



Mansoura University
Faculty of Science
Geology Department

Final Theoretical Exam.
1st Term 2015-2016

Date: - 03/ 01 /2016
Time: - Two Hours
Full Mark:- 60 Marks

المستوي الثاني - البرنامج نوعي مميز - برنامج جيولوجيا البترول والتعدين - الورقة الامتحانية :- ج ٢٢٢
المقرر :- الصخور النارية والمتحولة

IGNEOUS & METAMORPHIC PETROLOGY

ANSWER **FOUR** QUESTIONS FROM THE FOLLOWINGS :-

Each Question = ١٥Marks (Each part = 3.75

Marks)

1- Compare between the Followings :-

- A-Dyke Forms & Shield Volcano Forms
C- Slate & Hornfels

- B- Porphyritic & Ophitic Textures
D- Gneissose & Schistose Textures

2- Explain the Followings :-

- A- Graphic & Mermykitic Textures
C- Gneiss & Schist

- B- Laccolith & Batholith Forms
D- Granulose & Slaty Cleavage Textures

3- Identify and Describe the Followings :-

- A- Amygdular & Trachytic Textures
C- Marble & Serpentinite

- B- Monzonite & Granite
D- Cataclasite & Mesh Textures

4- Write in detail on the Followings :-

- A- Lapilli Tuff & Dacite
C- Magmatic Processes

- B- Types of Metamorphism
D- Characteristics of magma

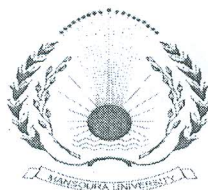
5-Write short notes on the followings :-

- A- Where does magma form on Earth?
C- Stratovolcanoes & Tephra Cones

- B- Protoliths of metamorphic rocks
D- Factors that Control Metamorphism

Good Luck & Best Wishes

لجنة التصحيح :- د. شعبان مشعل* - د. أحمد شلبي



Please answer ALL questions

1- Tick (✓) or (X) and correct (20 marks)

- 1- It is difficult to differentiate detrital from diagenetic clay particles. ()
- 2- Sandstones derived from source area rich in volcanic rocks may contain more plagioclase than potash feldspars. ()
- 3- Ooids with asymmetric coats can form under high energy conditions. ()
- 4- Elongated gravel-size clasts tend to become oriented parallel to the current flow during stream transport. ()
- 5- Matrix in lithic arenites may be of a secondary origin. ()
- 6- The presence of substantial micrite in a limestone commonly indicates deposition under low-energy conditions. ()
- 7- Positive skewed sand samples are weighed toward the coarse end-member. ()
- 8- Fecal pellets are produced by a variety of organisms that feed on organic-rich mud. ()
- 9- The migration of sand waves under conditions of net deposition gives rise to normal graded bedding. ()
- 10- Roundness of a sediment particle is the ratio of the average radius of corners and edges to the radius of minimum inscribed circle. ()

2- Complete the following sentences (20 marks)

- 1- The meteoric regime includes the unsaturated zone above the water table and the saturated zone below the water table.
- 2- Intergranular porosity is commonly reduced by and during diagenesis.
- 3- Effective porosity of a rock is the ratio between and
- 4- Diagenetic reactions in the telegenetic zone occur after and
- 5- The framework grains in most sandstones are dominated by....., and
- 6- The most common cements in beach rocks are and



- 7- Boundstones may be divided into , and
- 8- Ultrastable rock fragments in oligomict conglomerates are dominated by, and clasts.
- 9- The principle types of cements in the phreatic zone of the meteoric regime include and cements.
- 10- Euogenetic stage of diagenesis starts after and ends before burial.

3- Choose the suitable item between parenthesis

(20 marks)

- 1- Most carbonate-building organisms use both and in their skeletal structure (calcite, ankerite, aragonite, dolomite).
- 2- Carbonate grains that are structurally similar to ooids but are larger than 2 mm are called (cortoids, peloids, pisoids, intraclasts).
- 3- Accessory minerals in sandstones include and (feldspars, rock fragments, heavy minerals, coarse mica).
- 4- Sandstones may have a matrix of and (silt, cement, rock fragments, clay).
- 5- and are most useful structures for paleocurrent analysis (flute casts, slumping, cross bedding, trace fossils).
- 6- Post-depositional sedimentary structures may include and (graded bedding, groove casts, convolute bedding, slumping).
- 7- Petromict conglomerates contain significant amounts of and rock fragments (ultrastable, metastable, unstable).
- 8- Diagenetic reactions in the mezogenetic zone start after and end before (shallow burial, deep burial, uplift).
- 9- Sandstones that contain more than about 25% feldspars are called (lithic sandstones, feldspathic graywackes, arkoses).
- 10- Allochems generated by erosion of older carbonate rocks exposed on land outside the depositional basin are called (cortoids, fecal pellets, intraclasts, extraclasts).

د. طارق إبراهيم عنان

أ.د. آدم الشحات على يوسف*

With my best wishes
Prof. Adam El Shahat
لجنة التصحيح:



Q-1 (15 degrees)

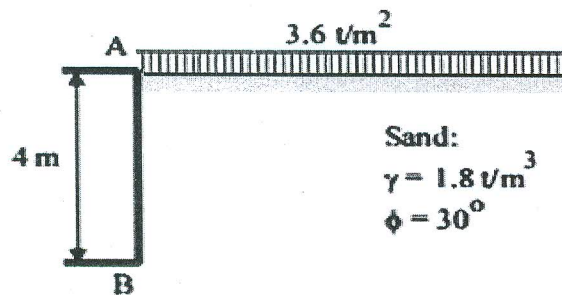
A- Define: Plastic limit – Well graded soil – Consistency index - Structural water – Permeability. (5 degrees)

B-The weight of soil sample is 20.0 kg and its volume is 0.009 m³ . The weight of solid part is 18.0 kg, if $G_s = 2.70$, find, water content, void ratio, porosity, degree of saturation, the saturation unit weight and dry unit weight. (10 degrees)

Q-2 (30 degrees)

A-

For the shown wall with smooth vertical back and sand backfill, determine the magnitude and point of application of the active earth pressure per meter length of the wall.



(12 degrees)

B- A silt soil sample 6 cm diameter and 20 cm long was tested in a falling head permeameter. The time elapsed for the head to drop from 42 to 27 cm is 150 min. The stand pipe has a cross sectional area of 2.0 cm² . After test the sample was splitted and was found to include a sandy silt lamination 5.0 cm thick. If the coefficient of permeability of the silt is 9×10^{-5} cm /sec., find the permeability of the lamination. (18 degrees)

Q-3 (25 degrees)

A- Define the soil compaction, what are the types of compaction? also, what are the factors affecting compaction? (10 degrees)

B-

The following results were obtained from a standard compaction test. Plot the compaction curve. Find the maximum dry density and corresponding optimum moisture content. Plot also zero and 5 % air voids curves. Take $G_s = 2.68$.

Moisture content - %	10.1	11.8	14.2	16.3	17.6	18.9
Bulk density – t/m ³	1.817	1.912	2.05	2.093	2.07	2.045

(15 degrees)



Geophysics -1 final Exam (2^{ed} Level petroleum and Mining Geology) 2015/2016

برنامج البترول وتعيين ج ٢٢١ (المستوى الثاني) ٢٠١٦/١/٢٧ صباحا

Answer the Following Questions

(Total mark 60)

1- Compare between the following:

(20 mark)

- a- Active and passive geophysical methods
b- Qualitative and quantitative interpretation
c- Apparent and true resistivity.
d- Gravity and magnetic methods.

2- Complete the following:

(10 mark)

- a- The earth magnetic field is from ----- and -----origin.
b- Free-air and Bouguer corrections consists are called -----corrections.
c- Magnetic susceptibility of igneous rocks is ----- than sedimentary rocks.
d- Total intensity F of T equals to $F = \dots$.
e- Bouguer anomaly means the ----- gravity measurements.
f- Intensity of magnetization equals to $I = \dots$ or $I = \dots$.
g- The Self potential method (SP) measure the variation of the -----of the earth.
h- DC resistivity measurements are usually used ----- explorations
i- Magnetic susceptibility sedimentary rocks ----- than igneous rocks.
j- Gravity method based on measuring ----- of the earth which ----- the earth's poles.

3- Rewrite the following in the correct form:

(10 mark)

- a. Gravity measure amplitude and direction of the earth's gravity filed.
b. Proton magnetometer measure the vertical component of the earth' magnetic field.
c. SP is an active method and measures potential difference of injected DC current into the earth.
d. Normal correction is applied for the elevation effect.
e. Magnetic anomaly amplitude is affected by density contrast
f. Amplitude gravity anomaly increase with increasing depth of the source body.
g. Acceleration (g) does not change with latitude
h. Magnetic susceptibility of igneous rock is greater than basic rocks.
i. True and apparent resistivity are equals for heterogeneous medium
j. Geophysics is the study of the hidden parts of the earth by direct observation.

4- Write on TWO of the following:

(20 marks)

- a. Operation of fluxgate magnetometers.
b. Operation of unstable gravimeters.
c. Electrodes arrays for DC resistivity survey.



Geology Of Mineral Deposits

Answer the Following Questions:-

Question One: Answer the following:

(A) Give a suitable scientific term **(10 Degree)**

- 1- Ore minerals are younger than the country rocks.
- 2- Primary ore minerals.
- 3- Pyrite > Sphalerite > Chalcopyrite > Galena.
- 4- The least ratio of metal in the ore make it exploited.
- 5- Ranges of uses from the ore.

(B) Give examples of mineral deposits **(15 Degree)**

- | | | |
|------------------------|-------------------------------|----------------------|
| 1- Carbonate deposits. | 2- Phosphate deposits. | 3- Uranium deposits. |
| 4- Coal deposits. | 5- Residual mineral deposits. | |

Question Two : Write short notes with examples of ore minerals **(15 Degree)**

- 1- Concentration by fractional crystallization of magma.
- 2- Concentration by sedimentation processes.
- 3- Geochemical classification of elements.

Question Three : Write briefly: **(20 Degree)**

- 1- Cavity filling and metasomatic replacement deposits.
- 2- Role of volatile constituents in the residual solution.
- 3- Factors controlling contact metamorphism and metasomatic deposits.
- 4- Factors controlling deposition of carbonates in sea water.
- 5- Causes of magmatic differentiation.

Exam Committee*:

Prof. Dr. Amin Gheith Prof. Dr. Salah Ayad*

Final Exam of 2nd level of students
Program: Petroleum geology and Mining
Course: Structural Geology
Code: Geo-204
Date: 24/1/2016
Time: 2 hours



Mansoura University
Faculty of Sciences
Department of Geology

Hall: 25
No. Students: 7

Answer all the followings

Q1. Match phrases from the column A to that convenience with the column B,
Your answer should be like (11-k) For example (20 marks)

Column A

Column B

- | | |
|--|------------------------------|
| 1. It is an extensional structural features developed by gravity sliding | a. Book-shelf structures |
| 2. The scarp has an opposite sense to the dip direction of the fault plane. | b. Dextral strike-slip fault |
| 3. The displacement is oriented perpendicular to ramps in | c. Roof fault |
| 4. The fold thrust belt is assembledof a staking nappe | d. Normal fault |
| 5. Omission of a stratigraphic unit in a well log indicates passing the well through a | e. Foreland |
| 6. The hanging wall is displaced updip of the fault plane in | f. Detachment fault |
| 7. The displacement of faulted blocks is clockwise in | g. fault-line |
| 8. The upper fault bounding duplexes | h. Frontal ramp |
| 9. The structure in which the hanging wall is faulted with parallel and planer synthetic normal faults | i. Growth faults |
| 10. The surface separates the autochthonus from allochthnous blocks | j. Reverse fault |

Q2. Compare between each of the following: *Sketches are necessary* (20 marks)

1. The hanging wall and the footwall in normal and reverse faults.
2. Drag and rollover folds
3. The foreland and hinterland dipping duplexes.
4. The Domino and imbricate fan-rollover fold models.
5. Fan structure and duplexes.

Q3. Write short notes on the followings: (20 marks)

1. Classification of folds.
2. Water saturation controls the mechanical behavior of rocks.
3. The uses of Mohr circle to define the angle between the conjugate fault planes.



Answer the following questions:

Question One: Discuss only **ONE** of each of the following: (20 marks "4x5")

- Methods for drilling water wells.
- The main different types of the aquifers.
- Analytical methods of pumping test data.
- Groundwater evaluation for industrial purposes.
- Graphical presentations of hydrochemical analyses.

Question Two: (20 marks)

- Compare between the following: (8 marks "4x2")
 - Specific yield and specific retention.
 - Gaining (effluent) and losing (influent) streams.
- What are the principle causes of recharge and discharge? (4 marks)
- What are the pumping test parameters and aquifer parameters?(3 marks)
- What do the following symbols refer to: (5 marks"0.5x10")
 - E.C., K, Q, r_0 , S, Δs , T, T_0 , T.S.S. and T.D.S.

Question Three: (20 marks)

- What are the conditions to: (5 marks "2.5x2")
 - Find artesian flow.
 - Apply an ideal tracer.
- Give simple sketches for the following: (5 marks "2.5x2")
 - Hydrologic cycle.
 - Groundwater well.
- Put true or false for the following: (5 marks "1x5")
 - Bar-graph is used to compare between several samples.
 - Groundwater moves much more slowly than surface water.
 - Geohydrology differs only by its greater emphasis on geology.
 - Groundwater serves as important resource in all climatic zones.
 - Sulin diagram is used to determine hypothetical salt assemblages.
- Complete the following: (5 marks "1x5")
 - From Darcy's law; the Flow Rate (Q) =
 - Groundwater is developed for use through: ..., ... &
 - The major ion constituents in groundwater are: ..., ..., ..., &
 - The water-bearing formations are classified into: ..., ..., ..., &
 - The most important groundwater reservoirs in Egypt are: ... &

مع أصدق الدعوات بالنجاح والتوفيق،،،
لجنة الإمتحان: أ.د. صلاح نصر عياد، د. عبد الرحمن إمبابي.