

(Time: 2 Hours)

Geology Department,

Faculty of Science,

Assiut University

Final Examination for Faculty of Science in

Geological Map of Egypt (Course, 410G)

Write Briefly on the Following Topics:

- (1) The Geomorphology of the Eastern & Western Egyptian Deserts.
- (2) The areal distribution & types of Rocks of the Basement Complex in Egypt.
- (3) The Nubian Sandstone in Egypt and its: (a) Nomenclature, (b) Stratigraphic setting, (c) Age, (d) Areal Distribution, (e) Economic importance.
- (4) The Lithological & Stratigraphic Difference between the:
Quseir Formation, Dakhla Formation & Esna Formation.
- (5) The Name of Rock Units in Egypt of the:
1) Upper Cretaceous, 2) Paleocene, 3) Eocene & 4) Miocene.
- (6) The occurrence & economic important of the Quaternary Sediments in Egypt.
- (7) The tectonic Events and development of the:
1) Red Sea, Gulf of Suez & Nile Valley,
2) Syrian Arc System.

Good Luck

May,10,2018

Time allowed :1h

University of Assiut

Faculty of Sciences

Department .of Geology

Part II Remote Sensing (445G)

4.th YEAR

Answer Two Questions Only of The Following :-

Illustrating your answer with diagrams:

1- Comment on the following :

a) Spectral – Reflectance Curves(6 marks).

b) Lineaments and Circular Features(6.5 marks)

2- Give short notes on :

a) Picture Element (Pixel).....(4 marks)

b) Atmospheric Effects on EMR(3.5 marks)

c) Relation between Wavelengths, Spectral Bands and Remote Sensing bands(5 marks)

3- Write what you know about :

a) Detection of Surface Alteration Halos Associated with Ore Deposits(7.5 marks)

b) Ratio images..... (5 marks)

Prof.Dr.M.E.Habib





كلية العلوم-قسم الجيولوجيا



جامعة أسيوط

امتحان طلاب المستوى الرابع (ساعات معتمدة)
مقرر (٤٤٥ ج) جيولوجيا تصويرية واستشعار عن بعد

الزمن : ساعتان

الدرجة الكلية (٥٠ درجة)

مايو ٢٠١٨

PART I. PHOTOGEOLOGY (25 Marks)

ANSWER ONLY THREE OF THE FOLLOWING QUESTIONS: (18marks)

1. Explain how differential erosion is considered the first key to bedrock identification and interpretation on aerial photographs. (6 marks)
2. Compare and contrast between photo-geologic characteristics of the following pairs: (6 marks)
 - a. Extrusive and intrusive igneous rocks
 - b. Sandstones and Shale.
 - c. Horizontal and inclined inter-bedded sedimentary sequence
3. Discuss scale variations and differences in parallax on vertical aerial photographs . (6 marks)
4. Internal and external drainage patterns are considered as important tools of photo-geologic interpretation. Discuss (6 marks)

ANSWER THE FOLLOWING QUESTION (7 marks)

5. Write on the characteristics that affect photographic appearance of different unconsolidated quaternary sediments

GOOD LUCK !!

Prof.Dr. Moustafa M. Youssef



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Prof.Dr. Moustafa M. Youssef

**Fourth Level Examination in
Seismic Sequence stratigraphy (Gp.426)
For Petroleum Geology students**

Time: Two hours

(50 degree)

May, 2018

Answer the following questions (*Illustrate your answer by diagrams*):

I) - Write on, and differentiate between THREE ONLY of the following: (24 marks)

- 1- The difference between retrogradational and progradational stratal pattern in response to sea level changes and sediment flux.
- 2- Write on the differences between sequence boundaries (SB), maximum Flooding Surfaces (MFS) and marine Flooding Surfaces.
- 3- The criteria of recognition of sequence boundaries.
- 4- How do you distinguish a low stand system track from a transgressive system track?

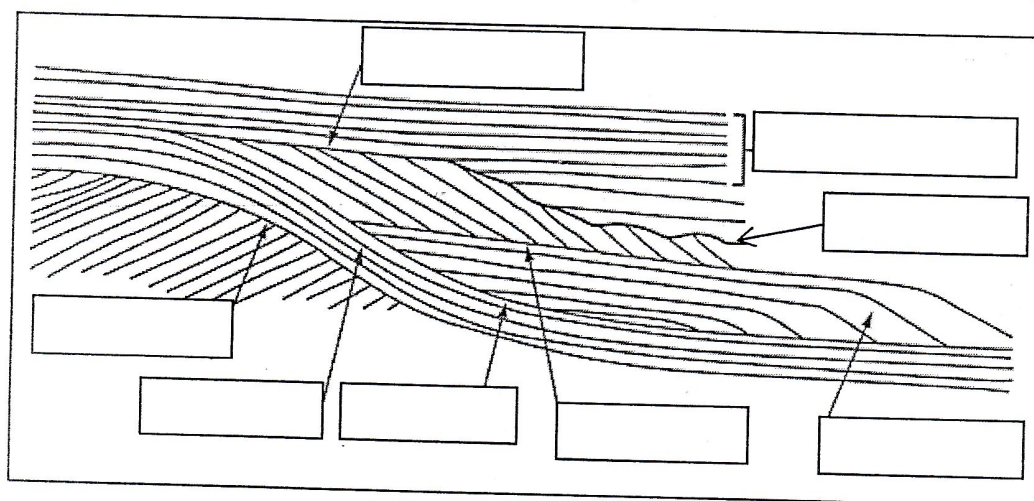
II) - 5- Provide short definitions of FOUR terms of the following and explain why they are important in sequence stratigraphy: (10marks)

- a) Gamma Ray Logs. b) Coastal onlap. c) Parasequence stacking patterns.
- d) Base level. e) Sequence stratigraphic seismic surfaces

III) - Answer TWO questions of the following: (10 marks)

- 6- What is the parasequences, how are their bounding surfaces recognized.
- 7- Define the difference between Type 1 and Type 2 sequence boundary and how do they form in response to the dominant factors influencing relative sea level?
- 8- What is meant by internal reflection configuration?

IV) - 9 -Identify the different types of seismic reflections and terminations given in the following figure (Write in the eight empty boxes) (6marks)



GOOD LUCK

PART II: (BIOSTRATIGRAPHY) (25 marks)

ANSWER THE FOLLOWING QUESTIONS:

Question No. 6: Choose the correct answer: (6 marks; 1 mark each)

- 1- arranges fossil-bearing rocks into chronometric order.
a- Taphonomy
b- Relative age dating
c- Bracketing
d- Radioactive age dating
- 2- Mass extinction at end -Cretaceous is attributed to
a- asteroid or comet impact
b- wide-spread volcanic activities
c- sea level fluctuations
d- A combination of terrestrial and extraterrestrial impacts
- 3- Almost ninety percent of the earth's 4.6 billion-year history is referred to as
a- Precambrian b- Proterozoic c- Phanerozoic d- Mesozoic
- 4- All rock strata have biostratigraphic characteristics; this statement is
a- True b- False c- not logic d- imaginary
- 5- Fluctuations in sea level cause significant in biogeographic record because of variations in water depths on the continental shelves.
a- flooding b- gaps c- systems tracks d- sediment aggradation
- 6- Zonal boundaries in biostratigraphic resolution are mostly influenced by
a- Sediment accumulation b- gaps in the record c- intrabasinal erosion d- all of them

Question No. 7: Compare between **two only** of the following: (10 marks; 5 marks each)

- 1- Reworked and introduced fossils.
- 2- Abundance Zone and Assemblage Zone.
- 3- Intrazonal and interzonal hiatuses.

Question No. 8: Answer **three only** of the following: (9 marks; 3 marks each)

- 1- Draw a time-distance diagram showing how range zone boundaries can differ between two geographic provinces or basins.
- 2- What is an index fossil? list the four characteristics.
- 3- What are the most significant index fossils used for Paleozoic biostratigraphy.
- 4- Write on the most significant problems and pitfalls in biostratigraphic analysis.

Examiner (Part I): Prof. Dr. Magdy S. Mahmoud (Geology Department)

Examiner (Part II): Dr. Abdelhamid Salman (Geology Department)

انتهت الأسئلة مع أطيب الأمنيات بالتوفيق



Final Exam, Geology Students
Palaeoecology & Biostratigraphy (G414)
May 2018

Total score: 50 marks

Time allowed: 2 hours

PART I: (PALAEOECOLOGY) (25 marks)

ANSWER THE FOLLOWING QUESTIONS:

Question No. 1: Mark the (right) and the (wrong) statements: (10 marks; 1 mark each)

- a- The diverse elements of the ecosystem slightly interact.
- b- Holocene dinoflagellate cysts reflect oxygen concentrations in surface waters.
- c- Diatoms are considered good depth indicators.
- d- Rivers discharges influence modern oceanographic conditions.
- e- Diagenetic alterations do not affect fossil preservation.
- f- The analysis of large biotic units such as realms is treated under palaeobiogeography.
- g- Animals moving in water are "streamlined".
- h- Palaeontologic data are used to reconstruct ancient environments.
- i- In palaeoecology work a great many parameters may be important, but some of the parameters are more important than others.
- j- Most interactions within biological creatures are preserved in the fossil record.

Question No. 2: Complete the missing word(s): (5 marks; 1 mark each)

- a- The rock unit containing a community is termed
- b- focuses on describing, understanding and interpreting organisms in the context of other organisms where they are coexisted.
- c- deals with the study of the interaction of organisms with one another and with the physical environment.
- d- In palaeoecology the total preserved part of the biocoenosis is termed
- e- Coralline algae occur in tropical to arctic areas, but best developed in

ANSWER TWO ONLY OF THE FOLLOWING QUESTIONS:

Question No. 3: (5 marks; 2.5 marks each)

Write briefly on the following:

- a- Ecology/palaeoecology interface
- b- Environmental gradients

Question No. 4: Answer the following: (5 marks; 2.5 marks each)

- a- Substrate, turbulence and locomotion method can be reflected by studying fossil morphology, discuss this statement?
- b- Compare between autecology and synecology.

Question No. 5: (5 marks)

Four groups of calcareous algae are important in interpreting depositional environments. What are these groups? Give an example on one of them.

← أقلب الصفحة من فضلك

II. Evolution

Q1: Correct over the line:

(13 marks)

- 1- Mutations give rise to new bacteria.
- 2- Preplanning causes sickle-cell anemia.
- 3- Darwin's theory is "the inheritance of acquired traits."
- 4- Turtles of Galapagos are examples of natural selection.
- 5- Cloning is the mechanism of old Darwinism.
- 6- Populations are same species if gene flow is prevented.
- 7- Living beings evolved gradually in intermediate forms by chance.
- 8- Ediacaran fossils have exoskeletons.
- 9- The sheep Dolly is a product of divergent evolution.
- 10- Appendix is functionless and over time should be disappeared.
- 11- Burgess Shale's fossils displayed simple similar animals.
- 12- Parallel evolution is the reason of bacterial immunity.
- 13- Variations add new characteristics resulting new species.

Q2: Answer only three of the following:

(12 marks)

- 1- Explain two doubts of evolution thesis by natural selection.
- 2- Discuss the Invalidity of Morphological Homology as an evidence of evolution.
- 3- Illustrate why metamorphosis should happen perfectly and not by chance.
- 4- Demonstrate the distribution of animals according to Darwinism & fossil record.

بالتوفيق و السداد

أ.د/هناء عاطف

د/ إقبال تادرس

Question No. 3

(Total 15 Marks)

A-What are the genetic; textural and mineralogical differences/or similarities between the known Egyptian iron ores: oolitic ironstone formation (southern Eastern Desert); Banded iron ore formation (BIF) (Red Sea coast) ; the Baharia iron ore (Westerns Desert) and Banded iron formation (BIF) Uwainate (southern Western Desert). (8Marks)

B--What factors controlling and limiting the development of oxidation zone? What types of ores you look fore in the oxidation zone? And How Cu-sulfide enrichment goes? Elucidate your answer with chemical equations. (7Marks)

Question No. 4

(Total 15 Marks)

A-How can you interpret the occurrences of the different ore deposits of Egypt (Metallogeny) within relation of crustal evolution of the Egyptian terrain? Illustrate your answer by drawing. (5Marks)

B- Evaporates are formed from different types of waters. What are these types? In addition, What are the normal paragenetic sequences of an evaporate assemblage from a sea water brine? From Where the Egyptian natural evaporates, wealth resource comes? (5Marks)

C-In Egypt, there are some important economic ore deposits, which are genetically resulted from metamorphic processes, What are these deposits? Where these deposits do occur? Discuss briefly its common uses. (5Marks)

و بالتوفيق

Examiner Prof. Dr. Nadia Sharara

Good Luck

Assiut University

Faculty of Science

Geology Department

Final B Sc. Examination

ECONOMIC GEOLOGY (G 434)

May 2018

Total Marks 50

Time allowed :2hours

Answer **THREE QUESTIONS ONLY** from the following

QUESTION NO. ONE IS COMPULSARY

Elucidate your answer with drawings whenever it possible

Question No.1

(Total 20 Marks)

A-Why gold is almost found concentrated along shear and fracture zones at the immediate vicinity with the host rock? **How** gold mineralization in Egypt is fit into the plate tectonic model of evolution for the Nubian Shield during the late Proterozoic time? **Discuss** briefly the dominant characteristics genetic aspect for both the **Epithermal gold – silver (copper)** mineralization and the **Mesothermal – Orogenic (Lode-gold)** mineralization styles . **How** gold precipitation mechanism goes in the above two different environmental styles? **Mention** only five important Egyptian mines and give their average gold content (grade, g/t)
(10 Marks)

B-What criteria you should look for and used as evidences of metasomatic origin of certain ore deposit?. **How** can you explain zoning in pegmatites?
(5 Marks)

C-What are the main factors that control uranium concentration, mobility and deposition? **Give** the names and the type of occurrences of five important localities for U-and/or Th-bearing mineralization in Egypt.
(5 Marks)

Question No. 2

(Total 15 Marks)

A-What are the essential features for the formation of hydrothermal mineral deposits? **What** are the important criteria for distinguishing fissure filling type hydrothermal deposits? And **What** are their common forms? **What** are the fundamental alterations used as practical guides for prospecting of hydrothermal deposits?
(8 Marks)

B-What are the main differences between the strata-bound and strata-form ore deposit formations? **Explain**, briefly the genesis of the Volcanogenic Massive Sulfides Deposits (VMS)? **Mentioning** its commonly associated ore minerals? **Where** do these deposits occur in Egypt and **Where** their correspondence famous known world types exist?
(7Marks)

Continued Overleaf



Answer the following questions

The First Question

(30 mark)

a) Write on

1. Radioactivity Decay (definition, law, example)
2. Geothermal dynamic sediment hosted system
3. Geothermal potential of Egypt
4. Rubidium– Strontium method used age dating
5. Geothermal Survey

b) Compare between Alpha Particles, Beta Particles and Gamma ray

The Second Question

(20 mark)

a) Complete the missing answer

1. The geologic events which can be dated by age dating methods are
1).....2).....3)
2. The geothermal areas is.....
3. The mathematical expression that relates radioactive decay to geologic time
is.....
4. The equation used to calculate paleotemperature (T) from oxygen isotope composition
is.....
5. Instruments for measuring radioactivity called 1).....2).....3).....
4).....
6. The main uses of geothermal energy in Egypt are 1)2)3)
.....4).....
- 7) The main elements of geothermal system are 1).....2).....3).....

b) Put mark (✓) or (X) with error correction

1. Micas and hornblende are well suited for K-Ar dating ()
2. Half life time of Tritium H3 is 12.5 m. yr. while C-14 is 5.7 yr. ()
3. Most elements are useful for geologic dating such U-238, K-40, Pb-204 and C-14 ()
4. Thermal diffusion depend only on density and thermal conductivity ()
5. The important factors in geothermal reservoir are rock units, tectonic elements, and
the presence of high temperature ()

PART-II: Sequence Stratigraphy (25 degree)

I- Answer the following question (Illustrate your answer by diagrams):

1. Define lithostratigraphy and sequence stratigraphy. Why is sequence stratigraphy preferred for reconstructing earth history? What are the primary surfaces used by sequence stratigraphers, how do they form, and how are they recognized? **(9 marks)**

II- Write on three ONLY of the following:

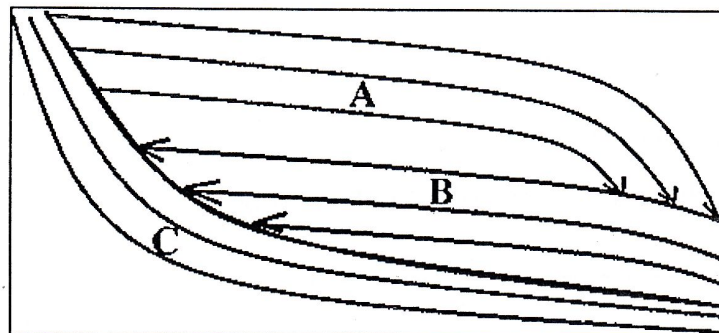
(9 marks)

2. What controls the changes in accommodation space?
3. What is a parasequence and how are the bounding surfaces recognized?
4. How does the vertical stacking pattern of parasequences allow for the recognition of systems tracts?
5. Explain how regression might occur during relative sea-level rise.

III- Choose the correct answer for the following statements:

(4marks)

6. A systems tract consists of
- a. Genetically associated stratigraphic units that were deposited during specific phases of the relative sea-level cycle
 - b. Tectonically active basins that adjoin each other
 - c. The regressive deposits that form when sediment accumulation rates exceed the rate of relative sea-level rise
7. A depositional sequence is
- a. One that never uses water saturation in marker beds as sequence boundaries.
 - b. The term used to indicate that hydrothermal alteration has occurred at certain intervals in time.
 - c. A stratigraphic unit composed of a relatively conformable succession of genetically related strata and bounded at its top and base by unconformities or their correlative conformity.
 - d. never used in deep marine clastics such as turbidites.
8. What letters (A, B or C) on the following diagram represent the **toplap-downlap** sequence? **Explain why?** (Yes, it is two different things, so watch out!) **(3marks)**



-----GOOD LUCK-----

Prof. Dr. Mohamed Ahmed Soliman

Prof. Dr. Ahmed-Reda El Younsy

**Fourth Level Examination in
Sedimentary Basins & Sequence stratigraphy (G420)
For Geology and Geophysics students**

Time: Two Hours (50 degree) May, 2018

PART-I: Sedimentary Basins (25 degree)

Answer the following questions:

- 1- a. What is a sedimentary basin? (5 marks)
b. Mention the sedimentary basins caused by plate divergence. (5 marks)

Answer three questions only from the following:

- 1- a. Mention the basins caused by plate divergence. (5 marks)
b. Choose the correct answer

Forearc basins are:

- basins related to Subduction
- basins related to collision

- 2- a. Choose the correct answer (5 marks)

Backarc basins are:

- Subduction-related basins
- Divergent-related basins
- Collision-related basins

- b. Mention briefly the sedimentary rocks filling the backarc basins

- 3- Write a brief account on the closing phase of the Wilson Cycle.

Illustrate your answer with drawing. (5 marks)

- 4- a. Choose the correct answer (5 marks)

The pull apart basins are:

- Strike-Slip basins
- Basins caused by plate convergence

- b. Describe briefly the sedimentary fill of pull apart basin

باقى الأسئلة بالصفحة التالية

2. Draw sketches demonstrating the use of well logs in detecting FOUR ONLY of the following: (8 marks)

a) Overpressure zones	b) Gas-water contacts
c) Gas influx	e) Facies of clastic rocks
f) Scintillation Counter	

بقية الأسئلة في الصفحة التالية

Time: 2 hours	Total marks: 50	GPR and Paleomagnetism (G453)	May., 2018
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Write on the following (10 marks each):

- 1) Different Applications of GPR and paleomagnetism
- 2) Sampling and measuring techniques of natural remnant magnetization

Write on FIVE only of the following (6 marks each):

- 1) Different types of remnant magnetization
- 2) The main parameters (electrical, magnetic and physical) that control the ground penetrating radar method
- 3) The main sources of Earth's magnetic field
- 4) Different ways of velocity analysis in GPR
- 5) Changes in earth's magnetic field
- 6) The different acquisition modes in GPR (with drawing)
- 7) The geomagnetic secular variations

GOOD LUCK Prof. Dr. Gamal Zidan



I. In hydrothermal ore deposits, the source of metals could come from
or be leached from any rock type as water passes through it.

J. Magmatic related hydrothermal system subdivided to two main groups
..... and

3. Identify the following processes and mention ore deposits related to each process
Mechanical accumulation-liquid immiscibility- hydrothermal deposit- Skarn process-
secondary super gene enrichment (5 marks)
4. Discuss the methods of VMS classification. (5 marks)
5. Mention why S-saturation caused in a basic magma due to fractional crystallization of
olivine, pyroxene, chromite and magnetite? (5 marks)
6. In suppergene enrichment process, write the chemical reactions caused in gossan,
leached, oxidized ore and enriched zones. (5 marks)
7. Write briefly about the sources of *Metals and Sulphur in Porphyry Deposits* (5 marks)
8. Match between the ore metals and their related processes in the following: (5 marks)

(A)	(B)
Cu-Ni	sedimentary chemical
VMS	magmatic liquation
Evaporites	Hydrothermal
Hematite and limonite	magmatic - hydrothermal
porphyry type	Supergene enrichment oxidation zone

9. Write in short about the pegmatite type deposits (5 marks)

With my best wishes

Prof.Dr./Mohamed Abdel Moneim



Answer The Following Questions

1. Write the formulas used for estimating **FOUR ONLY** of the following: (8 marks)

i) Electrochemical self potential.

ii) Movable hydrocarbon saturation.

iii) Permeability.

iv) Hole volume for cement requirements.

v) A discriminant function of source and non-source rocks.

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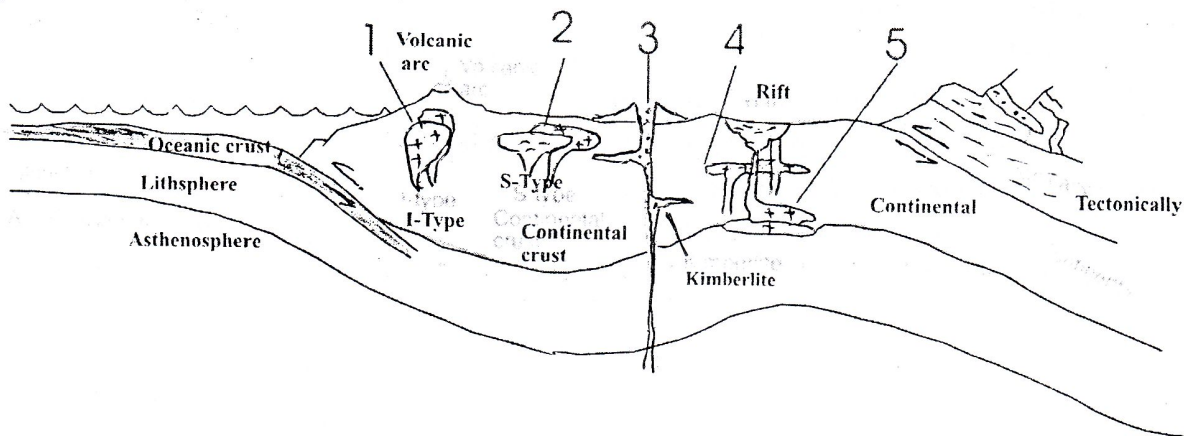
Prof.Dr./Mohamed Abdel Moneim



Ore forming processes (438g)

Answer the following questions :

1. Look to the continental crust architecture in the following sketch and write the main types of ore deposits related to 1,2,3,4,5 settings (5 marks)



2. Complete the following (10 marks)

- A. Phosphate and evaporates are formed by sedimentary process
- B. Bauxite and limonite are formed by sedimentary process named.....
- C. Minerals deposits formed by high temperature contact metamorphic processes where a silicic magma (granite) intrudes carbonate rocks named
- D. Process by which Excising mineral deposits can be turned in to more highly concentrated mineral deposits by weathering is called.....
- E. Process by which sulphides minerals separated from silicates magma due to decreasing temperature is named
- F. magnetite, molybdenite, sphalerite, galena, scheelite, hematite, garnet, epidote are the common minerals related to type deposit.
- G. Medium and high sulphidation hydrothermal solution may related to type deposit
- H. In VMS, the core and lower part of mineralizing zone are composed mainly ofand..... minerals.

4. Give shortly the reason of **FOUR ONLY** of the following: (8 Marks)

- a) SP tool won't record anything against evaporite formation.
- b) In case of density logs, the counts of detectors decrease with decreasing porosity.
- c) Mud cake is an indicator of permeability.
- d) Resistivity variations of rocks.
- e) Problems in logging measurements due to mud invasion.

5. What are the differences between the following: (10 Marks)

- Flushed, transition and uninvaded zones.
- Normal and lateral resistivity logs.
- Total and spectral GR logs.
- Positive, negative and zero deflection in SP log curve.

6. Explain how only TWO of the following are accomplished, using: (6 marks)

- Five temperature log applications.
- Combined density and neutron measurements to discriminate lithology.
- GR and SP logs to estimate shale volume.

انتھت الأسۃ

Good Luck !!

Examiners: Prof. Dr. Awad A. A. Omran

إمتحان مقرر جيولوجيا الآثار (458ج)

الفصل الدراسي الثاني / للعام الدراسي 2018/2017

الزمن ساعتان

المستوى الرابع (جيوفيزياء)

تاريخ الامتحان الأحد الموافق 2018/5/27

Answer FOUR questions only of the following (50M)

Q1 (12.5 M)

Give short notes about five points of the following?

- i- Seasoning of stones
- ii- Artifacts
- iii- Soil phosphate in archaeological surveys
- iv- Sedimentology in archaeology
- v- Archaeometry
- vi- Archaeomineralogy

Q2 (12.5 M)

- i- Discuss the geological setting of the gold deposits of the Egyptian and Nubian Deserts?
- ii- Mention some examples of minerals in the archaeological record and their applications?

Q3 (12.5 M)

- i- What is the meaning of Prehistoric Sites? Discuss the importance of studding prehistoric site in Egypt with a case study from Nile Valley?
- ii- Write on the geological materials used as paints and pigments in Ancient Egyptian art?

Q4 (12.5 M)

- i- Explain the factors governing choice of building stone with emphasis on the characteristics and qualities of good building stone?
- ii- *Write briefly on Gebel el-Silsila sandstone quarry (Middle to New Kingdom, Ptolemaic to Roman) and its products?*

Q5 (12.5 M)

Compare between Deposits of imperial porphyry around Gebel Dokhan and Deposits of tonalite and the Roman search for grey granitoids in the Eastern Desert?



Final Examination, Geostatistical Methods in Geophysics

May 2018	Geost. Methods (456G)	50 Points	Time: 2 Hours
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I. Answer only three of the following (use illustrations):.....(21 points)

- A)- Compare between descriptive and inferential statistics
- B)- Describe the Variogram model and its components, give four model examples
- C)- Compare between IDW and Natural neighbors interpolation methods
- D)- Discuss in details the kriging method

II. Define only four of the following:.....(10 points)

- A)- Cross section data
- B)- Unbiased natural occurrence
- C)- Tensor
- D)- Interpolation
- E)- Stochastic interpolation

III. Answer only four of the following questions:.....(10 points)

- A)- Draw a curve representing mode>median>mean
- B)- On one curve, represent a dataset with +ve kurtosis and +ve skewness
- C)- Write down the equation describing the variogram
- D)- On a curve, represent a dataset with negative-complete correlation
- E)- On a curve, represent a surface created with spline interpolation method

IV. Answer the following question:(9 points)

Taking into account the following geostatistical data:

γ	0.009	0.035	0.065	0.12	0.15	0.158	0.139	0.16	0.17
Distance	0	10	13	15	20	30	40	50	60

Draw the experimental data on a variogram and estimate the following (use the given graph paper):

- Optimum sampling distance (length) in meters
- Maximum variance distance (scale)
- Suggest the most appropriate variogram model that match these data

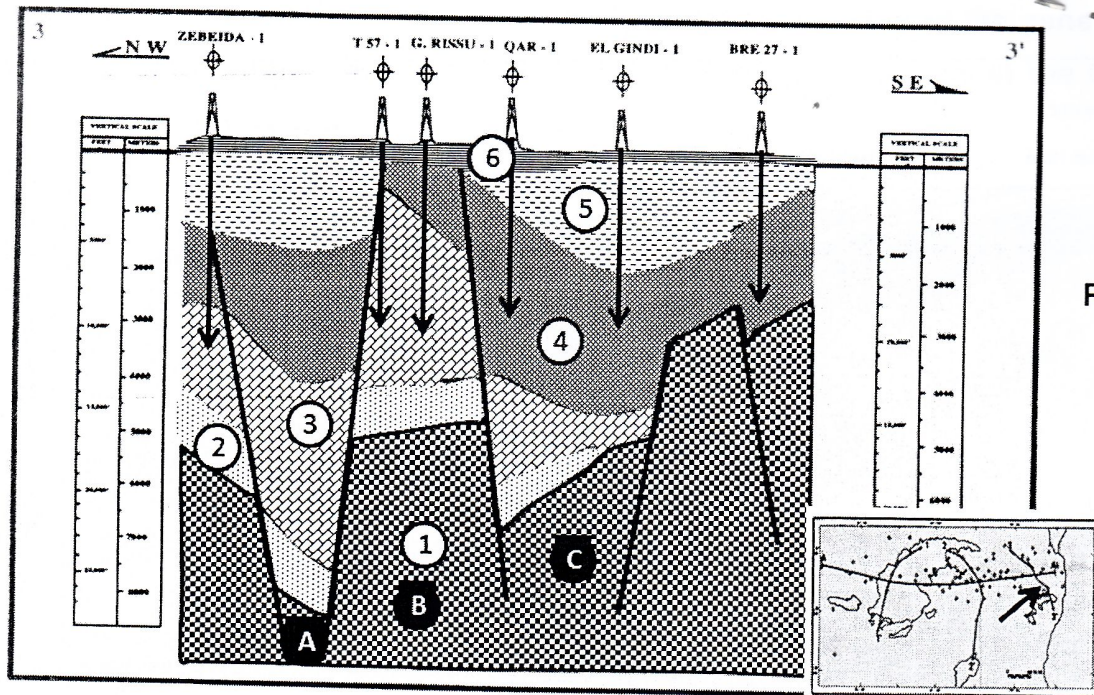


Fig. 3-A

3-B: You have in the following figure a subsurface stratigraphic correlation chart from Southwest to Northeast across the Beni Suef Oil field in the Nile Basin . Define the recovered rock units and their equivalent time units from 1 to 7

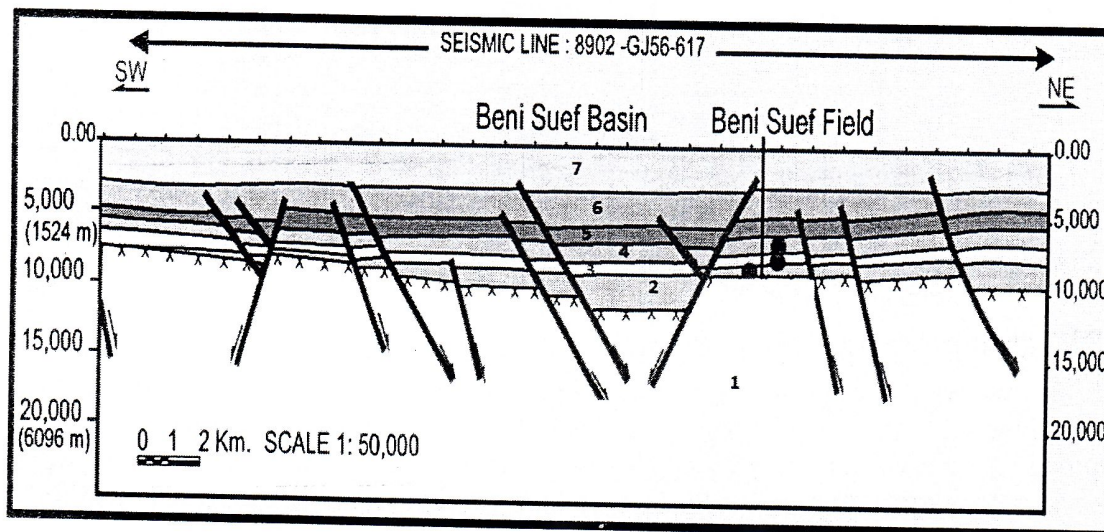


Fig. 3-B

3-C: You have a subsurface-submarine stratigraphic correlation chart from the Nile Delta (southeast) to Cyprus (Northeast) across the Eastern Mediterranean. Define the time units of the rock units recovered from 1 to 12, , and identify the meaning of the symbols S and R

2. Compare between neutron and sonic sondes by given items: (10 marks)

items	neutron sonde	sonic sonde
Sketch		
The measured quantity		
Source or emitter type		
Number and type of detectors		
The relation used for porosity estimation from the tool readings		

بقية الأسئلة في الصفحة التالية

Question No. 3

(Total 15 Marks)

A-What are the genetic; textural and mineralogical differences/or similarities between the known Egyptian iron ores: oolitic ironstone formation (southern Eastern Desert); Banded iron ore formation (BIF) (Red Sea coast) ; the Baharia iron ore (Westerns Desert) and Banded iron formation (BIF) Uwainate (southern Western Desert). (8Marks)

B--What factors controlling and limiting the development of oxidation zone? **What** types of ores you look fore in the oxidation zone? And **How** Cu-sulfide enrichment goes? **Elucidate** your answer with chemical equations. (7Marks)

Question No. 4

(Total 15 Marks)

A-How can you interpret the occurrences of the different ore deposits of Egypt (Metallogeny) within relation of crustal evolution of the Egyptian terrain? Illustrate your answer by drawing. (5Marks)

B- Evaporates are formed from different types of waters. **What** are these types? In addition, **What** are the normal paragenetic sequences of an evaporate assemblage from a sea water brine? From **Where** the Egyptian natural evaporates, wealth resource comes? (5Marks)

C-In Egypt, there are some important economic ore deposits, which are genetically resulted from metamorphic processes, **What** are these deposits? **Where** these deposits do occur? **Discuss** briefly its common uses. (5Marks)

و بالتوفيق

Examiner Prof. Dr. Nadia Sharara

Good Luck

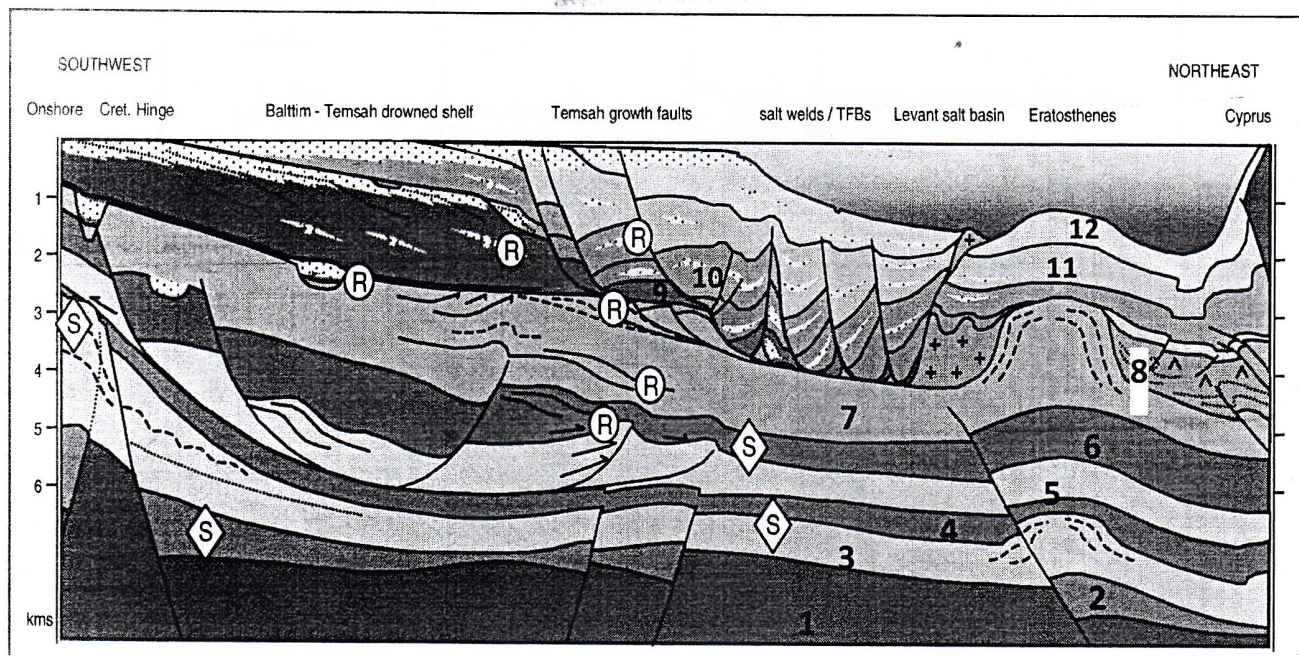


Fig. 3-

Good Luck
Prof. Dr. Khaled Ouda

QUESTION 2: Identify the items from 1 to 32 in the given table of the generalized stratigraphic column of the Cenozoic basins and oil potentialities in the Gulf of Suez Region. (10 Marks)

Time units Epoch & Age = Series & Stage			Rock units Formations & members	Lithology	Thickness	33	Reservoir Rock	Oil Field
2	6	13	31		3000 feet		X	●
		12	30		2300 feet		X	●
	5	11	29		1400 feet		X	●
			Feiran					
			28					
			27					
	4	10	26		1000 feet	☐	X	●
			25					
			24					
			23					
	4	9	22		32	☐	X	●
			21					
			Khoshera					
			20					
	4	8	19		1200 feet	☐	X	●
			18					
			17					
1	3	7	Abu zenima & Tayiba Beds		450 feet			

QUESTION 3 (A-C): (10 Marks)

3-A: You have in the following figure a subsurface correlation chart along Line 3-3' extending from northwest to southeast across the Fayum Depression in the eastern part of the northern Western Desert (Black Arrow in the geographic map), Egypt. Define the time units (Era, Period or Epoch) of the rock units from 1 to 6 which are recovered in the given wells, and identify the name of encountered Basins and Uplift from A to C.

Part IV (Structural Framework, Paleogeography and Paleoenvironment)
(10 Marks)

Answer the following question:

Question 6 (A-C)

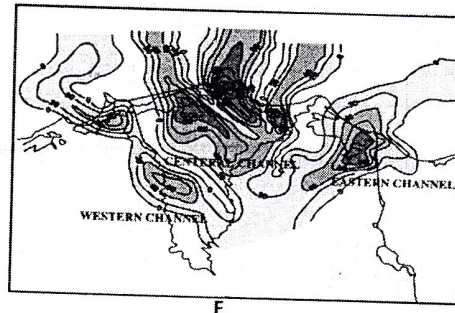
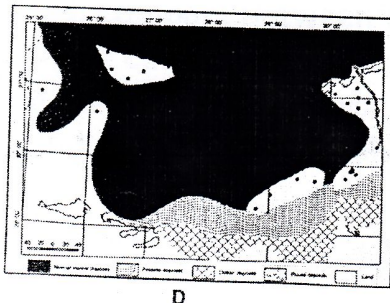
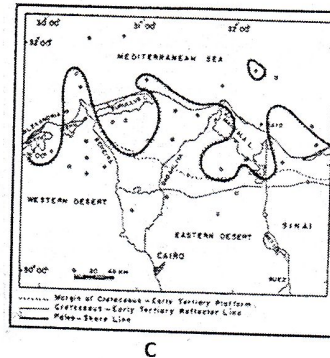
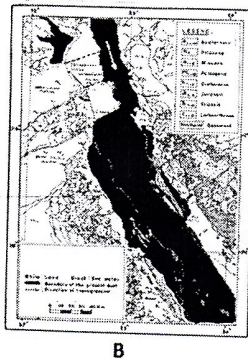
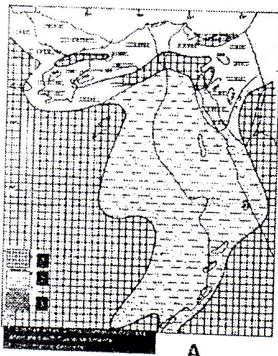
6-A: Write on ONE of the following. (3.5 Marks)

- 1) The spatial inter-relation between the Dokhan volcanics and the Hammamat sediments.
- 2) Archean to Early Proterozoic rocks of Gebel Oweinat

6-B: Give reasons for TWO only of the following statements:

- i) The difficulty in the determining the geologic age of the Paleozoic rocks.
- ii) The restricted occurrence of marine Triassic rocks in the north-eastern part of Egypt.
- iii) The variation in the thickness of the Paleozoic rocks in Egypt.

6-C: Look to the following paleogeographic maps and define the Period, Epoch and Absolute age during which the Egyptian land was submerged in a way such as in figures A, B, C, D and E. (4.0 Marks)



Good Luck.
Prof. Khaled Ouda;
Prof. Ali Khudeir;
Prof. Nageh Obaidalla

بسم الله الرحمن الرحيم

ASSIUT UNIVERSITY
FACULTY OF SCIENCE
GEOLOGY DEPARTMENT

جامعة أسيوط
كلية العلوم
قسم الجيولوجيا

الزمن ساعة

إمتحان المستوى الرابع جيولوجيا البترول

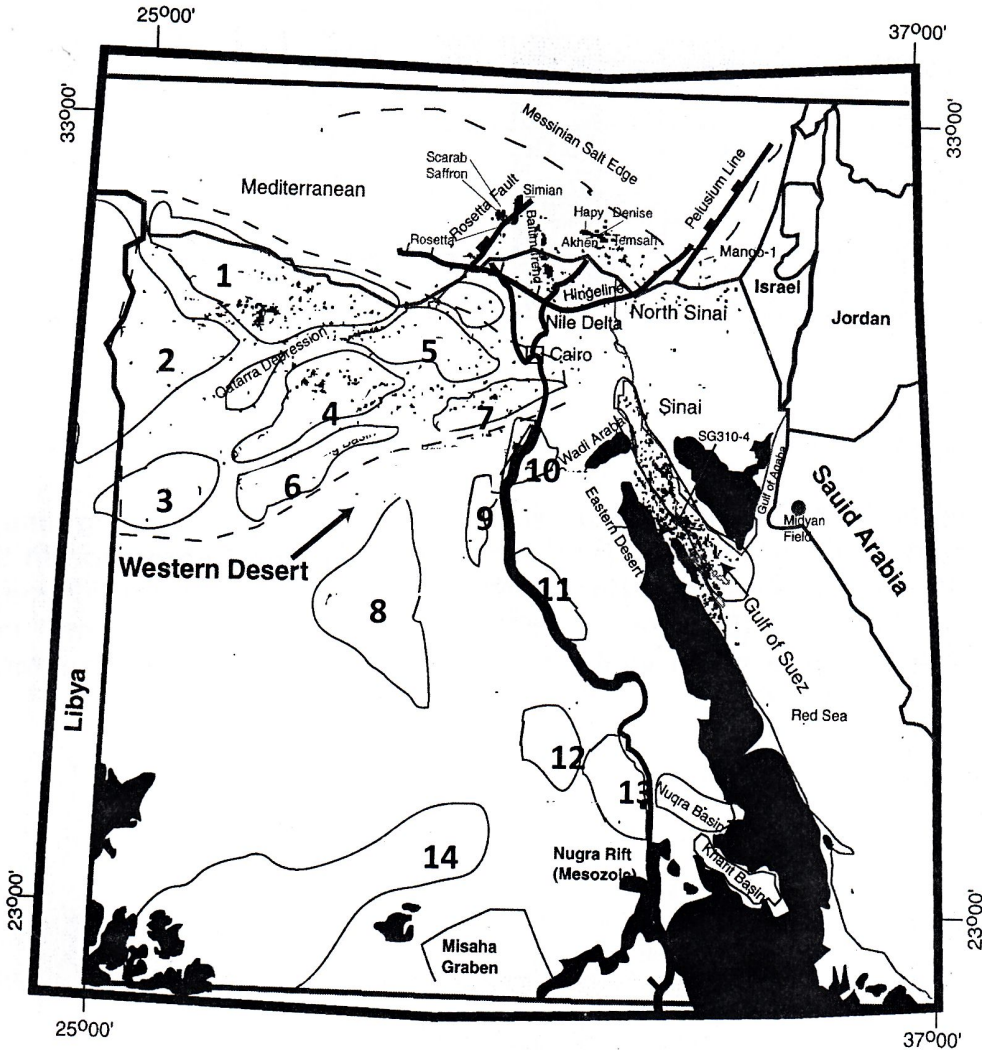
دور يونيو 2018

مقرر 427 ج ب (تحليل حوضى وأحواض ترسيب مصرية)

Part 2: Sedimentary basins in Egypt (4 pages)

Answer TWO only of the following questions:

QUESTION 1: Identify the sedimentary basins in Egypt which are given in the following map from No.1 to No.14. (10 Marks)



(F) None of the above.

• **A Rift basin is.....(2.5 marks).**

(A) A normal fault bounded basin that develops during extension of continental lithosphere.

(B) Elongate depression overlying a place where the lithosphere has ruptured in extension.

(C) None of the above.

(D) All of the above.

• **A back-stripping method of basin analysis is.....(2 marks).**

(A) A sedimentological analysis technique used on sedimentary rock sequences to quantitatively estimate the depth that the basement would be in the presence of sediment and water loading.

(B) A geophysical analysis technique used on sedimentary rock sequences. The technique is used to quantitatively estimate the depth that the basement would be in the absence of sediment and water loading.

(C) All of the above.

• **According to their tectonic settings sedimentary basins are.....(2 marks).**

(A) Variously termed arches, paleohighs, schwelle, axis of uplift, or positive areas.

(B) Circular, or more frequently elongate depressions, troughs, or embayments, but often they may have quite irregular boundaries.

(C) Post-depositional, syn-depositional, or pre-depositional basins.

(D) Both (a) and (b).

(E) None of the above.

(F) All of the above.

IV. Question no (4). Write briefly on the following (8.5 marks):

(A) Definition of geosyncline and its types depending on the kinds of rock of the mountain belt (3 marks).

(B) The cyclical opening and closing of ocean basins (Wilson cycle) (3 marks).

(C) Basins associated to transform basins (strike-slip fault basins) (2.5 marks).

Good Luck

Dr. Abdalla El Ayyat

Question 3: (10 Marks)

Describe in a time table the litho-, bio- and chemostratigraphy as well as the paleoenvironment and paleontology of the Paleocene-Eocene boundary interval as given in the Global Stratotype Section and Point (GSSP) at Dababiya village , south Luxor.

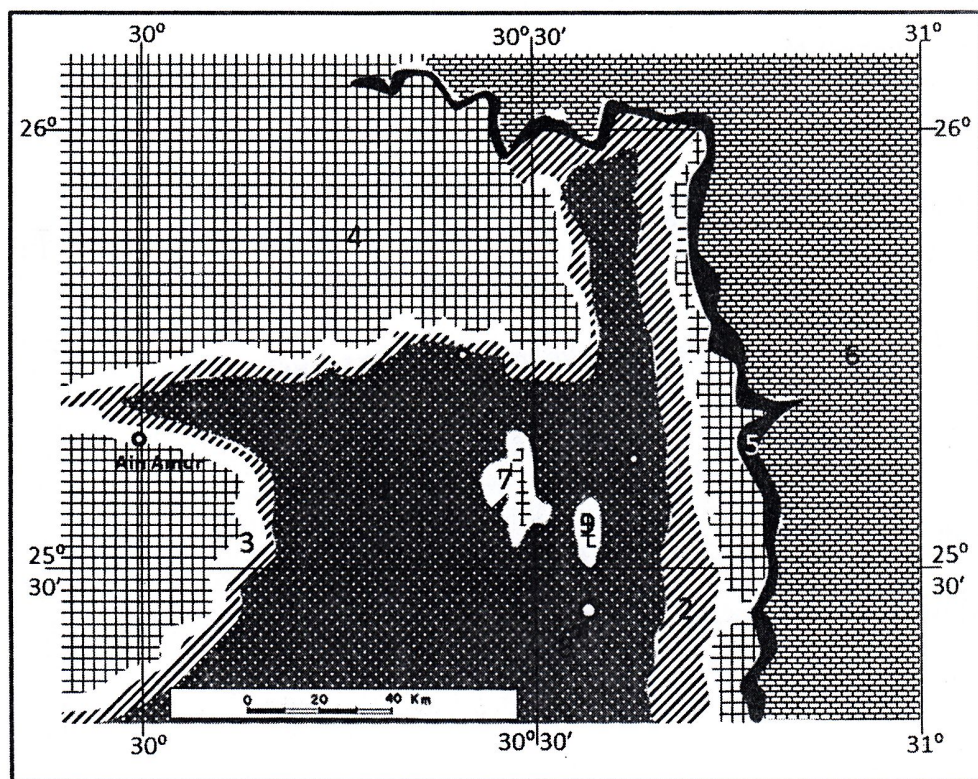
Question 4: (10 Marks)

Correlate in a time table the Oligocene-Miocene rock units in the Northern Western Desert, the Nile Delta and the Gulf of Suez.

Question 5 (A- B): (10 Marks)

5A: Define the Middle Eocene-Upper Eocene rock units in the Fayoum Province and correlate them with their comparable rock units in the Nile Valley (5 Marks)

5-B: Look to the following map and define: a) the name of district, b) the names , lithology and age of rock units from 1 to 6, C) the name of topographic and geographic features from 7-9 (5 Marks)



Geology Department Faculty of Science Assiut University		Time: 2 Hours May 2018 Second Term Exam
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Second Semester Final Examination-May 2018
Basin analysis and Egyptian sedimentary basins (427GP)
Students: 4th level of Petroleum Geology

Part One: Sedimentary basin analysis (25 marks)

Answer only Three questions out of the following

I. Question no (1). True or false (8.5 marks):

- (a) Structure-contour maps can reveal the locations of sub-basins or depositional centers within a major basin as well as axes of uplift (1 mark).
- (b) A geosyncline is large trough like or basin like down warping of the crust in which thick sedimentary and volcanic rocks accumulated (1 mark).
- (c) A sedimentary basin has an axis, a line connecting the lowest structural points of the basin; the axis of trough may plunge (1 mark).
- (d) Basin relief can be created mechanically on a regional scale in two very important ways: thermally or flexurally, or by a combination of those two effects (1 mark).
- (e) On a small scale, hundreds to thousands of meters laterally, fault movements can create relief resulting in small but often deep basins (1 mark).
- (f) Back-stripping is a geophysical analysis technique used to quantitatively estimate the depth that the basement would be in the absence of sediment and water loading (1 mark).
- (g) In pre-depositional basins, rapid tectonic movements predate significant sediment accumulation and create a morphological basin, which is filled later by post tectonic sediments (1.5 marks).
- (h) Sedimentary basins are separated from another by raised linear areas termed arches, paleohighs, schwelle, or positive areas (1 mark).

II. Question no (2). Write briefly on the following (8.5 marks):

- (A) Descriptive classification of sedimentary basins (3 marks).
- (B) Post-depositional, syn-depositional and pre-depositional basins (3 marks).
- (C) Formation of sedimentary basins by flexural way (2.5 marks).

III. Question no (3). Choose the correct answer (8.5 marks):

- Aulacogens are.....(2 marks).
- (A) The second, failed arm of a three-armed rift, two of whose arms continued to open to form an ocean basin.
- (B) Aulacogens start at the passive continental margin.
- (C) Extending from the margins toward the open sea.
- (D) Both (A) and (C).
- (E) All the above.

Question No. 3

(Total 15 Marks)

A-What are the genetic; textural and mineralogical differences/or similarities between the known Egyptian iron ores: oolitic ironstone formation (southern Eastern Desert); Banded iron ore formation (BIF) (Red Sea coast) ; the Baharia iron ore (Westerns Desert) and Banded iron formation (BIF) Uwainate (southern Western Desert). (8Marks)

B--What factors controlling and limiting the development of oxidation zone? **What** types of ores you look fore in the oxidation zone? And **How** Cu-sulfide enrichment goes? **Elucidate** your answer with chemical equations. (7Marks)

Question No. 4

(Total 15 Marks)

A-How can you interpret the occurrences of the different ore deposits of Egypt (Metallogeny) within relation of crustal evolution of the Egyptian terrain? Illustrate your answer by drawing. (5Marks)

B- Evaporates are formed from different types of waters. **What** are these types? In addition, **What** are the normal paragenetic sequences of an evaporate assemblage from a sea water brine? From **Where** the Egyptian natural evaporates, wealth resource comes? (5Marks)

C-In Egypt, there are some important economic ore deposits, which are genetically resulted from metamorphic processes, **What** are these deposits? **Where** these deposits do occur? **Discuss** briefly its common uses. (5Marks)

و بالتوفيق

Examiner Prof. Dr. Nadia Sharara

Good Luck

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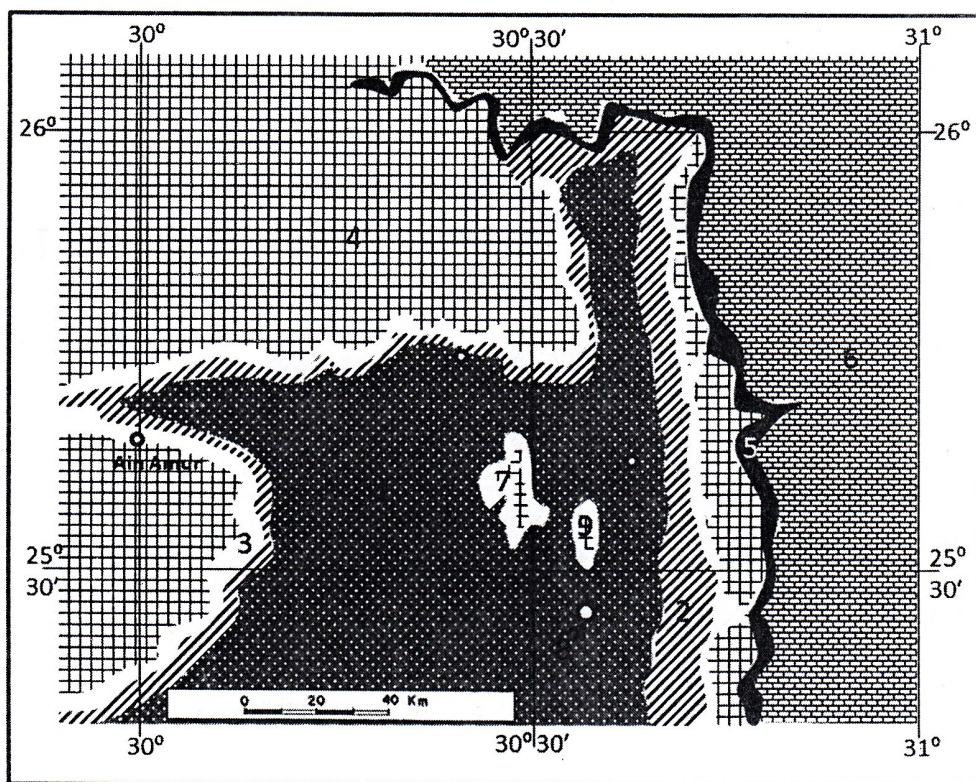
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بسم الله الرحمن الرحيم

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Faculty of science
Geology Department

إمتحان المستوى الرابع (شعبتي الجيولوجيا والجيوفيزياء)

مقرر 415 ج (جيولوجية مصر)

Course 415 G (Geology of Egypt)

الزمن ثلاث ساعات

الدرجة: 50 درجة

دور يونيو 2018

الإمتحان مكون من ثلاث صفحات

Part I (PreCambrian) 10 Markes

Question 1 (A-B) : Write shortly on the following items. (10 Marks)

1-A: The main characteristics of the Egyptian ophiolite suites. (5 Marks)

1-B: The general features of the syn-to late orogenic granite outcrops exposed in the Eastern Desert. (5 Marks)

Part II (Cambrian to L. Cretaceous) 10 Marks

Question 2 (A-B) : (10 Marks)

Answer the following question:

2- A: In a geological time table write the surface Paleozoic rock units in northern and southern parts of Egypt. (7 Marks)

2- B:- Discuss the Early Cretaceous rocks in Sinai. (3 Marks)

Part III (Upper Cretaceous to Quaternary) 20 Marks

Answer TWO Questions of the following:

Part IV (Oil and Gas Potentialities in Egypt) 10 Marks

Answer the following question:

Question 6 (A&B): (10 Marks)

Give the appropriate data on the following items:

6A : The reserves by age and petroleum system in the Gulf of Suez, Nile Delta and the Northern Western Desert of Egypt (5 Marks)

6-B: The estimates of volumes of undiscovered oil and gas in the Nile Delta Basin (Nile Cone and Nile Margin) in the eastern Mediterranean as given by the USGS. (5 Marks)

Good Luck.

Prof. Khaled Ouda; Prof. Ali Khudeir; Prof. Nageh Obaidalla

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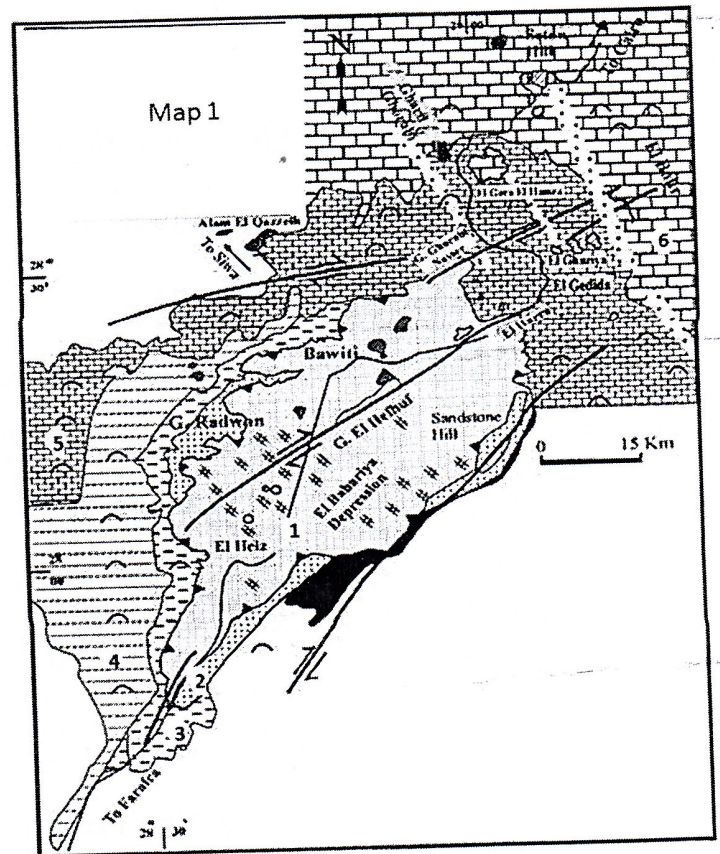
Good Luck.

Prof. Khaled Ouda; Prof. Ali Khudeir; Prof. Nageh Obaidalla

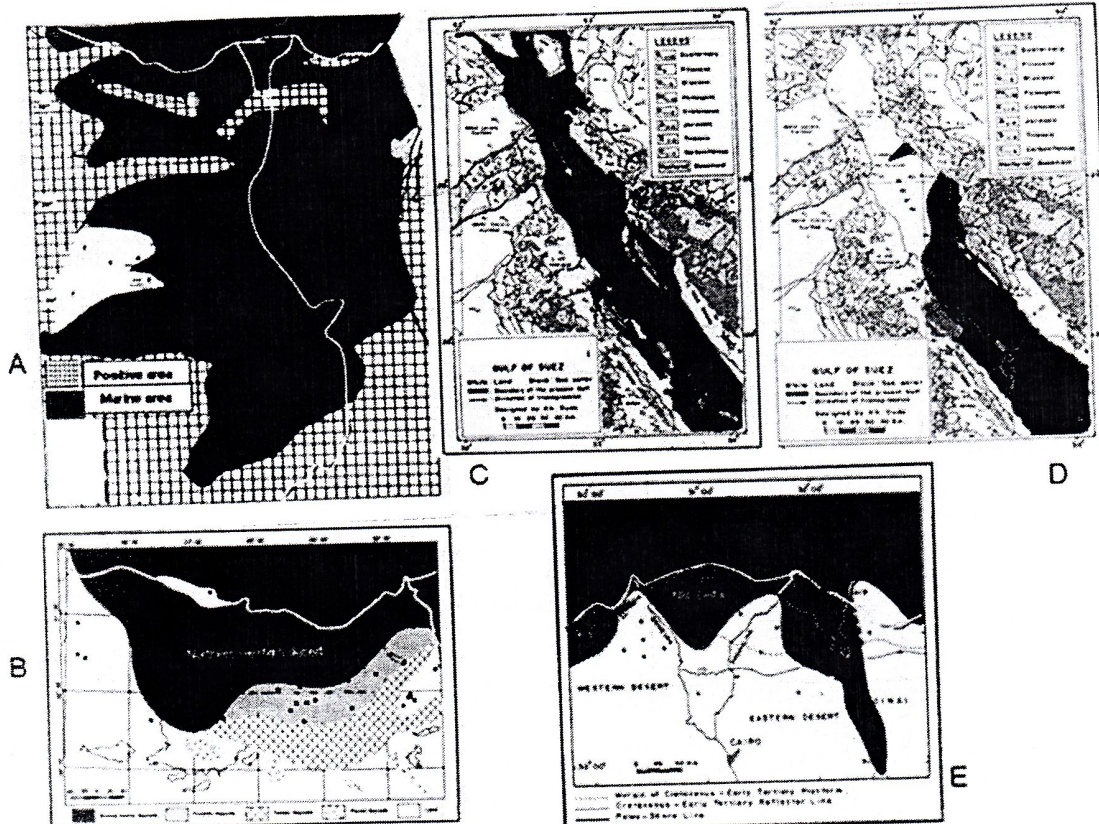
Question 5 (A&B): (10 Marks)

5-A: Look to the adjacent map (Map 1) and define:

- i-The name of district (1 mark)
- ii-The names of rock units and their equivalent ages which are given from 1 to 6. (4 Marks)

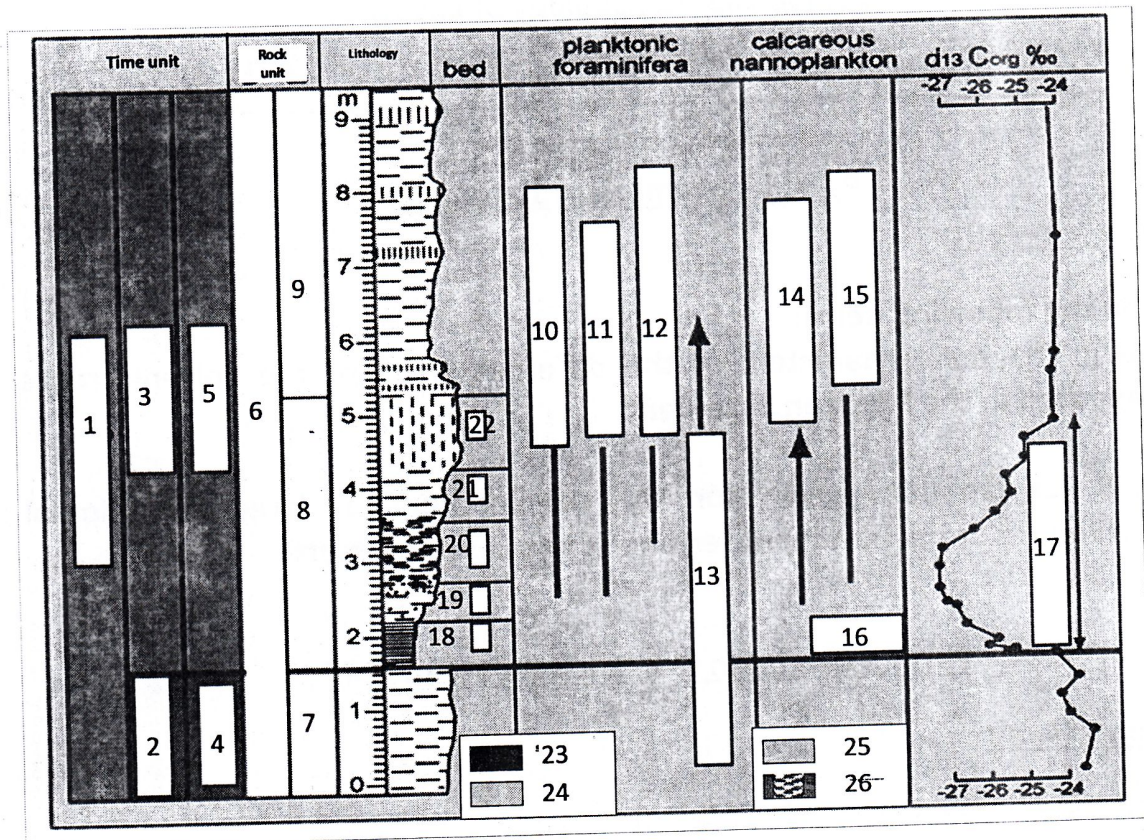


5B: Look to the following paleogeographic maps and define the Period, Epoch and Absolute age during which the Egyptian land was submerged in a way such as in figures A, B, C, D and E (5 Marks)



Question 3: (10 Marks)

If you know in the following table that No. 2 is the Paleocene Epoch and No. 3 is the Eocene Epoch in the GSSP of the P/E boundary, please identify the type locality of this boundary, and fill the remaining white spaces from 1 to 26 in the given table by appropriate litho-, chemo- and chronostratigraphic terms as well as characteristic bioevents which mark the this boundary.



Question 4: (10 Marks)

Define stratigraphically in a time table the different rock units of the Oligocene-Miocene Series in the Gulf of Suez region and correlate them with those of the northern onshore of the Red Sea coast. (10 Marks).

بسم الله الرحمن الرحيم

جامعة أسيوط

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قسم الجيولوجيا

Assiut University

Faculty of Science

Geology Department

إمتحان المستوى الرابع (شعبة جيولوجيا البترول)

مقرر 405 ج ب (جيولوجية مصر والإحتمالات البترولية)، أربع صفحات

Course 405 PG (Geology of Egypt)

الزمن : ساعتان

الدرجة: 50 درجة

دور يونيو 2018

الإمتحان في أربع صفحات

Part I (PreCambrian) 10 Markes

Question 1 (A & B):

Write on the following items:

1-A: The main characters of the different types of the volcanic rocks exposed in the Egyptian basement

1-B: Explanations given for the development of large-scale domal structures in the basement terrane of the Eastern Desert.

Part II (Cambrian to L. Cretaceous) 10 Marks

Question 2 (A-B):

Write on the following items: (10 Marks)

2-A: In a geological time table write the sub-surface Paleozoic rock units in northern of Western Desert. (7 Marks)

2-B: Compare between TWO only of the following statements: (3 Marks)

i- The Cenomanian sediments in north Sinai and Bahariya Oasis.

ii- Raisan Aniza and Mallaha formations..

iii- Triassic rocks at Sinai and Gilf El Kabeir Plateau.

Part III (Upper Cretaceous to Quaternary) 20 Marks

Answer TWO Questions only of the following:

جزء المملكة

السؤال الأول:

أجب عن ثلاثة فقط مما يلي (15 درجة)

1) اشرح مع الرسم دورة حياة فطر البوجو *Cystopus*.

2) بين مع الرسم أنواع البكتيريا الكروية .

3) عدد الأهمية الاقتصادية للطحالب .

4) أنكر فقط أقسام الفطريات وأسس تقسيمها .

السؤال الثاني:

أجب عن إثنين فقط مما يلي (10 درجات)

1) أنكر مع الشرح الأنواع الثلاثة للتكاثر الجنسي في الطحالب .

2) تكلم عن البكتيريا كيميائية التغذية غير العضوية .

3) ماتعرفه عن إثنين فقط مما يلي أكتب مع الرسم :

(a) الجراثيم الباذيدية Basidiospores .

(b) الأكياس الزقية Asci .

(c) فيروسات البكتيريا Bacteriophages .

"أطيب الأمنيات بالتوفيق والنجاح"
د/ خالد عبدالله

(9 درجات)

السؤال الرابع: اذكر ما تعرفه عن ثلاثة فقط مما يلي موضحا اجابتك بالرسم كلما أمكن:

1. التكاثر الجنسي لطحلب أخضر يتكاثر عن طريق تكوين أمشاج متشابهة.
2. البكتيريا كيميائية التغذية الذاتية.
3. التكاثر اللاجنسي في فطر الريزوبس *Rhizopus* sp.
4. الغشاء الخلوي والكبسولة في البكتيريا.

مع تمنياتي بالتوفيق والنجاح ،،،
د. مصطفى أحمد فوزي

ثانيا: تشريح النبات

(10 درجات)

السؤال الاول: ضع علامة صح او خطأ مع التصويب:

1. تتباين الخلايا الحجرية في أشكالها فمنها الشكل النجمي كما في ورقة الهاكيا. ()
2. تنزود الشعيرة الغدية بجدار رقيق وفجوة عصارية كبيرة ويتركب جدارها من السليلوز وتتغذى بمادة بكتات الكالسيوم. ()
3. يفتح الثغر المائي في الضوء ويفقد الماء من النبات في صورة سائل. ()
4. تفرز مادتي الهستامين ومادة الاستيل كولين من خلال الشعيرة اللاسعة. ()
5. يفرز اللين النباتي من خلال الخلايا اللبنيية وهي عبارة عن خلية واحدة عديدة الانوية. ()
6. تنشأ الالياف من اصل مرستيمى بينما تنشأ الخلايا الحجرية من اصل بارنشيمى. ()
7. يحتوى العصير الخلوى على أحماض عضوية ذائبة مثل حمض الليمونيك والتفاحيك. ()
8. تتميز النباتات ذوات الفلقة الواحدة بوجود طبقة الياف اسفل البشرة. ()
9. يعتبر كل من الكامبيوم الحزمى والكامبيوم الفلينى من الانسجة الانشائية الثانويه. ()
10. الشبكة الاندوبلازمية عبارة عن مجموعة من الخيوط التى تنتشر داخل العصير النووى. ()

(15 درجه)

السؤال الثانى: أكتب باختصار فى 5 نقاط فقط مما يأتى:

1. ميكانيكية فتح وغلق الثغور.
2. تركيب الجدار الخلوى مع ذكر أنواع النقر المختلفه.
3. اذكر أهم مميزات وأنواع الخلية الانشائية.
4. اذكر الانواع المختلفه للاحماض النوويه مع ذكر ميكانيكية عمل الجينات.
5. تركيب اللحاء وارتباط التركيب بالوظيفه.
6. التركيب التشريحي لساق نبات ذو فلقة واحدة.

د/إيمان صلاح الدابى

مع أطيب تمنياتي بالتوفيق

Faculty of Science Botany & Microbiology Department		كلية العلوم قسم النبات والميكروبيولوجي
المادة: نبات عام (١٠٠ ن). الزمن: ساعتان. درجة الامتحان: خمسون درجة.	امتحان الفصل الدراسي الثاني - العام الجامعي ٢٠١٧/٢٠١٨ المستوى الأول (نظام الساعات المعتمدة) تاريخ الامتحان: الخميس ٢٤ / ٥ / ٢٠١٨	

المملكة النباتية

السؤال الأول: اختر الاجابة الصحيحة المناسبة للعبارات الآتية: (٧.٥ درجات)

- ١- يتراوح نسبة..... من ٤٠-٩٠% وهو الذي يقرر الخواص الطبيعية للفيروس و يحدث الإصابة
أ- البروتين ب- بكتيريوفاج ج- البلازميد د- ال DAN الفيروسي
- ٢- يترسب..... علي طبقة الميورين في جميع انواع البكتريا الموجبة الجرام.
أ- الليكوسين ب- التيكويك ج- دهون عديدة التسكر د- الببتيدوجليكان
- ٣- يتكاثر فطر الخميرة جنسيا عن طريق تكوين جراثيم.....
أ- زقية ب- بازيدية ج- زيجوتية د- لا شئ مما سبق
- ٤- ينتمي طحلب الفيوثيريا الي مجموعة الطحالب.....
أ- البنية ب- الخضراء المزرقه ج- الخضراء المصفرة د- اليوجلينية
- ٥- وحدة الغشاء في الخلية البكتيرية تتمثل في.....
أ- الميتوكوندريا ب- الغشاء الخلوي ج- البلاستيدات د- جميع ما سبق

السؤال الثاني: ضع علامة () او (X) مع تصويب الخطأ: أجب عن خمسة فقط (٧.٥ درجة)

١. يكون فطر عيش الغراب جسم ثمري يسمى الابوسيزم Apocesium. ويحمل بداخله الاكياس الزقية ()
٢. تحتوي الطحالب الخضراء بالاضافة الي البكتريا علي نواة حقيقية و غلاف نووي ونوية. ()
٣. الفيروسات كائنات لاخلوية تقع علي الحد الفاصل بين النبات والحيوان . ()
٤. ظاهرة التزاوج الأوجامي هي ظاهرة تميز الطحالب الخضراء المزرقه مثل طحلب الفولفكس. ()
٥. Sarcina هي تجمعات لثمان خلايا بكتيرية في شكل مكعب ()
٦. المادة المختزنة من فائض عملية البناء الضوئي للطحالب الخضراء المصفرة هي الجليكوجين. ()

السؤال الثالث: قارن بين كل مما يلي (٤ درجة)

- ١- بدائيات النواه وحقيقيات النواه
- ٢- الخصائص العامة للطحالب البنية والطحالب الخضراء

السؤال الرابع: ناقش باختصار كل من: (٦ درجة)

- ١- دورة حياة الفيروسات البكتيرية
- ٢- الهمية الاقتصادية للبكتريا
- ٣- الجراثيم الجنسية واللاجنسية للفطريات

"أطيب الأمنيات بالتوفيق والنجاح"

د/ أسماء مصطفى معوض

باقى الاسئلة بالخلف جزء التشريح

أجب عن الأسئلة التالية:

السؤال الأول: ناقش بالتفصيل مع الرسم كلما أمكن أربعة فقط مما يأتى: (١٢ درجة)

- ١ - الأنواع المختلفة للنقر موضعا أهميتها بالنسبة للنبات.
- ٢ - الفرق بين الأنسجة الإنشائية الابتدائية والثانوية.
- ٣ - ميكانيكية فتح وغلق الثغور.
- ٤ - تركيب الجدار الخلوى للخلية النباتية.
- ٥ - أكتب ما تعرفه عن (الجليكوسيدات - اللب النباتى) .

(٥ درجات)

السؤال الثانى: أجب على كل مما يأتى:

- ١ - أكتب فى جدول وظيفة اثنين فقط مما يلى:
النسيج الاسكلرنشيمى - الثغور المائية - البلاستيدات عديمة اللون.
- ٢ - أذكر أى من عضيات الخلية:
 - تساهم فى اتمام عملية التنفس وتكوين الطاقة.
 - تلعب دوراً هاماً فى عملية البناء الضوئى.

(٨ درجات)

السؤال الثالث: وضح بالرسم والبيانات فقط (اثنين فقط) مما يأتى:

- ١ - الحزم الوعائية الجانبية.
- ٢ - الأنواع المختلفة للتغلظ فى أوعية الخشب.
- ٤ - الغدد الداخلىه كجهاز إفرازى فى النبات.

"أطيب الأمنيات بالتوفيق والنجاح"
د/ أمل وليم

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جزء التشريح

أجب عن الأسئلة التالية:

السؤال الأول: ناقش بالتفصيل مع الرسم كلما أمكن أربعة فقط مما يأتي: (١٢ درجة)

- ١- الأنواع المختلفة للنقر موضحا أهميتها بالنسبة للنبات.
- ٢- الفرق بين الأنسجة الإنشائية الابتدائية والثانوية.
- ٣- ميكانيكية فتح وغلق الثغور
- ٤- تركيب الجدار الخلوي للخلية النباتية.
- ٥- أكتب ما تعرفه عن (الجليكوسيدات - اللبن النباتي) .

(٥ درجات)

السؤال الثاني: أجب علي كل مما يأتي:

- ١- أكتب في جدول وظيفة اثنين فقط مما يلي:
- النسيج الاسكلرنشيمي - الثغور المائية - البلاستيدات عديمة اللون.
- ٢ - أذكر أى من عضيات الخلية:
- تساهم في اتمام عملية التنفس وتكوين الطاقة.
- تلعب دوراً هاماً في عملية البناء الضوئي.

(٨ درجات)

السؤال الثالث: وضح بالرسم والبيانات فقط (اثنين فقط) مما يأتي:

- ١- الحزم الوعائية الجانبية.
- ٢- الأنواع المختلفة للتغلظ في أوعية الخشب.
- ٤- الغدد الداخلية كجهاز إفرازي في النبات.

"أطيب الأمنيات بالتوفيق والنجاح"
د/ أمل وليم

باقى الاسئلة بالخلف

جزء المملكة

السؤال الأول:

أجب عن ثلاثة فقط مما يلي (15 درجة)

1) اشرح مع الرسم دورة حياة فطر البوجو *Cystopus*.

2) بين مع الرسم أنواع البكتيريا الكروية .

3) عدد الأهمية الاقتصادية للطحالب .

4) أنكر فقط أقسام الفطريات وأسس تقسيمها .

السؤال الثاني:

أجب عن إثنين فقط مما يلي (10 درجات)

1) أنكر مع الشرح الأنواع الثلاثة للتكاثر الجنسي في الطحالب .

2) تكلم عن البكتيريا كيميائية التغذية غير العضوية .

3) ماتعرفه عن إثنين فقط مما يلي أكتب مع الرسم :

(a) الجراثيم الباذيدية Basidiospores .

(b) الأكياس الزقية Asci .

(c) فيروسات البكتيريا Bacteriophages .

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د/ خالد عبدالله