



Final Examination in (Crystal Growth 354F) for the (3ed year)

Exam date: (28/8/2025)

Time allowed: 3hr

Answer five questions from the following:

1- Write short notes on:

- (a)- Crystallization by solute diffusion (b) - Crystallization by vapor diffusion
- (c)- Why crystals grow at different rates in different directions and why different crystals have different shapes and sizes?

2- Define each of the following:

- (a)- Perfect crystal (b) - Unassisted nucleation (c)-Crystal habit
- d) Why the choice of crucible material is of fundamental importance in melt techniques for growing single crystals.

3- (a)- Explain the slow cooling method of growing single crystals with an example.

- (b)- Explain in detail the Bridgeman method of growing single crystals with necessary diagrams. List its merits and demerits.

4- Write on three from the following: (a)-The difference between *Kyropoulos* and Czochralski methods used for growing single crystals from melt. (b)- The Verneuil method (c) - The floating zone method (d)- Seeding process and the formation of the molten zone in LHPG technique.

5- (a)- Sketch within a cubic unit cells: the simple cubic, body centered cubic and face centered cubic.

- (b)- Consider the seven Bravais lattices. What is the relationship between their lattice vectors (lengths and angles)?

6- (a)- Derive Bragg's Law which describes the condition for constructive interference when X-rays, interact with a crystal lattice,

- (b)- A beam of X-rays is incident on a NaCl crystal with lattice spacing 0.282 nm. Calculate the wavelength of X-ray if the first order Bragg's reflection takes place at a glancing angle of $8^{\circ}35'$.

Best Wishes

Prof. Dr. Abdulaziz Abualfadl

J. Which one of the following can NOT be determined from an understanding of the conditions under which sedimentary rocks form.....

1. environment of deposition.
2. origin of the rock's component particles.
3. age of the rock.
4. both (3) and (4).

K. The sedimentary basin is a low area in the Earth's crust of

1. tectonic origin.
2. stratigraphic origin.
3. sedimentary origin.
4. paleontologic origin.

L. Basin relief can be created mechanically on a regional scale by.....

1. thermal or flexural ways.
2. by a combination of those two effects.
3. both (1) and (2).
4. none of the above.

M. Basins are separated from another by.....

1. raised linear areas termed arches, paleohighs, schwelle, axis of uplift, or positive areas.
2. artificial dams constructed by man.
3. natural lakes and forests.
4. both (1) and (4).

N. The physical parameters of sedimentary environments include.....

1. the velocity, direction and variation of wind, wave and flowing water.
2. the climate (temperature, snowfall, rainfall and humidity)
3. the weather of the environments.
4. all the above.

O. The sedimentary environments are characterized by.....

1. physical, chemical and biological processes.
2. geometrical properties of sediments.
3. primary properties of sediments in terms of mineralogy and chemistry.
4. derived properties of sediments like porosity, permeability, grain size etc.
5. all the above.

P. The continental environments are those environments which are present on the terrestrial plains of continents and include the following sub-environments except.....

1. fluvial environments (rivers).
2. lacustrine environments (lakes)
3. aeolian environments (deserts).
4. reefs (coral reefs).

Q. Windblown sand forms sand dunes that are characterized by.....

1. well-sorted grains.
2. large-scale cross bedding.
3. different types with variable sizes and shapes.
4. all the above.

R. Beaches, tidal-flats, spits, bars, barrier islands, lagoons, estuaries, and deltas all form in

1. transitional environment.
2. marine environment.
3. continental environments.
4. both (1) and (2).



Third Level Examination in

Sedimentary Rocks and Sedimentary Environment (327G.)

Time: Two Hour

(Total 50mark)

27-Aug -2025

PART I

Sedimentary Rocks

(Total 25 mark)

I- Complete the Following

(1 mark for each question)

- 1- **Matrix** is fine material which fills the among the particles.
- 2- The minor or **micro relief** features of the quartz grains are termed such as
- 3- **Cement** is post- depositional in the among the grains and matrix.
- 4- **Roundness** refers to the of the of the clastic grains.

II- Choose the correct answer of the following:

(1 mark for each question)

5. **What is the difference between a breccia and a conglomerate?**
 - a. breccias are coarse grained and conglomerates are fine grained
 - b. breccias have rounded fragments and conglomerates have angular fragments
 - c. breccias have angular fragments and conglomerates have rounded fragments
6. **The process not contributing to clastic rocks is**
 - a. Weathering
 - b. Oxidation
 - c. Erosion
 - d. Deposition
7. **Shale refers to a rock formed from:**
 - a. sand sized material
 - b. plant remains
 - c. clay minerals
 - d. carbonate
8. **Which one of the following is a biochemical sedimentary rock?**
 - a. sand sized material
 - b. coal
 - c. shale
 - d. conglomerate
9. **A clastic rock is:**
 - a. a rock formed from the cementation of transported grains
 - b. rock formed from evaporation of sea water
 - c. transformed by heat into limestone
 - d. transformed by pressure into limestone
10. **Which of the following lists is written in order of decreasing particle size?**
 - a. sandstone, siltstone, conglomerate
 - b. sandstone, conglomerate, siltstone
 - c. conglomerate, sandstone, siltstone
 - d. siltstone, sandstone, conglomerate
11. **What is the difference between a breccia and a conglomerate?**
 - a. breccias are coarse grained and conglomerates are fine grained
 - b. conglomerates are coarse grained and breccias are fine grained
 - c. breccias have rounded fragments and conglomerates have angular fragments
 - d. breccias have angular fragments and conglomerates have rounded fragments
12. **Compaction and cementation are two common processes associated with:**
 - a. erosion
 - b. transportation
 - c. sedimentation
 - d. lithification

13. Which of the following is not a type of sandstone?

- a. arkose
- b. graywacke
- c. orthoquartzite
- d. all of these are types of sandstone

III-Write about **TWO** questions **ONLY** of the following:

(6 mark for each question)

(Illustrate your answer by diagrams)

- 14. Surface textures of clastic quartz grains
- 15. Petrographic classification of limestone.
- 16. Non-clastic textures of sedimentary rocks.

PART II

Sedimentary Environment

(Total 25 mark)

First Part: (multi-choice questions. 15 marks)

1. Natural levees result when.....

- A. Streams flood their banks and deposit sediment directly on top of the banks.
- B. Streams erode downward in their channel, leaving their banks higher relative to the surface of the stream.
- C. Hard, erosion-resistant rocks become part of a stream's banks. Smaller streams flow parallel to a main stream and deposit material on the stream bank.
- D. None of the above.

2. A sedimentary facies is defined as.

- A. A mass of sedimentary rock which can be defined and distinguished from others by its geometry, lithology, sedimentary structures, paleocurrents and fossils.
- B. A sedimentary facies is the product of a depositional environment, a special kind of sedimentary environment.
- C. A sedimentary facies is defined as any aerially restricted part of a designated stratigraphic unit which exhibits characters significantly different from those of other parts of the unit.
- D. All the above.
- E. Both (b) and (c).
- F. None of the above.

3. A meandering river channel.....

- A. usually has a relatively narrow and deep cross section.
- B. usually is the most common type of natural channel in the world.
- C. usually is dominated by suspended load sediment types.
- D. usually is found only in arid climate regions.
- E. usually has a gentler longitudinal gradient than a braided stream

4. Braided streams with, large amounts of very coarse bed-load sediments, deposit what bed-form.....?

- A. Point bars.
- B. Mid-channel bars.
- C. Levees.
- D. Both (B) and (D).

5. **A braided river channel**
 - A. Usually has a relatively narrow and deep cross section.
 - B. Usually is the most common type of natural channel in the world.
 - C. Usually is dominated by suspended load sediment types.
 - D. Usually is found only in arid climate regions.
 - E. Usually has a steeper longitudinal gradient than a meandering stream.
6. **Where do deltas form?**.....
 - A. At the start of a river.
 - B. Where a river empties into a larger body of water.
 - C. At the point where two rivers join together.
 - D. All the above.
7. **The term aeolian refers to**.....
 - A. Stream-related processes.
 - B. Glacial processes in areas outside the polar regions.
 - C. Erosion, transportation, and deposition by the wind.
 - D. None of the above.
 - E. All the above.
8. **The sediments of a delta in any stratigraphic sequence are detected by**.....
 - A. Volcaniclastic grains.
 - B. Coarsening upward sequences, sometimes in repeated cycles.
 - C. Fining upward sequences with continental fossil remains.
 - D. Both (B) and (C).
9. **Which of the following may be indicative of sediment deposition in a non-marine terrestrial environment**.....
 - A. Red colored sediments and traces of plant roots.
 - B. Calcareous ooze.
 - C. Manganese nodules and crusts.
 - D. All the above.
10. **If you were to walk from a beach out into the open water, what would happen to the size of grains you walk over ?**
 - A. The grains would get progressively finer as you walk out into the open water.
 - B. The grain size would decrease as you move out, and then increase as you get closer towards the deepest parts of the ocean.
 - C. There would be no change in the grain size of the particles as you walk out to sea.
 - D. Both (A) and (C).
11. **Which of the following lists includes the three most common sedimentary environments**.....?

A. Fluvial, aeolian, marine	B. Continental, alpine, oceanic
C. Land, sea, air.	D. Continental, marine, abyssal
E. Continental, marine, transitional.	
12. **Continental environments include all of the following except**.....

- | | | |
|-----------------|----------------|-----------------------|
| A. Lake beds. | B. River beds. | C. Glacial deposits. |
| D. Coral reefs. | E. Deltas. | F. None of the above. |

13. A sedimentary facies is defined as.....

- A. A mass of sedimentary rock which can be defined and distinguished from others by its geometry, lithology, sedimentary structures, paleocurrents, and fossils.
- B. A sedimentary facies is the product of a depositional environment, a special kind of sedimentary environment.
- C. A sedimentary facies is defined as any areally restricted part of a designated stratigraphic unit which exhibits characters significantly different from those of other parts of the unit.
- D. All the above.
- E. Both (A) and (B).
- F. None of the above.

14. The Carbonate Compensation Depth (CCD) is

- A. The zone in the oceans where organisms with calcite skeletons live
- B. The depth in the ocean where calcium carbonate is supersaturated
- C. The depth in the ocean where oxygen is at a minimum
- D. The depth in the ocean where calcium carbonate is undersaturated
- E. Both (B) and (C).
- F. None of the above

15. Trace fossils (biogenic sedimentary structures) are used as facies diagnosis because.....

- A. Trace fossils occur in situ and are not transported from outside the sedimentary basin.
- B. Recent and ancient sediments show that various assemblages of trace fossils are specific to environments and have changed little through geological time.
- C. It is not always easy to be sure that a fossil lived in or on the sediment in which it was buried.
- D. both (a) and (b).
- E. None of the above.

Second Part: (True or false, one mark for each question)

1. The lateral migration of a meandering channel erodes the inner convex bank, scours the river bed, and deposits sediment on the outer concave bank as point bar deposits consisting primarily of massive sandstones.

A. True	B. False
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2. D. A meandering river system has a unidirectional current flow; marine tidal channels have bidirectional but aeolian environment has polydirectional current flow.

A. True	B. False
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3. The geometry is the two-dimensional shape of a sedimentary environment, which is a function of syn-depositional topography, the geomorphology of the depositional environment and its post-depositional history.

- A. True B. False
4. Thick sequences of red-colored interbedded conglomerates, sands, and shales devoid of marine fossils and showing fining upward are generally believed to be deltaic in origin.
A. True B. False
5. Fossils are the most useful tools in paleoenvironmental reconstructions. However their applications are highly limited in Precambrian rocks.
A. True B. False
6. Fining upward sequence means that the grain size is decreasing upward, whereas coarsening upward means that the grain size is increasing upward.
A. True B. False
7. Beaches, tidal-flats, spits, bars, barrier islands, lagoons, estuaries, and deltas all form in the transitional environment.
A. True B. False
8. Sedimentary facies generates depositional environments.
A. True B. False
9. The coarser the grain size the higher the energy level of the depositing current and the better the sorting the more prolonged its action.
A. True B. False
10. A vertical section through the apex of a delta thus reveals a gradual vertical increase in grain size
A. True. B. False.

GOOG LUCK

Prof. Dr. Ahmed Reda El YOUNSY

27-Aug -2025

Prof. Dr. Abdalla El Ayat



Answer the following questions (NOTE: Exam in TWO pages) (50 Marks)

Q1: Choose the best correct answer: (10 Marks: 1 Mark for each)

- 1- Marble is a metamorphic rock that forms from a _____ parent.
a- granite b- limestone c- shale d- sandstone
- 2- What is the most prominent textural feature of regional metamorphic rocks?
a- foliation b- bedding c- cataclasis d- ripples
- 3- Which of the following metamorphic rocks cannot form from a shale?
a- schist b- hornfels c- slate d- marble
- 4- Which of the following index minerals forms at the highest metamorphic grade?
a- chlorite b- sillimanite c- biotite d- actinolite
- 5- Which of the following rocks represents the highest metamorphic grade?
a- slate b- schist c- phyllite d- gneiss
- 6- Low temperature (300-500°C) and pressure (3-8 kb) facies of regional metamorphism, characterized by minerals chlorite, epidote and actinolite.
a- greenschist b- blueschist c- eclogite d- zeolite
- 7- texture is porphyroblasts with a very high density of inclusions.
a- Poikiloblastic b- slaty cleavage c- schistosity d- corona
- 8- are shells surrounding a crystal of another composition consisting of one or several phases.
a- Poikiloblastic b- slaty cleavage c- schistosity d- coronas
- 9- texture is a microtexture in which the crystal is randomly oriented.
a- Decussate b- hornfelsic c- kink bands d- augen structure
- 10- Some gneisses have large eye-shaped grains (commonly feldspar) that are derived from pre-existing large crystals by shear.
a- ribbon structure b- augen structure c- mica fish d- mortar

Q2: Write short notes on only FOUR from the following with illustrations if possible. (20 Marks: 5 Marks for each)

- 1- Metasomatism
- 2- Kink bands
- 3- Blueschist facies
- 4- Corona texture
- 5- Schistosity texture

Q3: Discuss the following with illustrations if possible. (20 Marks: 10 Marks for each)

- 1- Mineral composition of metamorphic rocks according to the metamorphic grade.
- 2- Facies of regional metamorphism.

Good luck ...

Dr/Eman Saad

Geology Department Faculty of Science Assiut University		Time: 2 hours September 2025 Summer Semester 2025
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Sedimentary environments & sedimentary basins (335G)

Students: 3rd level of Geology

Part one (20 marks, one mark for each question)

A. When rivers enter large bodies of standing water they typically debouche their loads forming.....?

1. submarine fans. 2. deltas. 3. sand dunes. 4. none of the above.

B. In which type of environment would you be most likely to observe wind erosion.....?

1. high mountain. 2. a hot desert. 3. a rocky sea shore. 4. all the above.

C. Which of the following environments is an example of a shoreline/transitional environment

1. continental shelf. 2. delta. 3. organic reef. 4. none of the above.

D. The term "aeolian" refers to transport and deposition by.....

1. the wind. 2. ocean waves. 3. pocket gophers. 4. polar glaciers.

E. Of the following terms, which is considered to be a sedimentary structure.....?

1. graded bedding. 2. ripple marks. 3. cross bedding. 4. all of the above.

F. Where do deltas form.....?

1. at the start of a river. 2. where a river empties into a larger body of water.
3. at the point where two rivers join together. 4. none of the above.

G. Which of the following lists includes the three most common sedimentary environments.....?

1. fluvial, aeolian, marine. 2. land, sea, air.
3. continental, marine, transitional. 4. both (1) and (3).

H. Geologic processes powered by the running water in rivers are called

1. barchan. 2. coriolis. 3. aeolian. 4. fluvial.

I. Which of the following can be used to determine the direction of the ancient current.....?

1. wave-formed ripple marks. 2. cross-bedding.
3. all of the above. 4. none of the above.

J. Which one of the following can NOT be determined from an understanding of the conditions under which sedimentary rocks form.....

1. environment of deposition.
2. origin of the rock's component particles.
3. age of the rock.
4. both (3) and (4).

K. The sedimentary basin is a low area in the Earth's crust of

1. tectonic origin.
2. stratigraphic origin.
3. sedimentary origin.
4. paleontologic origin.

L. Basin relief can be created mechanically on a regional scale by.....

1. thermal or flexural ways.
2. by a combination of those two effects.
3. both (1) and (2).
4. none of the above.

M. Basins are separated from another by.....

1. raised linear areas termed arches, paleohighs, schwelle, axis of uplift, or positive areas.
2. artificial dams constructed by man.
3. natural lakes and forests.
4. both (1) and (4).

N. The physical parameters of sedimentary environments include.....

1. the velocity, direction and variation of wind, wave and flowing water.
2. the climate (temperature, snowfall, rainfall and humidity)
3. the weather of the environments.
4. all the above.

O. The sedimentary environments are characterized by.....

1. physical, chemical and biological processes.
2. geometrical properties of sediments.
3. primary properties of sediments in terms of mineralogy and chemistry.
4. derived properties of sediments like porosity, permeability, grain size etc.
5. all the above.

P. The continental environments are those environments which are present on the terrestrial plains of continents and include the following sub-environments except.....

1. fluvial environments (rivers).
2. lacustrine environments (lakes)
3. aeolian environments (deserts).
4. reefs (coral reefs).

Q. Windblown sand forms sand dunes that are characterized by.....

1. well-sorted grains.
2. large-scale cross bedding.
3. different types with variable sizes and shapes.
4. all the above.

R. Beaches, tidal-flats, spits, bars, barrier islands, lagoons, estuaries, and deltas all form in

1. transitional environment.
2. marine environment.
3. continental environments.
4. both (1) and (2).

S. Sedimentary basins are filled with strata deposited entirely in.....

1. terrestrial environments.
2. other basins are filled with strata deposited below sea level in marine environments.
3. many basins include both kinds of sediments.
4. all the above.

T. In plan view sedimentary basins may be approximately.....

1. circular, or more frequently elongate depressions, troughs, or embayments.
2. but often they may have quite irregular boundaries.
3. all the above.
4. none of the above.

Part Two (15 marks, one mark for each question)

1. Deltas are among the most significant marine environment deposits. They occur when two rivers meet together and slow down abruptly dropping their sediment load.

- a. True.
- b. False.

2. A sedimentary basin has an axis, a line connecting the lowest structural points of the basin.

- a. True.
- b. False.

3. Sedimentary facies is defined as the place of deposition and physical, chemical, and biological conditions that characterize the depositional setting.

- a. True.
- b. False.

4. The biological parameters of an environment include the composition of waters and the geochemistry of the rocks in the catchment's area of a terrestrial environment.

- a. True.
- b. False.

5. Environments of equilibrium are surfaces of the earth, both on the land and under the sea, which for long periods of time are neither sites of erosion nor of deposition.

- a. True.
- b. False.

6. Erosional sedimentary environments also occur on cliffed coastlines and, under the sea, in submarine canyons and on current-scoured shelves.

- a. True.
- b. False.

7. The marine environments are those environments which are present on the terrestrial plains of continents such as fluvial environments (rivers), lacustrine environments (lakes), aeolian environments (deserts), and coral reef environments.

- a. True.
- b. False.

8. Wind is an effective sorting agent and will selectively transport sand. Gravel is left behind and dust-sized particles are lifted high into the atmosphere and transported great distances
a. True. b. False.
9. Lacustrine (lake) deposits are very well sorted, devoid of coarse particles such as coarse sand or gravels, and are characterized by thin layers that reflect annual deposition of sediments.
a. True. b. False.
10. In plan view sedimentary basins may be approximately circular or more frequently elongate depressions, troughs, or embayments.
a. True. b. False.
11. Aulacogen is an active arm of a three-armed rift system, one of whose arms continued to evolve to form ocean basins.
a. True. b. False.
12. The depocenter of the basin is the part of the basin with the thickest sedimentary fill.
a. True. b. False.
13. Sedimentary basins are separated from another by raised linear areas termed arches, paleo-highs, schwelle, or positive areas.
a. True. b. False.
14. Embayments are sedimentary basins that are not completely closed structurally, but which open out into a deeper area.
a. True. b. False.
15. On a small scale, hundreds to thousands of meters laterally, fault movements can create relief of hundreds to thousands of meters, resulting in small but often deep basins.
a. True. b. False.

Part three (15 marks, 5 marks for each question)

Write in detail on the following items:-

1. Formation of sedimentary basins by thermal method only.
2. Environments of erosion, equilibrium and deposition.
3. Failed arm (Aulacogen).

Good Luck

Prof. Dr. Abdalla El Ayyat

University of Assiut
Faculty of Science
Department of Geology

3rd Level Examination for Geology, Geophysics and Geochemistry students
In Field Geology (306G)

Time: Two Hours

50 Marks

Summer Term, 2025

ملحوظة هامة: الامتحان يتكون من صفتين

Answer the following question:

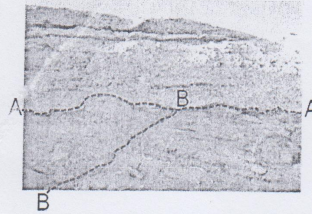
1- First Question (10 Marks)

- Summarize the contact boundaries between the different rocks units illustrating your answer by drawing.

2- Second Question (10 Marks)

- i- Redraw the field photograph at the right hand side, then answer the following questions:
(5 Marks)

- a- The line A-A represents
- b- The line B-B represents
- c- Interpret in a brief report the geologic history of the field photograph.



- ii- Discuss the stratigraphic-cross section, illustrate your answer by drawing.
(5 Marks)

3- Third Question (10 Marks)

- i- Write on one only of the following: (5 Marks)

- a- The field criteria of faults. (2.5 Marks)
- b- Tools and equipments of the geological field mapping. (2.5 Marks)

- ii- Define the following concepts: mud cracks - load casts (2.5 Marks)

- iii- Write short notes on the main terms of pyroclastic, Tuffites and Epiclastic rocks.
(5 Marks)

3- Fourth Question (10 Marks)

- Describe the main types of calderas.

4- Fifth Question (10 Marks)

- Write short notes on the following items: (10 Marks, 2.5 Marks for each one)

- a- Slaty Cleavage b- Crenulation Cleavage
- c- Slip Cleavage. d- Fracture Cleavage.

GOOD LUCK

Prof. Dr. Ali A. Khudier

Prof. Dr. Nageh A. Obaidalla