4- Heteractinellida | 5- Conodonts | |

Second question (10 marks)

Compare between Two Only from the following:

- 1- Articulate and Inarticulate brachiopods (give examples for each).
- 2- Different types of Sponge (explain your answer by drawing).
- 3- Conodonts elements.

Third question (5 marks).

Choose the correct answer:

- 1- Group of fossils that have a great fossil record and oldest living hard shell organisms.....
a. Bivalvia b. Brachiopoda c. Ostracods
- 2- Foraminiferal wall structure could be changed as a result of the environmental changes....
a. True c. False
- 3- The Paleogene group of discoasters has recorded its last occurrence during
a. Pliocene b. Paleocene c. Eocene
- 4- A group of microfossils can be used as a geo-thermometer indicator.....
a. Diatoms b. Nannofossils c. Conodonts d. Foraminifera
- 5- Family Fasciculithaceae is a common morphological type of coccolith.
a. Holococcoliths b. Nannolith c. Heterococcoliths

Fourth question (10 marks)

Answer Two Only from the following:

- 1- Brachiopoda has a large fossil record and abundant diversity during the geologic time compared to their diversity at present, *explain*.
- 2- Describe the skeleton structure of Archaeocyatha.
- 3- The effect of salinity on foraminiferal test.
- 4- Classification of Marine organisms.

Continue.....

Fifth question (10 marks)

Complete the following sentences:

- 1- The subclass of Cephalopods which has a geologic importance, known as
- 2- The process that occurs when ground water carrying dissolved minerals infiltrates the microscopic pores and cavities in bone and wood, known as.....
- 3- A group of microfossils that can be used as a useful tool for detecting the surface water palaeotemperature.....
- 4- The Ostracods carapace element that lacks to the teeth and sockets, known as.....
- 5- The Fossil record can tell us a lot of information about the geologic history, among these information are
- 6- Oyster Bank, is a common geologic feature which has a paleoenvironmental importance duringage.
- 7- Subclass: Tabulate, was a reef formation during age.
- 8- Pennate diatoms are found to dominate the environment and has a geologic range extended from to recent.
- 9- The group of calcareous nannofossil which has an unknown biologic affinity
- 10- Order: Calcarea has a..... spicules and made up of

Sixth question (10 marks)

Write on Two Only from the following:

- 1- The shell structure of Bivalvia.
- 2- Ostracods depth related fauna (inner shelf fauna).
- 3- Ecology and distribution of Brachipods.
- 4- Advantages and disadvantages of coccoliths

Good Luck....

Dr. Amr Abdel Sabour

Second Level Examination in
Geomorphology and Environmental Geology (201G)

Time: Two Hours

23- Dec. 2018

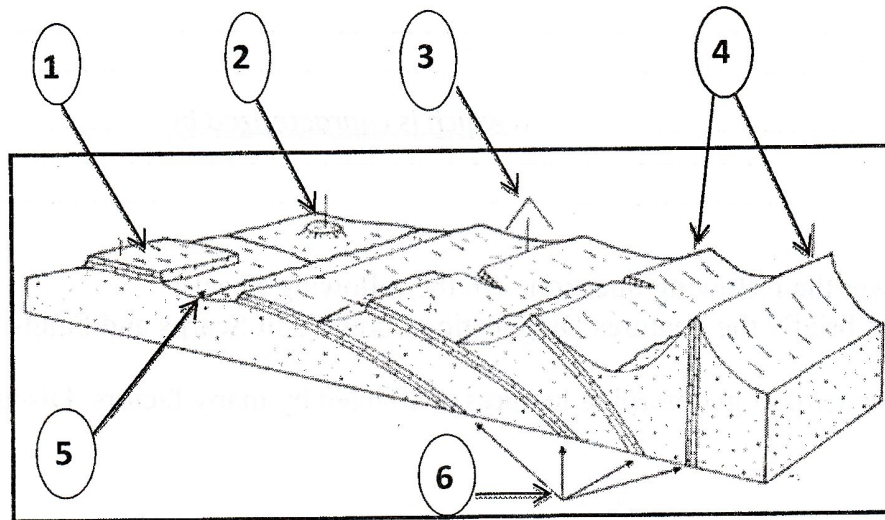
PART I
GEOMORPHOLOGY

(25 degree)

أجب في نفس ورق الأسئلة

I -Complete the following:

- 1-The following diagram illustrating different shapes of landforms related to structure and dip of soft and resistant rock layers, these landforms are: (4 degree)



- 1-.....
2-.....
3-.....

- 4-.....
5-.....
6-.....

Briefly explain how the landform was formed?

.....
.....
.....
.....

II-Complete the following (*Illustrate when Possible*):

(3 degree)

2-Drainage basins means

.....

and they are separated from each other by

which is defined by

3 - Among genetic types in the valleys we find:

(3 degree)

- a) Which arise by
b) Which arise by
c) Which arise by

(1 degree)

- 5- Egypt terrains is divisible geomorphologically into the following provinces: **(4 degree)**

.....

[illegible]

[Return to top](#)

[illegible]

6) Discuss briefly the Features Diagnostic of both Fault Scarps and Fault-line scarp.

(6degree)

(4degree)

Lined paper area for writing.

GOOD LUCK

Prof. Dr. Ahmed Reda El-Younsy

PART II

ENVIRONMENTAL GEOLOGY (25 degree)

I- (Questions 1-19, one mark for each);

أجب في نفس ورق الأسئلة

Select the letter (a, b, c, d, or e) of the choice that BEST answers the question.

Each question has ONLY one correct answer.

1- The earth's early atmosphere was quite different from the modern one.

- a. It probably consisted dominantly of hydrogen and helium
- b. It probably consisted dominantly of nitrogen and methane
- c. It probably consisted dominantly of nitrogen and oxygen

2-In the isolated system; the boundaries are such that

- a. They prevent the system from exchanging either matter or energy with its surroundings.
- b. It is impossible for any boundary to be so perfectly protecting that energy can neither enter nor escape.
- c. Make a system is imaginary only
- d. All above
- e. None above

3-The fact that the Earth is a closed system has two important implications for environmental geology, mention them?

.....
.....
.....

4- The Earth loses energy from the cycle by

- a. Tidal Energy
- b. Solar Radiation
- c. albedo
- d. All
- e. Non

5- Volcanic ash, cinders, and bombs are examples of _____ material.

- a. plutonic
- b. erotic
- c. fissure
- d. pyroclastic
- e. metamorphic

6- Crater Lake contains a collapse volcanic feature known as a

- a. caldera
- b. shield volcano
- c. flood basalt
- d. big hole in the ground
- e. none of the above

7- Active volcanoes

- a. volcano with no historic record however show evidence of geologically recent activity
- b. volcano with no historic record and no evidence of geologically recent activity
- c. volcano observed in eruption during historic time

8- Just mention the factors influencing the style of volcanism (i.e. Explosive vs. Quiescent)

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9- Which magma of the following rocks is more viscous?

- a. Rhyolitic/Granitic magma b. Andesitic/intermediate magma c. basaltic magma

10- The Secondary and tertiary hazards of volcanisms include:

.....
.....
.....

11- Debris flow involves the downslope movement of regolith whose consistency is:

- a. coarser than that of sand b. finer than that of sand
c. a type of a slurry flow d. A and C

12- The Triggering events influence slope stability are;

- a.....
b.....
c.....

13- Fall is

- a. a block rotation / tipping
b. mass sliding along well-defined failure surface
c. free vertical drop of material from a cliff or steep slope.
d. all above

14- Slurry flow can divide to

- a. mud flow and debris flow b. earth flow and granular flow
c. debris flow, mud flow and solifluction d. none from above

15-Contaminants in surface water come primarily from:

- a.....
b.....
c.....
d.....

16-Effluents that cause the depletion of dissolved oxygen in a water body are said to

- a. a biochemical oxygen demand (BOD) c. sewage
b. aerobic environment

17-The heavy metals that can contaminate the surface water include:

.....

18-When the temperature of water rises, the amount of dissolved oxygen

- a. Decreases b. increases c. unchanged

19- Liquid mercury is sometimes used to extract gold from crushed rock in mines

- a. it used to bonds with gold to form a semi-solid gold "amalgam"
b. it used to dissolve the gold
c. it used to re-melt the gold and the crushed rock

20- The life on the Earth's surface has had an intense influence on the chemical evolution of the Earth's atmosphere. Clarify that? (2 marks)

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21- Predicting Volcanic Eruptions includes: (2 marks)

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22- Acid Mine Drainage (AMD) is the biggest environmental challenge facing the mining industry today. Discuss in short notes the treatment of AMD (2 marks)

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GOOD LUCK

Prof. Dr. Mamdouh Farrag Soliman



Second Level Examination in
Geomorphology and Environmental Geology (201G)

Time: Two Hours

23- Dec. 2018

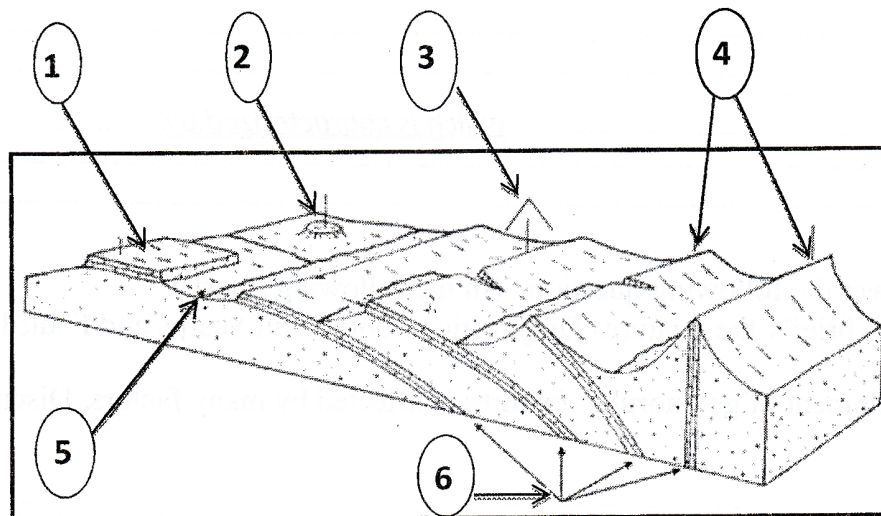
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3 - Among genetic types in the valleys we find:

(3 degree)

- a) Which arise by
b) Which arise by
c) Which arise by

(1 degree)

- d .Pediment

(4 degree)

which is characterized by:

b-..... which is characterized by.....

C- which is characterized by.

which is characterized by

(10degree)

(6degree)

(4degree)

GOOD LUCK

Prof. Dr. Ahmed Reda El-Younsy

PART II

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أجب في نفس ورق الأسئلة

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- b. Solar Radiation
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- c. fissure
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- a. coarser than that of sand b. finer than that of sand
c. a type of a slurry flow d. A and C

12- The Triggering events influence slope stability are;

- a.
b.
c.

13- Fall is

- a. a block rotation / tipping
b. mass sliding along well-defined failure surface
c. free vertical drop of material from a cliff or steep slope.
d. all above

14- Slurry flow can divide to

- a. mud flow and debris flow b. earth flow and granular flow
c. debris flow, mud flow and solifluction d. non from above

15-Contaminants in surface water come primarily from:

- a.
b.
c.
d.

16-Effluents that cause the depletion of dissolved oxygen in a water body are said to

- a. a biochemical oxygen demand (BOD) c. sewage
b. aerobic environment

17-The heavy metals that can contaminate the surface water include:

.....

- 18-When the temperature of water rises, the amount of dissolved oxygen
- a. Decreases
 - b. increases
 - c. unchanged

- 19- Liquid mercury is sometimes used to extract gold from crushed rock in mines
- a. it used to bonds with gold to form a semi-solid gold "amalgam"
 - b. it used to dissolve the gold
 - c. it used to re-melt the gold and the crushed rock

- 20- The life on the Earth's surface has had an intense influence on the chemical evolution of the Earth's atmosphere. Clarify that? (2 marks)

.....

.....

.....

(2 marks)

[illegible]

Prof. Dr. Mamdouh Farrag Soliman

Geology Department Faculty of Sciences Assiut University Second level		Second Term Examination Crystallography and Optical mineralogy (234 G) Sept., 2018 Two Hours
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Crystallography and Optical mineralogy

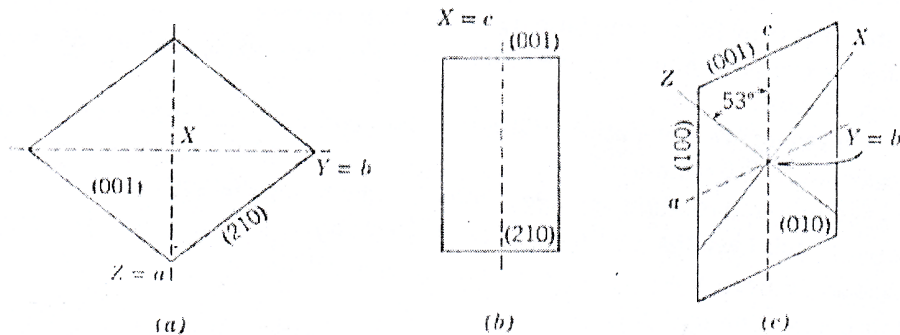
Answer the following

- Sign the true statements by (✓) and the false by (X) of the followings (10 marks)
 - The main external symmetry operations are rotation axes, center of symmetry and rotoinversion only.
 - Crystals containing a combination of 4-fold, 3-fold and 2-fold rotation axes can only occur in the hexagonal crystal system
 - Six-fold and two-fold rotation axes are common in the hexagonal system
 - Isometric crystals have the greatest degree of symmetry.
 - Triclinic crystals have non-perpendicular axes of unequal length
 - In monoclinic system $a = b \neq c$
 - 6-fold axes of symmetry in hexagonal system are correspond to c-axes
 - In tetragonal system, b-axis is different in length while a and c axes are equal
 - Triclinic system has the lowest degree of symmetry.
 - In cubic system the $\alpha = \beta = \gamma \neq 90^\circ$.
- Write the elements of symmetry of the following system: (5 marks)
Trigonal – tetragonal - monoclinic- orthorhombic- triclinic
- How can differentiate between the following crystal systems using only the axis of symmetry corresponding on the c-axis? (5 marks)
Tetragonal- Hexagonal –Cubic –trigonal – orthorhombic
- Mention why cubic system contains the highest degree of symmetry, while the triclinic system contains the lowest degree of symmetry (5 marks)
- Choose the correct answer of the following: (10 marks)
 - (relief-cleavage-pleochroism) is a measure of the relative index of refraction
 - Mineral grains go extinct 4 times in 360° are (isotropic – anisotropic-isometric)
 - Angle between analyser and polarizer fixed at $(90^\circ-180^\circ- 360^\circ)$.
 - Changes in absorption color in PPL as rotate stage is called (relief – pleochrism-color).
 - Monoclinic and triclinic minerals have (inclined- symmetrical – parallel) extinction
 - The reflectivity index (R) IS (>1 , <1 , $=1$).
 - All uniaxial minerals show (parallel-oblique-symmetrical) extinction.
 - A 3-d map of how the IR of light varies with vibration direction in a mineral is (anisotropic-isotropic-indicatrix).
 - Trimetric minerals are (uniaxial-biaxial-triaxial).

10. Twinning is usually obvious in (normal light-plane polarized PPL-crossed Nicolas C.N)

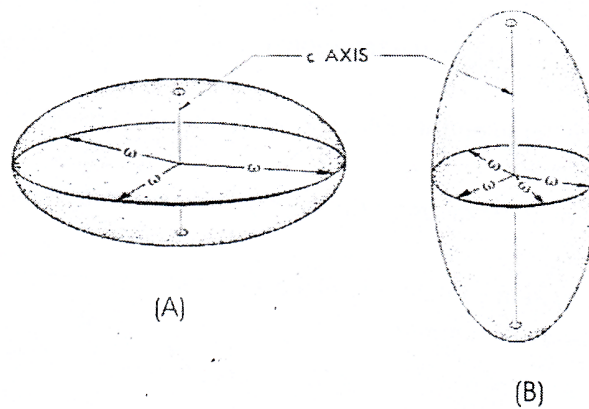
6. Name the types of extinction angles that would be generated by these three crystal configurations

(5 marks)



7. Look to the figures and then answer the questions

(10 marks)



- What crystal systems display this type of optics?
- What is the sign of the indicatrix on (A) and (B)?
- What is another name for the C-axis?
- Is light vibrating in the ω direction the fast or slow ray in (B) diagram?

Best wishes
Mohamed Abdel - Moneim

Answer the following question اجبارى (20M)

i- Define five of the following (10 M):

A crystal, Habit, Snow crystals and snowflakes, Planes of symmetry, Unit cell, Polycrystals, Axis of rotation.

ii- Complete the following sentences (10 M)

- a- The geometric shapes of crystals depend on.....
- b- A cube has planes of symmetry
- c- When rotation repeats form every 120 degrees, then we have.....
- d- The crystal face arrangement symmetry of any given crystal is simply an expression of the.....
- e- Crystals, even of the same mineral, can have differing CRYSTAL FORMS, depending upon
- f- Materials Lacking Long range order is termed a.....
- g- HOLOHEDRAL refers to the.....
- h- Isometric forms is characterized by
- i- HCP means.....
- j- The presence of a $1A_4$ signifies a class crystal and if more A_4 there must be $3A_4$, then belonging to the class.

Answer three questions only of the following (30M)

Q1 (10 M)

- i- Mention the common characteristics of the metallic crystal structures?
- ii- Explain the relation between energy and packing?

Q2 (10 M)

- i- What is the meaning by MILLER INDICES and identify the face of an octahedron and face of a cube using Miller's indices?
- ii- Mention the various crystal forms of Peruvian pyrite?

Q3 (10 M)

- i- Compare between the Simple Cubic Structure (SC) and Body Centered Cubic Structure (BCC)?
- ii- Describe three of the Non-isometric forms?

Q4 (10 M)

- i- Explain a Model for the ionic compound LiF?
- ii- Identify the Atomic Packing Factor (APF)?