



TANTA UNIVERSITY
FACULTY OF SCIENCE
GEOLOGY DEPARTMENT

Final EXAM for 3rd Level PETROLEUM & MINING GEOLOGY PROGRAM (PMGP)

Course title:	Sedimentary Rocks		CODE PMGE 3101
Date:	Mars 25, 2021	TERM: FIRST	TOTAL ASSESSMENT MARKS: 120
			TIME: 2 HOURS

PART (A) الحل في كراسة الإجابة

Write briefly on:

1- The direct and indirect measurements for grain size analyses.

(30 marks)

2- The differences between:

(30 marks)

- a- Roundness & Sphericity
- b- Fabric & Packing
- c- Porosity & Permeability

3- The most common types of Syndepositional (intrabed) primary sedimentary structures.

(30 marks)

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PART (B) الحل في النموذج الإلكتروني

Choose the correct answer for the following: (15 marks)

1. Sedimentary rocks are changed to sediments by:
 - A. Weathering and erosion
 - B. Cementation
 - C. Compaction
 - D. Heat and pressure

2. The angularity of the edges and corners of grains in a sedimentary rock is referred to as:
 - A. Roughness
 - B. Smoothness
 - C. Roundness
 - D. Abruptness

3. The process of reducing pore space by depositing younger sediments on top of older material is referred to as:
 - A. Dilation
 - B. Reduction
 - C. Contraction
 - D. Compaction

4. Lithification, the conversion of sediment to sedimentary rock, is a result of:
 - A. Evaporation and precipitation
 - B. Decomposition and compaction
 - C. Compaction and cementation
 - D. Weathering and erosion

5. The important difference in the clastic sedimentary rocks types: conglomerate, sandstone, shale and siltstone -- is:
 - A. Composition
 - B. Cement type
 - C. Particle size
 - D. Parent rock

6. The cement in a sandstone is typically the result of the precipitation of minerals like quartz and calcite from:
 - A. Organisms
 - B. Fauna
 - C. Flora
 - D. Solutions

7. Gravels are pieces of older rock material greater than:
- A. 2 mm
 - B. 4 mm
 - C. 64 mm
 - D. 256 mm
8. Which of the following types of currents can transport sand grains?
- A. Rivers
 - B. Wind
 - C. Ocean waves
 - D. All of the above
9. Porosity in a sediment or sedimentary rock is a measure of:
- A. The percentage of water contained in the material
 - B. The percentage of void space in the material
 - C. The percentage of petroleum contained in the material
 - D. The ability of water to be transmitted through the material
10. In which of the following sedimentary environments would you expect the sand deposits to be poorly sorted?
- A. Alluvial
 - B. Beach
 - C. Desert
 - D. Glacial
11. Rounding is:
- A. The grinding away of sharp edges and corners of rock fragments during transportation
 - B. The relative sphericity of a grain
 - C. Weathering of sharp edges and corners of bedrock exposed at Earth's surface
 - D. All of these
12. Cross-bedding observed in sand dunes can be used:
- A. To determine the direction the wind was blowing
 - B. To determine the speed of the wind
 - C. To determine the height of the sand dune
 - D. All of these
13. Graded beds are the result of deposition by:
- A. Rivers
 - B. Blowing wind
 - C. Moving ice
 - D. Turbidity currents

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14. A common mineral found in carbonate sedimentary rocks is
- A. Quartz
 - B. K-feldspar
 - C. Gypsum
 - D. Calcite
15. Which one of the following is a biochemical sedimentary rock?
- A. Sand sized material
 - B. Coal
 - C. Shale
 - D. Conglomerate

True & False

(10 marks)

Indicate whether the following statement is true or false

- 1- Sedimentary rocks may form from rock and mineral fragments from pre-existing metamorphic and igneous rocks.
- 2- Textures are fragments that make up rocks.
- 3- Graded bedding is often found in turbidites.
- 4- Symmetrical ripples can reveal the direction of current flow.
- 5- Mud cracks and graded bedding are useful for "right-side-up" determinations.
- 6- "Coal" is a biochemical sedimentary rock.
- 7- A clastic rock is a rock formed from the cementation of transported grains.
- 8- Most shells of marine organisms are composed of calcium sulfate.
- 9- Conglomerates consist mostly of angular fragments generally above 2 mm.
- 10- Shale is a non-clastic sedimentary rock chiefly made of calcium carbonate.

Matching

(5 marks)

- | | |
|--|--|
| 1. The conversion of sediment to sedimentary rock is a result of | A. formed from the cementation of transported grains |
| 2. A clastic rock | B. selective transport and deposition |
| 3. Sorting is a result of | C. coarsest below, getting finer upward |
| 4. Detrital sediments and rocks are classified by | D. compaction and cementation |
| 5. Graded bed | E. Grain size |



1969	COURSE TITLE:	SURVEYING AND FIELD MAPPING		COURSE CODE: PMGE 3105
DATE:	2 MARCH, 2021	TERM: FIRST	TOTAL ASSESSMENT MARKS: 180	TIME ALLOWED: 2 HOURS

Answer the following questions, illustrating with drawing when it possible**1) Compare between the following:- (60 marks)**





- a- Geographic coordinates and metric grids. (15 marks)
- b- P-Code and C-Code signals of GPS. (15 marks)
- c- Controlling and cross-section traverses in geological mapping (15 marks)
- d- Gravity and magnetic measurements as mapping tools. (15 marks)

2) Write BRIEFLY on the following:- (60 marks)

- a- Sources of GPS errors. (15 marks)
- b- Use of Air Photography as a mapping tool. (15 marks)
- c- Reconnaissance and regional geological maps. (15 marks)
- d- The basic sections of the geologic reports. (15 marks)

3) Choose the correct answer (45 marks)

- 1- The fundamental Lithostratigraphic unit is:
(A) Formation (B) Member (C) Bed (D) Group
- 2- Field description of Fossils must include: (A) Biostratigraphic purposes (B) Relative age
(C) Lateral relationships (D) Distribution and preservation
- 3- The main features of igneous rock samples that should be noted in the field are:
(A) Colour, texture, grain size and fabric (B) Mineralogy and chemical composition
(C) degree of homogeneity and rock shape (D) weathered surface and forms of igneous bodies
- 4- Factors controlling metamorphism: (A) Chemical composition (B) The change in temperature
(C) The change in pressure (D) All of them
- 5- The most important Sections of the geologic Report are:
(A) Figures, tables and plates (B) Introduction, geological history and conclusions
(C) References and figures (D) Format and appendix
- 6- A mass of igneous rock, typically lens-shaped, that has been intruded between rock strata causing uplift in the shape of a dome:
(A) Lopolith (B) Laccolith (C) Phacolith (D) Pluton
- 7- Texture of igneous rocks is primarily controlled by
(A) Mineralogic composition (B) Silica (SiO₂) content (C) Cooling rate (D) Rock chemistry
- 8- Conventions for graphic logs: (A) The vertical scale (B) The horizontal scale
(C) lithostratigraphic nomenclature (D) All of them
- 9- Type of metamorphism dominated mechanical deformation and chemical recrystallization and metamorphism occurs covering larger area. (A) Cataclastic (B) Burial (C) Contact (D) Regional
- 10- Metamorphic rock comprises equidimensional minerals viz. quartz and feldspars, non-foliated; show granulose structure. (A) Quartzite (B) Hornfels (C) Marble (D) Serpentine
- 11- The source of temperature during metamorphism is from:
(A) Magma (B) The depth factor (C) mechanical deformation (D) A and B

- 12- Coarse, relict, deformed crystals (porphyroclasts) set in a fine-grained, sometimes mylonitic matrix.
 (A) Porphyroblastic (B) Granoblastic (C) Porphyroclastic (D) A and B
- 13- Schistosity surfaces that are planar, or nearly so, along which the rock may break into tabular or platy fragments. (A) Gneissosity (B) Cleavage (C) Schistosity (D) Compositional layering
- 14- Concordant igneous bodies occur along the crests and troughs of the folded sedimentary strata.
 (A) Lopolith (B) Laccolith (C) Phacolith (D) Pluton
- 15- Field work with Shallow intrusions/hypabyssal rocks include.
 (A) Measure the thickness. (B) attitude and orientation of all intrusive sheets.
 (C) Record internal structures. (D) All of them.
- 16- All changes (physical & chemical) that occur to sediment following deposition, including compaction, cementation, and dissolution. (A) Diagenesis. (B) Lithification.
 (C) Deposition. (D) A and C.
- 17- Sediment is produced by the and of preexisting rock bodies.
 (A) Weathering and deposition (B) Erosion and lithification
 (C) Weathering and Erosion (D) Weathering and Diagenesis
- 18- Example of elastic sediments (A) Rudaceous Rocks (B) Ferruginous Rocks
 (C) Siliceous Rocks (D) Carbonate Rocks
- 19- Example of chemically formed sedimentary rocks (A) Rudaceous Rocks
 (B) Arenaceous Rocks (C) Siliceous Rocks (D) Argillaceous Rocks
- 20- Example of Organically formed sedimentary rocks (A) Carbonate Rocks
 (B) Arenaceous Rocks (C) Siliceous Rocks (D) Biochemical Rocks
- 21- Recording sedimentary Textures in field include
 (A) Grain-size, sorting and size-grading (B) Morphology of constituent grains
 (C) Grain Fabric (D) All of them
- 22- Example of post-depositional sedimentary structures
 (A) Bedding and lamination (B) Ripples (C) Cross-stratification (D) Convolute bedding
- 23- Example of depositional Sedimentary Structures
 (A) Load structures (B) concretions (C) Cross-stratification (D) Geodes
- 24- Example of Erosional sedimentary structures
 (A) Dish structures (B) Groove casts (C) Rain spots (D) Slumps
- 25- Symbol for shale (A)  (B)  (C)  (D) 
- 26- Description of hardness for sediment grains that are difficult to separate with a pen-knife and difficult to break with hammer.
 (A) Friable (B) Very hard (C) Hard (D) Extremely hard
- 27-for grain in sedimentary rock refers to their orientation and packing and to the nature of contacts between them
 (A) Sorting (B) Shape (C) Roundness (D) Fabric
- 28-is a measure of surface irregularity of grains in sedimentary rocks
 (A) Sorting (B) Shape (C) Roundness (D) Fabric
- 29- Igneous rock names are based on: (A) texture (B) mineralogic composition
 (C) Rock chemistry (D) All of them
- 30-is an extremely coarse-grained igneous rock (most crystals >5 cm) formed when magma cools *very slowly* at depth.
 (A) Andesite (B) Migmatite (C) Pegmatite (D) Granodiorite

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4) Put (T) in front of the Correct phrase and (F) in front of the Wrong phrase

(15 marks)

- 1- Intrusive igneous rocks form when magma solidifies underground. Granite is a common example
- 2- Recording sedimentary textures in the field should include grain-size, sorting, size-grading and grain fabric.
- 3- Igneous rocks can be named/classified in the field based on silica content.
- 4- Slate is metamorphic rock characterized by parallel alignment of moderately coarse grains and grains are visible by eye.
- 5- Drawing graphic log for lava sequences and volcanoclastic/pyroclastic sequences with lavas record the number of flows.
- 6- Granoblastic metamorphic rock is composed of crystals of the same size.
- 7- Serpentinite is a type of granofels that is typically very fine-grained and compact, and occurs in contact aureoles.
- 8- Lava is a form of molten rock that exists below the Earth's surface.
- 9- Sediment texture is concerned with the grain-size and its distribution, morphology and surface features of grains, and the fabric of the sediment.
- 10- Dike is a tabular intrusive structure that cuts across any layering in country rock.

EXAMINERS	Prof. Mohamed Abd El-Wahed	Dr. Samir Z. Kamh
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FINAL EXAMINATION FOR THIRD LEVEL PMGP STUDENTS (RESIT)

COURSE TITLE	GLOBAL TECTONICS		COURSE CODE: PMGE 3212
DATE: December 2020	SEMESTER: 1st	TOTAL ASSESSMENT MARKS: 120	TIME ALLOWED: 2 hrs

Answer the following questions:

(Illustrate your answers with drawing whenever necessary)

1. Write in detail in the following:

- a) Formation of mountains in light of the Geosynclines theory. (20 marks)
b) Basics of Global Wrench Tectonics model in comparison with the Plate Tectonics model (20 marks)

2. Discuss the following:

- a) Evidences for the concept of continental drift. (15 marks)
b) Role of convection cells in driving the tectonic plates. (15 marks)
c) Estimating past rates of tectonic plate velocities. (20 marks)
d) Mantle pluming and formation of triple junctions. (20 marks)

3. Read each of the following statements and mark either (√) if correct or (X) if wrong: (10 marks)

- a) Global geologic structures cannot be studied through direct observations. ()
b) Oceanic crust is much older than continental crust. ()
c) The continental "cratons/ shields" witnessed the full appearance of life. ()
d) According to Plate Tectonics, the oceanic crust is much thinner than continental crust. ()
e) The supercontinent **Laurasia** first broke into **Gondwana** in the southern hemisphere and **Pangaea** in the northern hemisphere. ()
f) According to continental drift model, the **Indian** Ocean is expanding while the **Pacific** Ocean is shrinking. ()
g) A **tectonic plate** consists of the rigid upper layer of mantle and the overlying crust. ()
h) The **Rodinia** supercontinent existed before the **Pangaea** supercontinent. ()
i) The **Appalachian** Mountains formed as a result of the collision of India against Asia. ()
j) There are 8 possible **triple** junction combinations in plate tectonics. ()

EXAMINERS	PROF. ABDELAZIZ L. ABDELDAYEM	



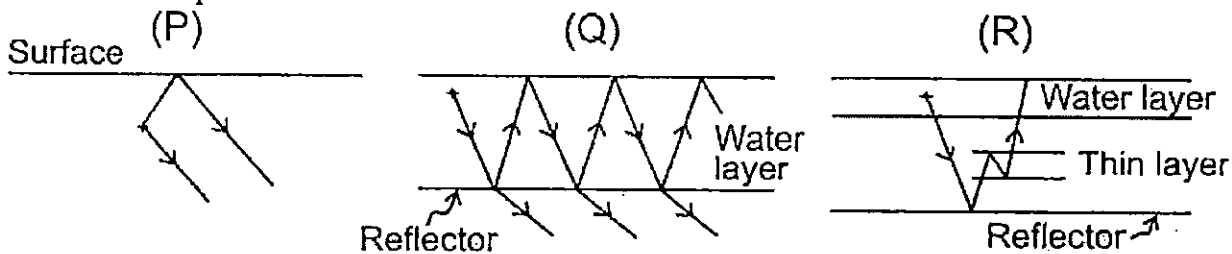
EXAMINATION FOR JUNIORS (THIRD YEAR) STUDENTS OF PETROLUEM AND MINING GEOLOGY PROGRAM

COURSE TITLE:	SEISMIC EXPLORATION		COURSE CODE: PMGE 3111
DATE:	7 MARCH, 2021	TERM: FIRST	TOTAL ASSESSMENT MARKS: 180
			TIME ALLOWED: 2 HOURS

PART 1 (One Hour – 90 Marks)

Answer the following questions

- 1- What does bright spot mean in Seismic Exploration? (15 Marks)
- 2- What are acoustic impedance, the reflection coefficient and the transmission coefficient? (15 Marks)
- 3- Choose the Best Answer (60 Marks)
 - 1- What is correct in the following?
 - a. Lower frequencies penetrate deeper but higher frequencies do not penetrate to deeper levels because Earth acts as a natural filter.
 - b. Higher frequencies penetrate deeper but lower frequencies do not penetrate to deeper levels because Earth acts as a natural filter.
 - c. Lower frequencies and higher frequencies do not penetrate to deeper levels because Earth acts as a natural filter.
 - 2- The dominant method worldwide in the exploration for oil and gas is the
 - a- refraction methods
 - b- reflection methods
 - c- refraction and reflection methods
 - 3- From the application of seismic exploration, we can obtain information about sand and gravel resources, rock competence siting drilling rigs.
 - a- True
 - b- False
 - 4- Seismic interpretation plays an important role in determination the place of an exploration well for hydrocarbons which will be drilled.
 - a- True
 - b- False
 - 5- What is correct in the following?
 - a. Subsurface features larger than the Fresnel zone usually cannot be detected using seismic waves.
 - b. Subsurface features smaller than the Fresnel zone usually cannot be detected using seismic waves.
 - c. Subsurface features larger or smaller than the Fresnel zone usually can be detected using seismic waves.
 - 6- From the following figure, choose the CORRECT multiple reflection events encountered in seismic exploration



- a- P is peg leg multiple, Q is ghost, R is long path multiple
- b- P is peg leg multiple, Q is simple multiple, R is reverberation .
- c- P is ghost, Q is reverberation, R is peg leg multiple



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EXAMINATION OF THIRD LEVEL OF PMGP STUDENTS

COURSE TITLE:	Seismic Exploration		Course Code: PMGE 3111
DATE:	MARCH 7, 2020	TERM: Frist	TOTAL ASSESSMENT MARKS:
			TIME ALLOWED: 1 HOURS

Answer of the following questions (Illustrate your answers with clear drawings).

Question (1):

(30 Marks)

Explain the time-distance curve in case of reflection method in two horizontal layers.

Question (2):

(30 Marks)

In case of refraction methods:

Mention the different ways for determines the depth in two horizontal layers.


Question (3):

(30 Marks)

Compare between the reflection and refraction methods.

EXAMINER

DR. MOATAZ KH. BARAKAT

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF GEOLOGY		
	EXAMINATION FOR JUNIORS STUDENTS OF GEOLOGY		
	COURSE TITLE:	SUBSURFACE GEOLOGY	COURSE CODE: PMGE3109
DATE:	11/3/ 2021	SEMESTER: SECOND	TOTAL ASSESSMENT MARKS: 180
			TIME ALLOWED: 2 HOURS

Answer the following questions (Sketch maps and diagrams should be drawn whenever possible):

(45 Marks)

1) Give reasons:

- Logging data are used to identify reservoirs.
- Facies analysis can be done using self potential or gamma ray logs.
- Most of oil production in the Gulf of Suez comes from the Miocene rocks.

2) Discuss the purposes of correlation of stratigraphic sequence and the methods used for lithologic correlation. **(25 Marks)**

3) What are the main differences between the following: **(30 Marks)**

- Structure contour map and isopach map.
- Percentage map and isolith map.

4) Write on of the followings:

(33Marks)

- Geochemical facies map.
- Ratio maps

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4- Put (✓) at the correct sentence and (X) at the wrong one: -

(46 marks)

- True thickness of a formation is obtained by multiplying drilling thickness with cosine of dip angle.
- Biofacies maps which enable the geologist to determine shelf, basin, and geosynclinals tectotopes.
- In a normal fault, the hanging wall moves down relative to the footwall along the dip of the fault surface.
- Lithofacies maps include ratio map and percentage map only.

- 5) Vertical thickness is the real thickness of bed.
- 6) The clastic ratio sometimes used for the determination of the fossil content.
- 7) Geochemical facies maps include ratio maps and isolith maps.
- 8) The basins of deposition are of various characters some are tectonically active, others are tectonically semiactive or inactive.
- 9) Both the clastic and sand-shale ratios range from zero to infinity.
- 10) Isopach map displays lines of equal thickness in a layer, where the thicknesses are measured perpendicular to the layer boundaries.
- 11) Exploration is considered as the work aiming at finding the economic deposits, not to find it but only to establish the conditions of its probable existence.
- 12) Geophysical survey depend on the elements, their distribution, frequency and mobility.
- 13) Structure contour map shows the variation in thickness of sedimentary unit.
- 14) The determination of facies and facies changes is very important in subsurface work, and in prospecting and exploration of petroleum.
- 15) The basin and environment of deposition can be defined from subsurface geologic maps interpretation.
- 16) Tectofacies map shows the areal variation in biologic aspect of a stratigraphic unit.
- 17) Source of Information for the subsurface is gained by geophysical and geochemical methods only.
- 18) The clastic ratio differentiates between areas of chemical activity and those of mechanical deposition.
- 19) The simplest block diagram shows a surface area and two geologic cross sections on the forward vertical faces of the block.
- 20) Isolith map shows percentage of any lithology with respect to the total thickness.
- 21) Percentage map differentiate between near shore deposition and slight deep marine environment.
- 22) The main types of drilling are structural and stratigraphic drilling only.
- 23) Isopach map may indicate the paleotopography of the basin floor.

EXAMINERS	PROF. DR.NADER EL GENDY	DR. SHADIA ABD EL REHIM
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	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF GEOLOGY			
	EXAMINATION FOR LEVEL 3 STUDENTS OF PETROLEUM & MINING GEOLOGY PROGRAM			
	COURSE TITLE:	Engineering Geology		COURSE CODE: PMGE 3113
DATE:	MARCH 14, 2021	TERM: FIRST	TOTAL MARKS: 120	TIME ALLOWED: 2 HOURS

I-Write on the following:-

(30 points)

- a- The scope work for an engineering geologist in engineering projects.
- b- Atterberg Limits (Soil consistency)
- c- Geological causes of landslides

II- Compare between the following:-

(30 points)

- a- Electrical and seismic methods in subsurface site investigation.
- b- Gravity and arch dams.
- c- Advantages and disadvantages of the High Dam.

III- Discuss briefly the types and characteristics of slope process?

(30 points)

IV- Match TEN words only from column (A) with column (B): (30 pts)

Column (A)

Column (B)

- | | |
|--------------------------|---------------------------------------|
| 1- UCS | - Embankment Dam |
| 2- Buttress Dam | - Strong rocks |
| 3- Reservoir | - Interplay between two forces |
| 4- Transportation Tunnel | - Safe load upon rock |
| 5- Soil Classification | - Weak rocks |
| 6- Slope stability | - Strength of a rock in one direction |
| 7- Aswan Dam | - Martyr Ahmed Hamdy |
| 8- Clay | - Suitable for wide & narrow valley |
| 9- SBP | - Lake Nasser |
| 10- Granite | - Grain size |

Examiners

Prof. Mohamed Atef Noweir

(الجزء الألكتروني) الرجاء الاجابة في النموذج المخصص للتصحيح الألكتروني

4- Put (✓) at the correct sentence and (X) at the wrong one: -



(30 marks)

- 1- Porosity in well sorted rocks is larger than it in poorly sorted ones.
- 2- Both temperature and porosity increase with increasing depth.
- 3- Formation resistivity factor is directly proportional to porosity.
- 4- Porosity that origin from redeposition and cementation is a primary porosity.
- 5- A reservoir rock is that contain disconnected pores.
- 6- Cementation factor (m) value varies with grain size only.
- 7- The permeability and porosity of reservoir rocks are of highly importance in determining the reservoir storage capacity and fluid productivity.
- 8- Bulk density of rocks are often controlled more by the porosity only.
- 9- Horizontal permeability is usually measured perpendicular to the bedding planes of the reservoir rock.
- 10- Rounded grain decrease the porosity, while the angularity increase it.
- 11- The porosity of the rock will depends on its depth and age.
- 12- The size, form and orientation of clasts or minerals is called rock texture.
- 13- Compaction and cementation increase permeability and porosity.
- 14- The bulk density of limestone equal to 2.1 gm /cm^3 .
- 15- Carbonate reservoir rocks commonly have a more secondary porosity than sandstone.
- 16- Bulk density of igneous and metamorphic rocks more than bulk density of sandstone.
- 17- Lower salinity of pore fluid and add clay minerals are considered factors for increase resistivity of rocks.
- 18- The effective permeability is the ratio between the relative and the absolute permeability.
- 19- The rock is considered as reservoir if its permeability greater than 1mD.
- 20- In poor quality reservoir both displacement pressure and irreducible water saturation are high.

EXAMINERS

PROF. DR.NADER EL GENDY

DR. SHADIA ABD EL REHIM

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF GEOLOGY Petroleum & Mining Geology Program (PMGP)			
	Final Exam For The Third Level of PMGP Students			
Examiners: Prof. I. Salem Prof. B.el-desouky	COURSE TITLE : ECONOMIC GEOLOGY		COURSE CODE: PMGE 3107	
DATE: 21 -3-2021	FIRST	Total Assessment: 140 marks	Time allowed: 120 mins.	

Part One :Answer the following questions ,illustrate your answer with drawing: (100 marks)

- 1-Criteria of metasomatic replacement,Structural and Sedimentary features in localizing hyderothermal deposits.
- 2-Early magmatic segregation and Complex pegmatites.
- 3- Reactions between wall rocks and fluids.
- 4-Relation of contact metasomatism to intrusion and mineral paragenesis.
- 5-Write short notes on:
 - a-Cavity filling.
 - b-Carbonatization and propylitic alterations.
 - c-Classification of mineral deposits in Egypt according to Hilmy and Hussein,1978.
 - d-Immiscible liquid segregation.

Part Two : 1-Write on the following ,illustrating your answer with drawing if it possible : (40 marks)

- a-Oxidation and supergene enrichment.
- b-- Requirements of deposits related to sedimentation.
- c-Fence diagram .
- d- Iron and manganese cycles .